ISBN-978-93-5396-250-0

2020 NATIONAL CONFERENCE

Industry 4.0 (NCI-4.0)

29th February 2020, Saturday

THE WORLD IS REALIZING THE POWER OF INDUSTRIAL & TECHNOLOGICAL INNOVATION

Conference Proceeding

Technically Sponsored by

Computer Society of India

In Association With

International Journal of Research Trends in Computer Science & Information Technology (IJRTCSIT) (http://www.ijrtcsit.org)

Sponsored by

CETPA

Supported by

iNURTURE Education Solutions | Microsoft | IBM

Prof. Raghuvir Singh
Conference Chairman

Dr. Rakesh Kr. Dwivedi
Conference Director

Mr. Namit Gupta
Convener

Organized By

Faculty of Engineering & Computing Sciences

Teerthanker Mahaveer University, Moradabad

http://tmu.ac.in/

https://www.nci.tmu.ac.in/

Contents

Message of the Chancellor

It gives me immense pleasure that Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad is going to organize National Conference on Industry 4.0 (NCI-4.0) on 29th February 2020.

A conference is organized for the exchange of views and innovative ideas amongst the research scholars in their respective field. I am sure that the endeavors made by FoE & CS would be relevant for creating suitable platform for the exposure of the knowledge of participants in various fields of academia throughout the world.

I acknowledge the contribution of the talented team of Faculty of Engineering & Computing Sciences for organizing such a grand conference.

I express my best wishes for the success of the Conference.

Suresh Jain
Hon'ble Chancellor, TMU

Message of the Group Vice Chairman

I am glad to know that Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad is going to organize National Conference on Industry 4.0 (NCI-4.0) on 29th February 2020.

Such conferences are organized to dispense latent and innovative ideas, extremely helpful for the researchers and scholars in the field of industry to be successful in their research-oriented endeavors. I am heartily thankful to the organizing committee of the conference.

I extend my heartiest wishes for a grand success of the conference.

Manish Jain
Group Vice Chairman, TMU

Message of the Officiating Vice Chancellor

I am delighted to know that Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad is going to organize National Conference on Industry 4.0 (NCI-4.0) on 29th February 2020.

The conference like this is a great endeavor to update and enrich the thought process of all delegates. It provides a grand platform for demonstrating research and development at activities in the field of computing and related area. I am sure the conference will generate interesting results and new knowledge. I hope that the deliberations in the conference will help researchers, academicians and industry representatives from across the globe by certain with the latest advancement in computing. I would like to express my appreciation to all committee members of the conference for their hard work, commitment and relentless effort.

I extend my heartiest good wishes to the Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad for the grand success of the conference.

Prof. Raghuvir Singh
Pro Vice Chancellor, TMU

Message of the Chief Guest

Dr. Prakash Chauhan obtained his postgraduate degree in Applied Geophysics from Indian Institute of Technology (IIT), Roorkee and Ph. D. in Physics from Gujarat University, Ahemedabad. Prior to joining Indian Institute of Remote Sensing (IIRS), Dehradun, he was the Group Director at the Space Applications Centre, (ISRO), and Ahmedabad since 2014. He joined Indian Space Research Organisation (ISRO) in 1991 as scientist and since than working for the applications of remote sensing technology for natural resources management for ocean and land resources. He initiated research activities for planetary remote sensing at Space Applications Centre to study solar system objects mainly Earth's Moon and Mars, through Indian planetary missions.

His major achievements are in the area of earth observation applications including development of algorithms for ocean colour parameter retrieval, marine living resource assessment, aerosol remote sensing for space based air quality monitoring, river and reservoir water level estimation using space borne altimeters and coastal zone management. He has done lead work in using the hyperspectral data for lunar surface composition mapping using HySI and Moon Mineralogical Mapper (M3) instruments of Chandrayaan-1. He has been the Principal Investigator for Infrared Imaging spectrometer (IIRS) instrument on-board Chandrayaan-2 mission. He also led a team scientists for scientific analysis of data from Mars Orbiter Mission (MOM) instruments. He has published more than 100 research papers in both National and International Journals.

He is executive member of International Ocean Colour Co-ordination Group (IOCCG) and representing ISRO. He has also represented ISRO at CEOS as Co-Chair for Ocean Colour Virtual Constellation (OCR-VC). Currently he is a member of prestigious NASA-ISRO Planetary Science working group. He has been awarded prestigious Prof. P.R. Pisharoty memorial award for the year 2004 by Indian Society of Remote Sensing, Hari Om Ashram Prerit Dr. Vikarm Sarabhai Research Award by Physical Research Laboratory (PRL), Ahmedabad for 2009, ISRO merit award by Indian Space Research Organistaion in 2010 and Satish Dhawan award by ISRS, Dehradun for 2016.

Dr. Prakash Chauhan
Director, Indian Institute of Remote Sensing, Dehradun

Message of the Conference Director

It is a matter of great pleasure for me to welcome you all to the National Conference on Industry 4.0 (NCI-4.0) organized by Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad in association with International Journal of Research Trends in Computer Science & Information Technology (IJRTCSIT) on 29th February 2020.

Education is always a sign of development and learning. It should be research oriented helping the society to create something new. Thinking in an innovative and new way is significant to cope with technological changes. This Conference provides a forum for scholarly discussion on advance computing. It is also relevant for exploring and searching various aspects of education through appropriate application of information technology.

The response of contributors and likeminded educational fraternity showing their keen interest in this conference is highly motivating. Presentation of such research papers is extremely beneficial for research scholars and stimulating factor for us to organise such conferences frequently in future. I sincerely offer my earnest gratitude to those who have contributed through their research papers in the conference. I am sure that the conference would achieve its objective by providing suitable platform for learning and experiencing latest advancement in the field of industry. The cohesive efforts of a dedicated and committed team become necessary for organizing such conferences. We are fortunate enough for having such a hardworking team with us. I wish for the grand success of the conference.

Prof. (Dr.) R. K. Dwivedi
Conference Director

Convener Message

Dear Professors and Researchers

It is my privilege and honor to welcome you all to the "**National Conference on Industry 4.0 (NCI-4.0)**" in association with International Journal of Research Trends in Computer Science & Information Technology (IJRTCSIT) (http://www.ijrtcsit.org), Technical Sponsored by Computer Society of India (CSI), sponsored by CETPA Noida and supported by IBM, Microsoft, iNurture, Cisco and skill enhanced academic solution on 29th February 2020 at College of Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad-244001, Uttar Pradesh, India.

It is proof of the importance and significance of this event that it has the presence and active participation of the most important researchers, technologists and business entities in the field of industry. I hope that the platform that we have created for ourselves for learning from each other and sharing the excitement of the profession will also be a launching pad for the future collaborations and fascinating results.

The event is a great festival for exchange of technological know-how and sporting spirit. It has been our pleasure to watch students taking the initiative to participate with a high degree of improvisation each year in this kind of event. They need to be encouraged so that they may bring India to the level she richly deserves. I cordially invite all the enthusiasts to participate with full vigor in this celebrated event which can give immense exposure and global opportunities to our youth.

Er. Namit Gupta
Convener

Chief Patron

Shri Suresh Jain

Hon'ble Chancellor

Patron

Shri Manish Jain

Hon'ble Group Vice Chairman

Conference Chairman

Prof. Raghuvir Singh

Conference Director

Prof. R. K. Dwivedi

Conference Convener

Er. Namit Gupta

Advisory Board

Prof. K. K. Aggarwal, National Board of Accreditation
Prof. R. K. Mittal, Chaudhary BansiLal University, Haryana
Prof. S. K. Ghosh, IIT Roorkee
Prof. Raghuraj Singh, HBTU, Kanpur
Mr. R. K. Vyas, University of Delhi, Delhi
Prof. M. N. Hoda, BVICAM, New Delhi
Dr. Parmanand Astya, Galgotias University, Gr. Noida
Dr. Narendra Kohli, H.B.T.I Kanpur
Dr. K.S. Vaisla, Uttarakhand Technical University, Dehradun
Dr. Ashutosh Bhatt, Birla institute, Bhimtal
Dr. Abhay Saxena, Dev Sanskriti Vishwavidyalaya, Haridwar
Dr. M.K. Sharma, Amrapali Institute and Technology, Haldwani
Dr. Vinay Risiwal, M.J.P.R.U Bareilly
Dr. Vibhash Yadav, REC Engineering College, Banda
Dr. Shivendra Dutt Shukla, Oil and National Gas Organization Ltd
Mr. Gaurav Pandola, NIIT Technology, Grater Noida
Mr. L C Jain, NIIT Technology, Grater Noida
Dr. Sundresh B.S., iNurture, Banglore
Dr. Praveen Srivastava, Aithent Technology Pvt. Ltd., Gurgaon
Prof. Lokesh Varshney, Mechanical Engineering, G.B. Pant University of Ag & Technology
Prof. R.S. Mishra, Mechanical Engineering, Delhi Technical University, Delhi
Prof. R.P.S.Gangwar, Electronics & Communication Engineering, G.B. Pant
Dr. Vivek Shrivastava, Associate Professor & Dean, Electrical & Electronics Engineering, NIT, Delhi
Dr. Subrato Chowdhury, Scientist-F (Retired), Bureau of Indian Standards, Kaushambi, Ghaziabad
Prof. S.S.Gupta, Civil Engineering, G.B. Pant University of Ag & Technology, Pantnagar
Prof. L.M. Gupta, Applied Mechanics, Visvesvaraya National Institute of Technology, Nagpur
Prof. Sanjay Pant, Physics, Kumaun University, Nainital
Prof. A.K. Shukla, Mathematics & Statistics, G.B. Pant University of Ag & Technology, Pantnagar
Prof. Viveka Nand, Chemistry, G.B. Pant University of Ag & Technology, Pantnagar
Prof. R. P.Singh, English, Lucknow University, Lucknow

National Conference on Industry 4.0 (NCI-4.0)

29 February 2020

Faculty of Engineering & Computing Sciences

Teerthanker Mahaveer University, Moradabad,

http://tmu.ac.in/ , https://www.nci.tmu.ac.in/

Anchoring

Mr. Priyank Singhal,
Ms. Neha Anand,
Ms. Inderjit Jheetay,
Ms. Swati Vishnoi
Mr. Rahul Rathore

Welcome & Tilak

Dr. Megha Sharma
Ms. Neha Shrivastva
Mr. Manish Tiwari
Dr. Zareen Farooq
Ms. Humera Aqeel
Ms. Megha Jain

Cultural

Ms. Hina Hasmi
Ms. Swati Vishnoi
Dr. Garima Goswami

Delegate Stay & Transport

Mr. Navneet Vishnoi II
Dr. Arpit Jain
Mr. Manish Dhingra
Mr. Kamal Gola
Mr. Manish Joshi
Mr. Pawan Gupta
Mr. Talat
Mr. Ashutosh Sharma

Logistics

Mr. Manoj kumar Gupta
Mr. Sunil Kumar
Mr. Vishal Deep Saxena
Mr. Ankur Agarwal
Mr. Brahmdutt Gaur
Mr. Alok Kumar
Mr. Rajiv Kumar

Designing & Photography

Mr. Jyoti Ranjan Labh
Ms. Shikha Gambhir
Mr. Satendra Kumar
Mr. Akshay Saxena
Mr. Chitra Sen
Mr. Ajay Rastogi

Kit Distribution

Dr Ajit Kumar
Mr. Harish Kumar
Mr. Pradeep Kr. Verma
Dr. A.K. Singh
Mr. Laxmi K. Tiwari
Mr. Ankur Sisodia

Spot Registration

Mr. Mohd. Saleem
Mr. Arun Gupta
Mr. Ajay Chakravarty
Mr. Siddharth Mathur
Mr. Gaurav kumar Rajput
Mr. Vineet Saxena
Mr. Pradeep Sharma

Certificate Preparation

Dr. Navneet Kumar
Mr. Raghvendra Kumar Singh
Ms. Maryam Tahira
Mr. Amit Kumar Vishnoi
Mr. Harijinder

Discipline

Mr. Shambhu Bharadwaj & his Team
Mr. Rahul Vishnoi
Head of the Department, All Course Coordinator and Dept Coordinator

Media Coverage & News Creation

Dr. Sandeep Verma
Mr. Manish Tiwari
Mr. Pradeep Kr. Gupta
Mr. Prashant Kumar
Mr. Amit Singh

Invitation

Dr. Rajeev Kumar
Mr. Manish Dhingra
Ms. Neeraj Kumari
Dr. Kirti Shukla
Ms. Humera Aqeel

National Conference on Industry 4.0 (NCI-4.0)

29 February 2020

Faculty of Engineering & Computing Sciences

Teerthanker Mahaveer University, Moradabad,

http://tmu.ac.in/ , https://www.nci.tmu.ac.in/

Mr. Rajendra Prasad Pandey
Mr. Neeraj Kaushik

Stage

Ms. Ranjana Sharma
Mr. Shri Bhagwan
Mr. Abhilash Kumar
Mr. Anurag Srivastava
Mr. Amit Shukla
Dr. Kirti Shukla
Mr. Pradeep Kr. Verma
Mr. Ajay Rastogi
Mr. Dinesh
Mr. Nitin

Refreshment

Mr. Navneet Vishnoi I
Mr. Mohan Vishal Gupta
Mr. Harish Kumar

Infrastructure Arrangement

Mr. Abhishek Saxena
Mr. Manoj Kumar Gupta

Proceeding & External Communication
Prof. Rakesh Kumar Dwivedi
Dr. Ashendra Kumar Saxena
Mr. Namit Gupta
Prof. R C Tripathi
Dr. Parag Agarwal

Technical Session Coordinator

Dr Rajeev Kumar
Dr. Alok K Gahlot
Dr. Shakti Kundu
Dr. Ashok Kumar
Dr. Danish Ather
Mr. Tushar Malhotra

ID Preparation of Faculty & Staff

Mr. Aaditya Jain
Mr. Ashok Kumar

Database Creation

Prof. R C Tripathi
Dr. Amit K Sharma
Mr. Ratnesh Shukla
Mr. Tushar Mehrotra

Template Conversion

Mr. Pradeep Kr. Shah
Mr. Aman Kumar
Mr. Gaurav kumar Rajput
Mr. Sonia Jayant
Mr. Pramod Kumar
Mr. Praful Saxena
Mr. Mohd. Salman

Preface

I feel immense pleasure that young and budding researchers are gathered here to discuss the ongoing research practices in National Conference on Industry 4.0 (NCI-4.0) on 29 February 2020 at Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India.

It has been recognized that Computer Science and Engineering is the leading stream in taking the humanity to civilization. This conference determines to find new advancements in the fields of computer, engineering, computation and communication. Recent findings in Computer Science have touched almost every sphere of life. These new information works for the sustainable development and globalization of economy and social empowerment. In light of this, Advanced Computing is very much relevant to explore and implement new ways of computing.

The aim was to provide a platform to the eminent academicians, scientists, researchers, industrialists, technocrats, government representative, social visionaries and experts from all strata of society, under one roof, to explore the new spheres of innovative technologies to identify new path ahead. This new path should decay isolation, enlighten the obscurities regarding technology and find scientific progress aimed to pave the path of Indian growth in the field of technology in front of the world and to prove that India may be crowned as developed Nation. The conference will include regular paper presentation sessions, invited talks, key note address and panel discussions.

I felt fortunate in taking the opportunity to pay my thanks to our Chief Guest and Key note speaker Respected Dr. Prakash Chauhan, Director, Indian Institute of Remote Sensing, Dehradun, who has enlightened our minds and took us to the new world of knowledge. I am thankful to Dr. Veerendra Yadav, Member of the Department of Civil Engineering, IIT Roorkee, Roorkee, UK the Guest of honor, whose prestigious presence encourages the new learners to express themselves on new technologies. I am also thankful to C S Rajeev Bajaj, Associate Director and CEO, Panasonic AVC Network India Co. Ltd., Noida who encourage the new learners to express themselves on new technology. I am thankful to Dr. Anil Kumar, Hindu College, Moradabad who helped a lot in conducting the conference successfully.

At this point of time, I would like to thank our Hon'ble Chancellor Shri. Suresh Jain, who is always a constant source of inspiration for the young generation, for having given me this noble opportunity at Teerthnaker Mahaveer University, Moradabad. I pay my regards to our Hon'ble Group Vice Chairman, Shri. Manish Jain who constantly helps and gives direction to provide quality education and establishes a repository of knowledge and diverse activities of human interest encompassing academics, art and culture, sports and community service. Now I give special thanks towards our Officiating Vice Chancellor Prof. Raghuvir Singh under whose supervision the university is growing to achieve the perfection in interdisciplinary branches of education.

My special thanks to our esteemed Principal, Prof. R. K. Dwivedi, without his support would not have been able to successfully organize this mega event. He has given the opportunities to the new learners and experienced researchers to explore the advanced aspects of education through the appropriate uses of Information Technology.

This forum has given a wonderful platform to have an intensive dialogue on grid computing, quantum computing, image classification, voice recognition and machine learning. I hope this flame will alive forever.

Now I should not fail in my duty in paying my gratitude to the organizing committee who worked hard in team and established such a coordination which made the event successful. Last but not least I am grateful to all the researchers and students who proved to be the most important part of the event.

Teerthanker Mahaveer University, Moradabad,
29th February 2020

Er. Namit Gupta
Convener,
National Conference on Industry 4.0 (NCI-4.0)

Analysis of Chatbots

Animesh jain[1] Mohan Vishal Gupta[2]
[1]Scholar, FOECS, TMU, Moradabad
[2]Assistant Professor, FOECS, TMU, Moradabad
[1]animeshjain@ieee.org
[2]mohan.vishal01@gmail.com

***Abstract*— Chatbot is broadly popular now-a-days and easily spread speed as an application of computer communiqué. Some programs respond sharply like human. This type of program is called a Chatbot. For this purpose, many open source platforms are available. Artificial Intelligence Markup Language (AIML) is derived from Extensible Markup Language (XML) which is used to build up a conversational agent (chatbot) artificially This paper address the design and execution of a Chatbot system. We will also study another application where Chatbot's could be helpful and techniques used while designing a Chatbot**

Keywords— Chatbot; Communication; Pattern Matching; Request; Response; designing

INTRODUCTION

Now a days computers play an important role in our society? Computer helps us in lots of manners like they gives us information, they entertain us etc . A chatbot is a program designed to imitate a smart message on a text or written ground. But this paper is based on the AI(Artificial Intelligence)chatbot's. Artificial Intelligence Markup Language (AIML) is derived from extensible Markup language (XML) which is used to artificially build up a conversational agent . The AIML based chatbots are famous because they are light weighted, easy to configure as well as at minimum cost. It has a class of data objects called AIML object which describes behavior of computer programs .Chatbot identify the user input as well as by using blueprint identical, access information to provide a predefined acceptance. The chatbots that have been deploped on the internet, uses text, voice as well as sentiments as the input. For example, if the user is providing the bot a sentence like "What is your name?" The chatbot is most likely to reply "Myself Chatbot." or the chatbot replies "You can say Chatbot." Which is based on the judgment given by the user. When the input is brought into mortal in the database, a reply from a predefined pattern is given to the user. A Chatbot is implemented using pattern comparing, in which the order of the sentence is recognized and a saved response pattern is accustom yourself to the exclusive variables of the sentence. They cannot register and respond to complex questions, and are unable to perform complex activities. Chatbot is comparatively a new technology. The application of a Chatbot can be seen in various fields in the future. This

paper covers the techniques used to design and implement a Chatbot. Comparisons are made, findings are discuss and conclusion is drawn at the end.efficient,bots prove themselves as best in dealing with simple queries

What Is The Use Of Chatbot?

The Chatbots are capable of providing 24/7 automated self-service solutions and thus handle the customer related issues intelligently. They are capable of handling the frequently asked questions, the underlying transactions, and many more.Thus the timely addressing of issues by the chatbots results in increased efficiency by reducing the volume of calls from the customers to the staff.In 2019 and beyond chatbots will accord itself with search functionalities and with the capability of acting as a separate search engine. With chatbots capacity to understand voice-based messages with text, they can provide you with all the important details related to research at a single place without leaving the app.

network which is represented by a gain K and two time constants T1 and T2. This network is connected with a washout circuit of a time constant Tw. The signal washout block acts as a high-pass filter with the time constant Tw that allows the signal associated with the oscillations in rotor speed to pass unchanged. Furthermore, it does not allow the steady state changes to modify the terminal voltages. The phase compensation blocks with time constants T1i – T4i supply the suitable phase-lead characteristics to compensate the phase lag between the input and the output signals. The commonly used structure of the PSS is shown in Fig [10].
In the field of power system operation computer programs are executed and modified frequently according to any variations. Artificial intelligence (AI) has the ability to deal with the high non-linearity of practical Systems. The various technologies that are used in PSSs optimization problems are ANN, FL, ES etc.

1.1) Artificial Neural Network (ANN) in PSS-
In the power systems the most applications of the artificial neural network use a multilayer feed forward network. In the neural adaptive PSS, a feed-forward neural network with a single hidden layer is proposed which includes two sub networks: adaptive neuron-identifier, in which the dynamic characteristics of the plant are tracked and adaptive neuro controller to damp the low frequency oscillations. Radial basis function network (RBFN) has three layers: input layers, hidden layers, and output layers. The hidden layer find centers and widths of the radial basis functions for individual pattern units and the output layer finds the weights between the pattern units and the output units using an unsupervised learning algorithm. A recurrent neural network (RNN) stabilization controller is proposed to improve the transient stability of power systems in which both the governor and AVR is used. The weight of the proposed controller is adjusted on-line. The signal output of the first RNN is added to the PSS signal output for excitation control. The signal output of the second RNN is used as a stabilizing signal for the governor system. ANNs are intelligent controllers to control nonlinear, dynamic systems through learning, which can easily accommodate the nonlinearities and time dependencies.

1.2) Fuzzy Logic (FL) in PSS- In 1964, Lotfi Zadeh developed FL to address inaccuracy and uncertainty which usually exist in engineering problems [10]. A design process for a fuzzy logic based PSS (FLPSS) was proposed for a multi-machine power system. The input signal to FLPSS is the speed deviation of the synchronous generator and its derivative. For the robustness of the FLPSS, five generator power systems were used and for designing a normalized sum-squared deviation index were used. This A novel input signal based FLPSS was applied in the multi-machine environment.

B) Application of Artificial Intelligence Techniques in Network Intrusion Detection
Intrusion Detection Systems (IDS) uses the various Artificial Intelligence techniques for protecting computer and communication networks from intruders. Intrusion Detection System (IDS) is the process of monitoring the events occurring in network and detecting the signs of intrusion.

2.1) Artificial Neural Network in IDS-
ANN is a mathematical model that consists of an interconnected group of artificial neurons which processes the information. In IDS ANN are used to model complex relationships between inputs and outputs or to find patterns in data. In this a neuron calculates the sum by multiplying input by weight and applies a threshold. The result is transmitted to subsequent neurons. Basically, the ANN has been generalized to: [6]

$$yi=f(\sum wikxk+\mu i) \qquad (1)$$

Where wik are weights attached to the inputs, xk are inputs to the neuron i, μi is a threshold, $f(\bullet)$ is a transfer function and yi is the output of the neuron.

2.2) Fuzzy Inference Systems (FIS) in IDS: Sampada et al [12] proposed two machine learning paradigms: Artificial Neural Networks and Fuzzy

Types of Chatbots

Rule-Based Chatbots

They are not new in the market. They have marked their presence in text messaging and are used by many companies for the same purpose.A command in the form of a specific text is sent. The chatbot on the server on receiving the text extracts it and starts executing.

Artificial Intelligence Chatbots

This genre incorporates sophisticated chatbots built for messaging apps like Facebook messenger, slack, etc. The chatbots interact with humans using the normal language. The chatbots decode the message easily and reply accordingly. The input message is decoded into structured data and further broken down into commands.

Voice Enabled Chatbots

Voice enabled chatbots like Alexa, Siri creates personalized experience for the users. These chatbots accept user inputs through voice, act upon user request, answer their queries, and perform a number of creative tasks. Businesses can create their own voice-activated chatbot by using text-to-speech (TTS) and voice recognition APIs.

Context Enabled Chatbots

Contextual chatbots are the most advanced kind of conversational bots. They utilize Machine Learning and Artificial Intelligence to remember conversations that happened in the past, with specific users, to learn and grow over time. These chatbots learn with their experiences with the user. Siri, Alexa, Google Assistant are some of the examples of contextual chatbots.

Social Messaging Chatbots

These chatbots are integrated within a social messaging platform (Messenger, Telegram, Whatsapp, Slack etc.),
making it easy for customers to directly interact with the bot, just like they do with their friends.

Service/Action Chatbots

Service chatbots ask for relevant info from the user to complete their request or take a specific action. This chatbot is heavily used in the airline industry. It helps customers check flight booking, cost of reserving the flights and check

the statuses as well.

Few platforms for publishing chatbot:

- Facebook Messenger
- Skype
- Email
- Slack
- Amazon Echo
- LINE
- Telegram
- Twitter
- Viber
- Websites
- WeChat
- Android
- iOS

[4] DESIGN OF CHATBOT

A Chatbot refers to a chatting robot. It is a communication simulating computer program. It is all about the conversation with the user. The conversation with a Chatbot is very simple. It answers to the questions asked by the user. During designing a Chatbot, how does the Chatbot speak to the user? And how will be the conversation with the user and the Chatbot is very important [3]. The design of a Chatbot is represented using diagram as follows:

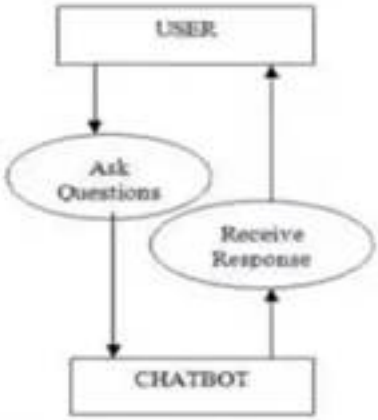


Fig. 1: Use Case Diagram of Chatbot Design.

The following facts are kept in mind during designing a Chatbot :

A. Selection of OS

Windows is used for this project because it is user friendly. It is also robust.

B. Selection of Software

Eclipse software is used for programming in java. Because it contains basic workspace and it is mostly used for java applications.

C. Creating a Chatbot

For creating a Chatbot, a program has to be written. Java programming language is used for programming. The Chatbot is created in such a way to help the user, improve the communication and amuse the user.

D. Creating a Chat

The chat is created using a pattern that is known to the user and could be easy to understand. Chat dialog box show up to create conversation. This dialog box is created using java applets.

E. Pattern Matching

It is a technique of artificial intelligence used in the design of a Chatbot. The input is matched with the inputs saved in the database and corresponding response is returned.

F. Simple

The design of a Chatbot is very simple. It just answers to the questions asked by the user, if the question is found in the database.

G. Conversational and Entertaining

The Chatbot responses are a way known to the user. The conversation follows a Basic English language and interacts in an easy to read manner. The conversation between the user and the Bot is entertaining. It is like talking to other person.

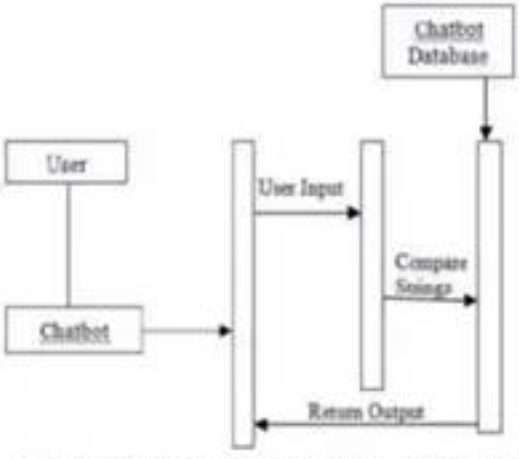


Fig. 2: Sequence Diagram Representing Design of the Chatbot.

[5] IMPLEMENTATION PROCESS

Chatbot is a computer application which uses artificial intelligence to mimic human conversation. It helps the user by answering the questions asked by them. The program is implemented using Java programming language. Particularly
Java applets are used. Applets are used because it is easy to create the dialog box required for the conversation between the user and the bot. Detailed implementation is given below :

A. Fundamental Design Techniques and Approaches

Creating the dialog box All the packages required for creating the dialog box are imported. The size of the dialog box and text area inside the dialog box is given. Vertical scrollbar is used so that the screen is scrolled as the conversation goes on. Horizontal scrollbar is never used because the size of the dialog box is fixed.

Creating a database Two dimensional string arrays are applied to build a database. Rows in the array are used for request and response. All the even rows contain the request or questions and all the odd rows contain the response or answers. Columns in the array are applied to save different types of questions that could asked by the user and responses that a Chatbot can answer. There is one row in the array which contains default responses which is used when the matching question is not found in the array.

B. Modules Description

The description of the modules used in the implementation is given below

Chatbot()

In this function, all the variables used for creating the dialog Box are added.Default close operation is set to EXIT_ON_CLOSE so that the dialog box closes on exit. Required background colour is set using inbuilt set Background () function.

Random()

The input from the user is taken using get Text () function. All the punctuation marks in the users input are removed using trim () function. The uppercase letters are converted to lowercase. A variable called response is used to hold a byte value and it is set to 0. While response is 0, the match for the input is found in the database and it is returned as a response which is displayed in the text area. If the response is 1, then the match for the input is not found in the database. In this case, a default response is returned. Random () function is used to choose the response saved in the database

AddText()

All the texts or strings used in input and output are added to the text area in the dialog box.

InArray()

This is used as a pattern matching function. A variable match is used to hold a Boolean value and it is set to false . If the match for the users input is found in the database, true is returned else false is returned as a result. This value is returned to keyPressed() function and the result is displayed in the dialog box.

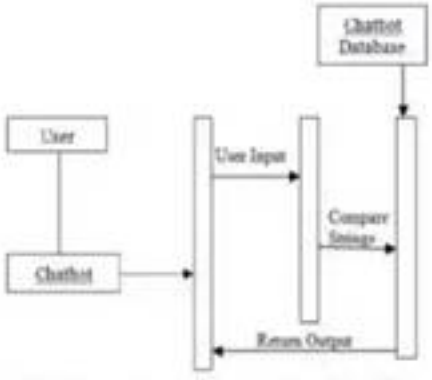


Fig. 2: Sequence Diagram Representing Design of the Chatbot

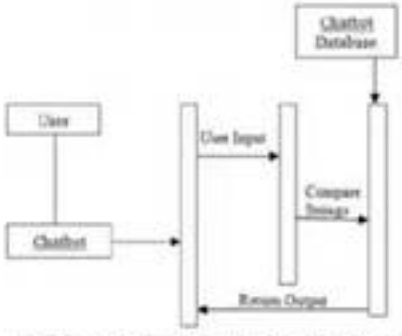
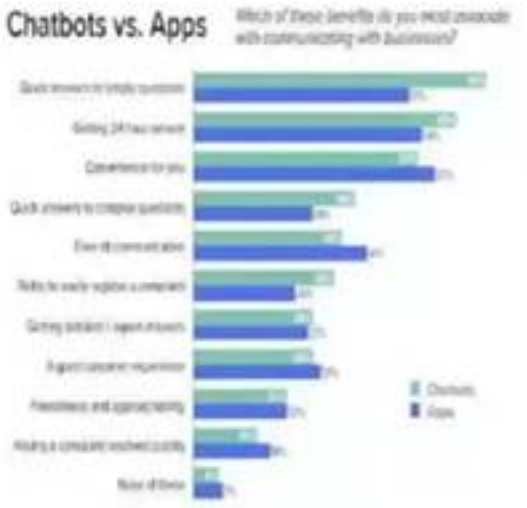


Fig. 2: Sequence Diagram Representing Design of the Chatbot

[6] According to Chatbot Report 2018: Global Trends and Analysis One of the basic reasons of chatbots expansion is so called "being tired of apps". Consumers are annoyed by the need to install special applications to their mobile devices.Many consumers showed reluctance to use new applications. Along with that, it is clear, that it is unprofitable to create, promote and bring into operation some new application, that will ultimately make no use. Being able to function at different planforms, chatbots deals with this issue by their multichannels. The general quantity of different messengers users is up to 4.1 billion people, so the business in conjunction with chatbots can take the advantage of it.



[7] Future scope

In this paper, we have introduced a chatbot application in android which is able to interact with users. This chatbot can answer for queries in the textual as well as in voice form of user input. For this purpose, AIML with program-o has been used. The chatbot can answer only those questions which he has the answer in its dataset. So, to increase the knowledge of the chatbot, we can add the APIs of Wikipedia, Weather Forecasting Department, Sports, News, Government Services and a lot more. In such cases, the user will be able to talk and interact with the chatbot in any domain. Using the APIs like Weather, Sports, News and Government Services, the chatbot will be able to answer the questions outside of its dataset and which are currently happening in the real world.

Conclusion

A chatbot is one of the simple ways to transport data from a computer without having to think for proper keywords to look up in a search or browse several web pages to collect information; users can easily type their query in natural language and retrieve information. In this paper, information about the design, implementation of the chatbot has been presented. From the survey above, it can be said that the development and improvement of chatbot design grow at an unpredictable rate due to variety of methods and approaches used to design a chatbot. Chatbot is a great tool for quick interaction with the user. They help us by providing entertainment, saving time and answering the questions that are hard to find. The Chatbot must be simple and conversational. Since there are many designs and approaches for creating a chatbot, it can be at

odds with commercial considerations. Researchers need to interact and must agree on a common approach for designing a Chatbot. In this project, we looked into how Chatbots are developed and the applications of Chatbots in various fields. In addition comparison has been made with other Chatbots. General purpose Chatbot must be simple, user friendly, must be easily understood and the knowledge base must be compact. Although some of the commercial products have recently emerged, improvements must be made to find a common approach for designing a Chatbot

REFERENCES

[1] R. S. Russell, "Language Use, Personality and True Conversational Interfaces", Project Report of AI and CSUniversity of Edinburgh, Edinburgh, pp.1-80, 2002.

[2] Y. Zhou, X. Ziyu, A. W. Black, A. I. Rudnicky, "Chatbot Evaluation and Database Expansion via Crowdsourcing", Proc. of the Chatbot Workshop of LREC, US, pp. 16-19, 2016.

[3] C. R. Anik, C. Jacob, A. Mohanan, "A Survey on Web Based Conversational Bot Design", JETIR, Vol.3, Issue.10, pp. 96-99, 2016.

[4] R. P. Schumaker, H. Chen, "Leveraging Question Answer Technology to Address Terrorism Inquiry", Decision Support Systems, Vol.4, Issue.3, pp. 1419-1430, 2007.

[5] B. P. Kiptonui, "Chatbot Technology: A Possible Means of Unlocking Student Potential to Learn How to Learn, Educational Research", Vol.4, Issue.2, pp. 218-221, 2013.

[6] S. Ghose, J. J. Barua, "Toward the Implementation of a Topic Specific Dialogue Based Natural Language Chatbot as an Undergraduate Advisor", International Conference on Informatics, Electronics & Vision, India, pp. 1-5, 2013.

[7] J. Jia, "The Study of the Application of a Keywords-based Chatbot System on the Teaching of Foreign Languages", Report of University of Augsburg, Augsburg, , pp.1-36, 2003.

Internet of Things and Cyber Security

Shahab Ghalib [1], Namit Gupta [2]

[1] *Student, College of Computing Science & Information Technology TMU Moradabad 244001, Uttar Pradesh, INDIA*
[2] *Asst. Professors, College of Computing Science & Information Technology TMU Moradabad 244001, Uttar Pradesh, INDIA*

[1]shahabghalib222@gmail.com
[2]namit.k.gupta@gmail.com

Abstract—
Internet of Things (IoT) devices are rapidly exist everywhere while IoT services are becoming pervasive. The Cyber Attacks are not new in the field of Iot, but it will be deeply interwoven in our lives and societies, it is becoming important to step up an take cyber defence seriously. Hence, there is a real need to secure IoT basically in the field of Cyber Security, which has consequently resulted in a need to comprehensively understand the threats and attacks on IoT infrastructure. This paper is written to classify the various type of threats, besides analyse and characterize intruders and attack facing IoT devices and services.

Keywords – Internet of Things, Background, Cyber-Security, Cyber-Attacks, Security Threats.

Fig.1. IoT Cyber Security

INTRODUCTION

Attackers are now using more sophisticated techniques to gain unethical access or we can say to target the victim's systems. Individually, the small scale businesses or large scale businesses are being impacted. So, all these firms whether IT (Information Technology) or non-IT firms have to understood the importance of Cyber Security and focusing on adopting all the possible measure to deal with the various cyber threats.
With the game up for cyber threats and hackers wo are trying to attack on a victim, organizations and their employees should take a step head to deal with them. As we would like to connect everything to the internet, this also increases the chances of various Vulnerabilities, Breaches and Flaws.

BACKGROUND

The Internet of Things (IoT) is an extension of the Internet into the physical world for the interaction with the various physical entities from our surroundings. Entities, devices and the services are the key concepts within the IoT domain, as depicted in the Figure 1. There are much type of meanings and definitions among various projects.

Therefore, it is necessary to have a good understanding of what IoT entities, an entity in the IoT could be a human, animal, car, logistic chain item, electronic device or a closed or open environment. Interaction among entities is made possible by hardware components called devices such as mobile phones, various sensors, actuators or RFID's tags which are able to allow the entities to connect to the digital world.
In the current state of technology, Machine-to-Machine (M2M) is the most popular application form of IoT. M2M is now widely employees in power, transportation, retail, public service management, health, water, oil and other industries to monitor and control the user, machinery and the

production processes in the global industry and so on.

According to the estimates M2M applications will reach 12 billion connections by 2020 and generate approximately 714 billion euros in revenue.

Besides all the IoT application benefits, several security threats are observed. The connected devices or machines are extremely valuable to cyber-attackers for several reasons:

i. Most IoT devices operate unattended by human, thus it is easy for an attacker to physically gain the access to them.
ii. Most IoT components communicate over wireless networks where an attacker could obtain critical data and information by eavesdropping.
iii. Most IoT components cannot support the complex security scheme due to low power and computing resource capabilities.

I. UNDERSTANDING IOT DEVICES AND SERVICES

We all know that IoT devices is changing industries across the board - from agriculture to healthcare to manufacturing and everything in between – but what is Iot, in a proper manner?

We can give a technical explanation of IoT in this way like "**The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.**" The Internet of Things is actually a pretty simple concept; it means taking all the things in the world and connecting them to the internet.

To be smart, a thing doesn't need to have a super storage or a supercomputer inside of it. All a thing has to do is to connect to super storage or to a supercomputer.

In the Internet of Things (IoT), all the things are being connected to the internet can be put into three categories:

i. Things that collected information and then sent it.
ii. Things that receive information and then act on it.
iii. Things that do both.

And these above all three categories have enormous benefits that feed on each other.

1. Collecting and Sending Information

This means the sensors. The sensors could be temperature sensors, motion sensors, moisture sensors, air quality sensors, light sensors etc. These sensors, along with a connection, allow us to automatically collect information from the environment which, in turn, allows us to make more intelligent decisions.

Fig.2. (Soil moisture sensor)

2. Receiving and Acting on Information

We all are familiar with machines that are getting information and then performing the task properly. Your printer receives a document and it prints it. Your vehicle (car) receives a signal from your car keys and doors open.

3. Doing Both

The sensors can be able to collect the data and information about the soil moisture to tell the farmer that how much need the water for a crop, but you don't actually need the farmer. Instead, the irrigation system can automatically turn on s needed, based on how much moisture is in the soil.

II. SECURITY IN IOT DEVICES AND SERVICES

Ensuring the security entails protecting both IoT devices and services from unauthorized access from within the devices and externally. Security should be securing our service which can be in any form, hardware resources, information and data, both in transition and storage. In this section, we identified three main key problems with IoT devices and services: Data confidentiality, Privacy and Trust.

Data confidentiality represents a basic problem in IoT devices and the services. In the IoT context not only user may access to data but also authorized objects. This requires addressing of two important aspects:

First, access control and authorization mechanism second authentication and identity management (IdM) mechanism. The IoT device needs to be able to verify that the entity is authorized to access the service.

Privacy is a major issue in IoT devices and service on the account of the ubiquitous character of the IoT environment. Entities are connected, and data is communicated and exchanges over the Internet on a network, rendering user privacy a sensitive subject in many research works. Privacy in data collection, as well as data sharing and management, and data security matters remain open research issue to be fulfilled.

Trust plays a vital role in establishing a secure communication when a number of things are communicating in an uncertain IoT environment. Two dimensions of trust should be considered in IoT. The trust in the interaction between the entities, and trust in the system from the user's perspective.

A) Attacks

There are five types of attacks in IoT which are as follows:

i) **Physical attacks**
ii) **Reconnaissance attacks**
iii) **Denial-of-service attacks**
iv) **Access attacks**
v) **Attacks on privacy**

B) Vulnerabilities

Vulnerabilities are the weaknesses which are exist in the system or its design that allow an intruder to execute commands, access unauthorized data, or conduct the Denial-of-Service attack.

The vulnerabilities can be found in a variety of areas in the IoT systems. In particular, we can say that it is a weakness in the system's hardware or software, weaknesses in policies and the procedures used in the systems and weaknesses of the system users themselves.

C) Exposure

Exposure is a problem or mistake in the particular system's configuration that allows an attacker to conduct information gathering activities. The one of the most challenging issues in IoT is resiliency against exposure to physical attacks.

D) Threats

A threat is an action that takes an advantage of security weaknesses in a system and has a negative impact on it. This can be originating from primary sources which are: humans and nature. Natural threats, like earthquakes, hurricanes, flood, and a fire could cause severe damage to the computer system.

III. PRIMARY SECURITY AND PRIVACY GOALS

Fig.3. IoT Security Targets

To succeed with the implementation of the efficient IoT security and the privacy, we must be aware of the primary security goals which are as follows:

i) Confidentiality

Confidentiality is an important aspect in the terms of security feature in IoT, but it may not be compulsory in some scenarios, where the data is presented publically, in the most cases that sensitive data and information must not be disclose or read by unauthorized entities which can be a human or a computer system, for example- it may be a patient data, private business critical information, government authorities data as well as security credentials and secret key, that are must be hidden from the unauthorized entities (Human or a machine).

ii) Integrity

The term integrity means to provide reliable services to IoT users; it is a mandatory aspect in the security property in most scenarios.

iii) Availability

A user of a device (or itself) must be able to accessing services anything, anywhere, whenever needed. There are much type of systems available which have different availability requirements.

iv) Accountability

When we want develop a security techniques to be a secure network, accountability add the redundancy and the responsibilities of certain actions, duties and the planning of implementation of network security policies.

CONCLUSION

Internet-of-Things (IoT) faces a number of threats that must be recognizes for the protected and the secures actions within the tasks. In this paper, IoT and Cyber Security we have discussed the various types of attacks, uses of the IoT technology in our day-to-day life also the security challenges and the security threats to IoT were introduced. The overall goal was to identify assets and the potential threats, attacks, vulnerabilities which we face by the IoT devices.

It's an overview which is the most important IoT security problems was provided, with the particular focus on the security challenges and the various aspects of the cyber security and the IoT devices implementations. Security challenges, like Confidentiality, integrity, availability, privacy and entity trust were identified.

REFERENCES

1) L. Atzori, A. Iera, and G. Morabito, "The internet of things: survey of the computer networks 2010.
2) S. Andreev and Y. Koucheryavy, internet of Things,2012.

3) https://elinux.org/images/f/f8/Common-Attacks-on-IoT-Devices-Christina-Quast.pdf.
4) https://geekflare.com/understanding-cybersecurity/
5) https://www.researchgate.net/publication/277718176_Cyber_Security_and_the_Internet_of_Things_Vulnerabilities_Threats_Intruders_and_Attacks
6) https://www.coursera.org/specializations/intro-cyber-security
7) https://www.riverpublishers.com/journal_read_html_article.php?j=JCSM/4/1/4
8) https://blogs.harvard.edu/cybersecurity/2017/01/11/cybersecurity-and-the-internet-of-things/
9) YouTube
10) Book: Internet of Things.

The Estimation of Hardness in Ground Water Samples by EDTA TRITIMETRIC Method

ASIM AHMAD
[1]CCSIT, TeerthankerMahaveerUniversity,Moradabad

Drasimahmad@gmail.com

Abstract: **The water which contain high concentration of calcium , magnesium chlorides, sulfates and bicarbonates is hard water. Water is the essence of life. But water with high degree of hardness is of no use for domestic and industrial applications. !20samples of ground water have been collected from district Moradabad and two different villages. The hardness of water is determined by EDTA titrimetric method. Out of all the samples tested 39 (32.5%) samples were moderately hard , 76 (63.33%) samples were hard water and 5(4.16%) samples were of very hard water . Very hard water is dangerous to health. The present Study did not revealed any soft water. There is a false notion that hard water is harmful to health, its not hard water , it is very hard water (>180ppm) . It has been noticed that minerals may be beneficial for good health to some extent .So public should be educated about degrees of hardness and its effects.**

Key words: Titrimetric method, Ground water , Hardness

Introduction:

Hardness of water is a physico chemical property of water. The concentration of calcium and magnesium ions is determined in water samples. Some time presence of aluminium, Zinc, Iron, Strontium, also contributes to hardness of water.
however they are generally present in very low concentrations(NRC, 1974). These ions reach the water supply by leaching from minerals of rocks and soil. The calcium is obtained from lime stone (calcium carbonate) and chalk (calcium sulfate). The magnesium is obtained from dolomite which also gives calcium ions (Gumashta et al., 2012). Water hardness is the soap consuming capacity of hard water. When hard water is rubbed with hard water, It produce sticky substance as calcium /magnesium stearate or palmitate. Initially the presence of polyvalent cations like Ca, Mg, Sr, Ba, Fe, Al, Mn etc were considered as hardness producing cations but later on hardness was defined as the sum of the calcium and magnesium concentrations, determined by EDTA titrimetric method. , and expressed in ppm / mg/l (Standard Methods , 1998).The presence of anions classify the types of hardness eg temporary hardness and permanent hardness. The temporary hardness can be removed by simply boiling the water while permanent hardness cannot be removed by boiling the water. The temporary hardness is also known as carbonate hardness while non carbonate hardness is known as permanent hardness. The total hardness means both temporary hardness and permanent hardness.
Based on the types of calcium and magnesium salts in water is categorized as soft or hard and very hard (Sengupta, 2013). From the technical point of view , multiple different scales Of water hardness have been suggested(eg. Very soft- soft-medium hard – very hard)
It is expected that both extreme degrees i.e very soft and very hard are considered as undesirable concordantly from the technical and health points of view, but the optimum Ca and Mg water levels are not easy to determine since the health requirements may not coincide with the technical ones(Kosisek, 2003).
The awareness about the hardness of water evidenced in late 1950's. The relationship between water hardness and the incidence of vascular disease was first described by a Japanese chemist Kobayashi (Kobayashi, 1957) who showed , based on epidemiological analysis , higher mortality rate from cerebrovascular diseases (Stroke)in the areas of Japanese rivers with more alkaline (i.e harder) water used for drinking purposes .

The WHO says that "there does not appear to be any convincing evidence that water hardness causes adverse health effects in humans " (WHO,2003).In fact , the United State National Research Council has found that hard water can actually serve as a dietary supplement for calcium and Magnesium (NRC,1974).It has been found that generally hard water is not harmful to one's health. But can pose serious problems in industrial applications. The hard water produce scales, sludges, corrosion, priming, foaming and caustic embrittlement including cooling towers and other equipments that handles hard water. In domestic settings, hard water is often indicated by a lack of suds formation when soap is agitated in water, and by the formation of lime scale in kettles and water heaters. The hard water is soften by various methods for the proper use in domestic and industrial usage. Keeping in view of all adverse effect of hard water the present study was carried out to estimate the amount of hardness In the ground water of Moradabad and nearby villages of Sambhal and Amroha.

MATERIALS AND METHODS:

One hundred and twenty samples (120) ground water samples were collected from district Moradabad Uttar Pradesh and two adjacent villages. All the water samples were collected aseptically in a sterilized screw capped glass bottles and brought to the laboratory. The hardness of all water samples was tested by using EDTA titrimetric method by taking 50 ml of water sample into a conical flask along with 100ml of ammonia buffer solution and 100-200mg of Eriochrome Black –T indicator followed by titration with EDTA solution present in burette. End point is noted down by changing of the water solution color from wine to blue and expressed as CaCO3equivalent in mg/l (Standard Methods, 1998). Amount of hardness in water was calculated by using the formula.

Hardness as mg/l CaCO3 =ml of EDTA solution x1000/ volume of water sample taken.

Hard and soft water, as per the table below

Classification	Hardness in mg/l	Hardness in ppm
Soft	**0-60**	**less than 60**
Moderately hard	**61-120**	**60-120**
Hard	**121-180**	**120-180**
Very hard	**≥181**	**≥180**

Table showing the results for hardness of different ground water samples

S. No	Place of sample	No of samples	Showing degree of hardness	% of sample
1	Moradabad	40	S-0	S-0
			MH-17	MH-42.5
			H-21	H-52.5
			VH-02	VH-5
2	Village sambhal	40	S-0	S-0
			MH-12	MH—30
			H-27	H-67.5
			VH-01	2.5
3	Village Amroha	40	S-0	S-0
			MH-10	2.5
			H-28	70
			VH-02	0.5

S=Soft water, MH=Moderately hard water, H=Hard water, VH= Very hard water

RESULT AND DISCUSSION

The present studies have revealed that out of three places, the two villages have shown high level of hardness as compared to the town. In Moradabad town, out of 40 water samples collected, almost all the samples were moderately hard (42.5%) and hard water samples (52.5%). Only few samples were very hard water (5%) Table.

The results of villages were different from the results of town. Forty each number of samples were collected from two villages.

In Sambhal village, more number of samples have shown hardness between 150-300mg/l

Of CaCO3 (67.5%) i.e hard water. Some of the samples have shown moderate hardness (30%) and very few of them have shown extreme hardness (2.5%) Table. Similar Type of results was found in the study of samples of Amroha villagealso. The results are Hard water – (70%) , Moderately hard water (2.5%) , and very hard water (5%0. Finally

No soft watere sample was found in all the 120 samples. (Table).

Altogether out of 120 samples, most of the samples are found hard water (63.33).

There are only 5 samples (4.16%) which are found to be very hard water. According To Kozisek (2003) both the extreme degrees of hardness are dangerous to human Health i.e very hard and very soft water. The present study did not find any soft water.

But it has been reported that there are few samples (4.16%) which are very hard and Can be ignored. Water intake of cattle and milk production have been found Unaffected by watercontaining up to 290 ppm of hardness (NRC, 1974). Hence The water is safe for cattle in the town and villages.

Hard drinking water is generally not harmful to human health (WHO, 2003) but Can pose serious problems in industrial settings. Most of the people especially House wives dislike hard water because it useless for washing the clothes.

Calcium is the element which reduces the corrosion and less likely to leach Toxic trace minerals, such as cadmium and lead, out of metal pipes (Seelig, 1977).

According to the US National Academy of Sciences by 1977, there had been more than 50 studies, in nine countries. It has inverse relationship ardiovascular between water Hardness and mortality from cardiovascular disease (Harold and Foster, 1994).

Most of the scientists have indicated a negative statistical association of various Types of cancer morbidity /mortality with the hardness of water and calcium (Yang, 1998).

Some studies showed increased eczema in children (Miyake et al, 2004) and Arnedo –Pena, 2007).

CONCLUSION

The present study has proved extreme degree of hardness in only 4.16% of the samples which may not be harmful to the people. Although majority of people dislike the use of hard water.

It has been found that concentration of Ca and Mg ions show some protective effect on cardiovascular mortality. The use of hard water does not give any evidence to prove casuality among those people who are using hard water. The required concentration of Ca and Mg are good for sound health but excess of Ca is not good for bones as it causes extra growth of bones specially in the back bone and become a big problem. Some people

think that hard water is harmful to health . It has been found that extremely hard water is Ex osmosis of blood cells and the acquire small size. This is important to bring awareness Among the people about soft, moderately hard, hard and very hard water.

Reference

[1] Arnedo Pena , A.,Bellido –Blasco , J, Artero-Civera, 2007 Domestic water Hardness and prevalence of atopic eczema in Castellon (Spain) school Children, Salud Piblica De Mexico .,492 (4):295-310

[2] Drinking water Hard water , hardness , Calcium , Magnesium Scale Stained laundry, Water –research .,net. Retrived 2013 -01-26

[3] Gumashta ,J Gumashta , R Sadawarte , S.K. 2012, Hard water and heart., revisited, IOSR , Journal of pharmacy and Biological sciences ,1 (1):)7-20

[4] Harold, D.F, 1994, Ground water and Human Health, Ground water resources of British Columbia. Ministry of environment, Lands and Parks and Environment Canada. 6.1 -6.3

[5] ISO. 1984, International standard ISO 6059. Water Quality –Determination of the Sum of

calcium and magnesium – EDTA titrimetric method. International Organization for Standerization-Geneva

[6] Kozisek, F, 2003. Health significance of drinking water, calcium and magnesium National Institute of public health. A review

[7] Miyake, Y, Yokoyama , T., Yura, A., Shimizu, T 2004, Ecological association of water ardness with prevalence of childhood atopic dermatitis in Japanese urban area . Environ, Res,.94(1) : 33-37

[8] Sengupta ,P ,2013, Potential health impacts of hard water . Int.,J of Prev. Med , 4(*): 866-875.

[9] Yang , C.Y , 1998 , Calcium and Magnesium in drinking water and risk of death from Cerebrovascular disease .Stroke , 29: 411-4

[10] World Health Organization (2003). Hardness in drinking water.

[11] Standard methods for the examination of water and waste water (1998),- #2340 Hardness . 20th ed, American Public Health Association / American work Association / Water Environment Federation, Washington, DC.

Blockchain Technology: A Futuristic Survey and its Challenges

Nitin Kumar, Tikendra Kumar, Rohaila Naaz, Ashendra Kumar saxena

FoE&CS, Computer science Department
TMU, Moradabad
India
nitinkumar6553@gmail.com
tikendrakumar163@gmail.com
[3]Rohailanaaz2@gmail.com
Ashendra.computers@tmu.ac.in

Abstract—
Blockchain is considered by many to be a disruptive core technology. Although many researchers have realized the importance of blockchain, the research of blockchain is still in its infancy. Additionally, we conduct a clustering analysis and identify the following five research aspects of BT(Blockchain Technology) that would largely impact future deployment of following sector-FinTech Economy, Agriculture Sector,health and Insurance Sector, Real Estate and Identity Crisis.This paper also discusses future challenges of Blockchain in various sectors

Keywords— Blockchain, Classification, Applications Future challenges

I. INTRODUCTION

Almost a decade ego Satohi Nakamoto, the unknown person/group behind Bitcoin, described how the blockchain technology, a distributed peer to peer linked-structure, could be used to solve the problem to maintaining the order of transactions and to avoid the double-spending problem. Blockchains introduced serious disruptions to the traditional business processes since the applications and transactions, which needed centralized architectures or trusted third parties to verify them.

II. BLOCKCHAIN OVERVIEW

A blockchain should be considered as a distributed append only time stamped data structure. Blockchain allow us to have a distributed peer to peer network where non trusting members can verifiably interact with each without the need for a trusted authority. Wewant to briefly discuss chance and challenge to provide a common point of definition from that we will link the possibilities of BT to the fundamental concept of open science

III. CLASSIFICATION

There is various type of blockchain technology. Initially the blockchain technology presumes complete freedom and independence of the chain, In which there is no single administrator. However, interest of large companies and financial institution in the new technology lead to the emergence of more centralized control system while distributed data are preserved.

Types of Blockchain

1) Public Blockchain

Any person in the world can get an access to public blockchains. In the blockchain topology, this means that he or she can send transactions and wait for their inclusion if they are valid, and also participate in the consensus process, that is, determination which blocks will be added to the chain.

Bitcoin and Ethereum are the most popular examples of public blockchains. The public nature of the blockchain allows these platforms to be used to make direct transactions between users without intermediaries [1].

2) Private Blockchain

Last but not least type of blockchain technology is private blockchain.Fully private blockchains is a chain of blocks in which the recording of new blocks is assigned only to one organization. The permission to read can be public or limited to some extent.

There are additional options, such as database management, audit, and so on, within one company, when in many cases public access will not be necessary. Although it is impossible to go without it, when a public activity report is required.

3) Blockchain, belonging to consortium

Other types of blockchain are consortium blockchains. Consortium blockchains are controlled by a pre-selected set of nodes. As an example Vitalik Buterin mentions a system of 15 financial institutions, each of which manages the node, and 10 of which must confirm each block to be recognized as valid and added to the chain.

R3 (full name R3 CEV LLC) — financial and technological research company. It works with a consortium of 70 large financial companies (including Bank of America, Goldman Sachs, Citigroup, National Australia Bank, Royal Bank of Canada, Sumitomo Mitsui Banking Corporation and others) in the development of the use of blockchain technology in the financial system [2]

How Does a Blockchain Work?

Picture a spreadsheet that is duplicated thousands of times across a network of computers. Then imagine that this network is designed to regularly update this spreadsheet and you have a basic understanding of the blockchain.

Fig.1 Diagram of the blocks with their hashes

Information held on a blockchain exists as a shared and continually reconciled database. This is a way of using the network that has obvious benefits. The blockchain database isn't stored in any single location, meaning the records it keeps are truly public and easily verifiable.

The traditional way of sharing documents with collaboration is to send a Microsoft Word document to another recipient and ask them to make revisions to it. The problem with that scenario is that you need to wait until receiving a return copy before you can see or make other changes because you are locked out of editing it until the other person is done with it. That's how databases work today. Two owners can't be messing with the same record at once. That's how banks maintain money balances and transfers

The reason why the Blockchain has gained so much admiration is that:

- It is not owned by a single entity, hence it is decentralized. The data is cryptographically stored inside the block.
- The blockchain is immutable, so no one can tamper with the data that is inside the blockchain
- The blockchain is transparent so one can track the data if they want to.

The Three Pillars of Blockchain Technology

The three main properties of Blockchain Technology which have helped it gain widespread acclaim are as follows:

- Decentralization
- Transparency
- Immutability

IV FUTURE IMAPCT OF BLOCKCHAIN

BLOCKCHAIN IN FINTECH ECONOMY

With technological advancements making waves in almost every sphere of global business, the financial service industry is no more left behind. In recent times it has gone on to become the fastest growing industry of the decade. Anyone with an internet connection can now engage in day-to-day banking activities, trading and investment in the stock market, widen e-commerce platforms, make online payments, exchange currency online, undertake equity funding and more while benefiting from the numerous finance apps designed for personal and business uses.As per a survey on financial services sector and fintech conducted by PWC, around 77% of financial services industry plan on adopting blockchain by 2020. Banks being 1/3rd of the institutions surveyed have shown an inclination in incorporating blockchain in their operations as was reported by a study published by Accenture and McLagan (January 2017) that made a mention of at least eight of the ten biggest global investment banks embracing the blockchain route. While blockchain promises to remedy inefficiencies in the back-office setups of most banks – particularly when it comes to processes such as clearing and settlement, arguably, the most noticeable impact this technology is set to bring about is by substantially reducing cases of fraud and cyber-attacks in the financial landscape.By allowing Fintech companies a decentralized network to share or transfer secure and unaltered information, blockchain would help in curbing data breach and other similar fraudulent activities, by making all concerned parties aware of such activity in financial transactions.It, therefore comes as no surprise that leading business executive and media personality Don Tapscott hails blockchain as a Distributed Ledger Technology with potential far greater than the internet itself.The impact of blockchain on the financial service sector is largely tangible. After all, startups in the fintech industry are receiving increased funding than ever before, with the funding having increased at a rate of 41 percent CAGR and crossing more than $40 billion investment in the last four years, as per the PWC's 2017 Global Fintech report.

BLOCKCHAIN IN AGRICULTURE

The Food and Agriculture Organization of the United Nations (FAO) and the International Telecommunication Union (ITU) continue to work together to promote the use of sustainable information and communication technologies (ICTs) in agriculture.

Fig 2.Biggest Barriers in Blockchain Adoption[8]

In the agriculture domain, self-executing smart contracts together with automated payments would be the game changer. The role of smart contracts especially in agricultural insurance, green bonds, and traceability could be very effective. Agricultural insurance built on blockchain with key weather incidents and related payouts drafted on a smart contract, linked to mobile wallets with weather data being provided regularly by sensors in the field and correlated by data from proximity weather stations would facilitate immediate payout in the case of a drought or flooding in the field. However, the framework to support such an innovation, such as high quality data, enabling policies and regulations, should be first addressed in order to ensure the maximum efficacy for smart contracts. The process of designing, verifying, implementing and enforcing smart contracts in traditional agricultural value chains is still a work in progress, with only a few pilot implementations to show proof-of-concept.

BLOCKCHAIN IN HEALTH AND INSURANCE

the healthcare industry is seeing huge advantage in adapting blockchain to its companies. But in order to maximise its usability, most (if not all) must participate in the public network. In fact, current insurers partnering up with blockchain-linked businesses are already seeing impressive innovations in their sphere of influence.

Since blockchain permanently logs all transactions between its participants, it offers a level of transparency not available in the current paradigm of the insurance world. There are often multiple levels of middlemen throughout the lifecycle of a health insurance policy. Information is shared between several stakeholders, but it takes forever for the cycle to go from one end to the other. The process is riddled with inefficiencies and blockchain can help with that.For example, applying automation to blockchain-developed programs, patients can establish 'contractual agreements' with hospitals, physicians, and pharmaceutical companies. Completed transactions between parties take up a 'block' that's subsequently linked to the 'chain', and over time results in a dependable record of all concurrent interactions. As an illustration, take your standard health plan agreement, where each party would usually give the other a paper contract while dealing with various third-party entities. With blockchain technology, each participant can now individually (and digitally) load only the information that's relevant to their shared contract. This way when a transaction is being executed, everyone involved can view the status, history, and process of what's being authorized. Hypothetically, if you ever need a specialized health professional (like an orthodontist to treat your sudden wisdom tooth impaction), they're now able to send and receive information solely related to that case. The

peer-to-peer (P2P) freedom and privacy blockchain offers is what's making it an incredibly valuable proposition for the industry.

resently, a handful of health insurance companies are working on projects incorporating blockchain technology to accelerate their growth and market share. Since it's a relatively new development, smart insurers are paying extra attention to the long-term benefits — while remaining focused on maintaining short-term vigilance.

For example, The Office of the National Coordinator for Health Information Technology, in response to the blockchain challenge (where everyone needs to participate in order to maximize usability), is now spreading awareness through white papers on the technology and its potential use in health IT "to address privacy, security and scalability challenges of managing electronic health records and resources".

The goal of blockchain is to implement a user-oriented, user-friendly, and voluntary method for maintaining any health information (like patient records or prescription scripts).

According to Tieron's 2016 report on the potential for blockchain in healthcare, you now can (and should):

- Improve your integrity and security by providing better management of patient data
- Call for a higher quality of clinical trial records
- Reduce regulatory and compliance costs
- Set up new standards and practices
- Optimize interactions between healthcare professionals, insurance companies, and policyholders
- Form partnerships with leading ventures using blockchain technology

BLOCKCHAIN IN REAL ESTATE

Commercial real estate constitutes a significant portion of world economic asset and transaction activity. According to an MSCI report, the size of the professionally managed global real estate investment market increased from $7.4 trillion in 2016 to $8.5 trillion in 2017.

With rising valuations of properties and continuous development around the world, blockchain technology is primed to bring several benefits to the real estate industry:

- Automation and more efficient processes
- Reduced costs
- Network transparency and data accessibility
- Real-time payment settlements
- Tokenization

Blockchain technology has recently been adopted and adapted for use by the commercial real estate (CRE) industry. CRE executives are finding that blockchain-based smart contracts can play a much larger role in their industry. Blockchain technology can potentially transform core CRE operations such as property transactions like purchase, sale, financing, leasing, and management transactions.

Our Blockchain in commercial real estate report takes a deeper dive into the ways blockchain technology can create opportunities while alleviating some of the existing challenges. We look at six use cases for improving the leasing and purchase and sale process through the use of blockchain:

1. Improve property search process
2. Expedite pre-lease due diligence
3. Ease leasing and subsequent property and cash flow management
4. Enable smarter decision-making
5. Transparent and relatively cheaper property title management
6. Enable more efficient processing of financing and payments

Blockchain technology has significant potential to drive transparency, efficiency, and cost savings for CRE owners by removing many of the existing inefficiencies in key processes. CRE companies and industry participants evaluating an upgrade or overhaul of their current systems should have blockchain on their radar as its demonstrated usefulness has the ability to bring significant value to the industry.

BLOCKCHAIN IN IDENTITY CRISIS

Trust is the foundation of any transaction: is your counterpart who they claim to be? Is the information provided accurate and up to date? Even on a small scale these aspects can be difficult to manage, but in a complex world with several layers to every transaction, the probability of weaknesses in the chain of information increases constantly.

Blockchain on the other hand takes trust out of the equation as it data is time stamped with each transaction and block added to the chain to create a record that cannot be tampered with and is available in real-time. At the same time, Blockchain technology addresses another key issue of our time: the concern about privacy and data protection.Cryptography provides protection where traditional systems are vulnerable to attacks and identity theft.

Using blockchain for identity management (as a form of a decentralized public key infrastructure) makes protecting your identity much easier. Blockchain and trust go hand in hand: this way, you don't have to fully reveal yourself to whoever you're interacting with. Through the use of secret keys and a special type of digital signature, those requiring your information can ensure, beyond a shadow of a doubt, you are the right person when initiating a transaction or requesting a change. So many applications can use identity management via blockchain to their advantage. As long as there is an identity piece to it, and as long as there's a trust element to it, it can be built. A secure digital identity is possible with the right tools, as blockchain and trust go hand in hand. Organizations supporting the use of blockchain for identity management are certainly getting some traction as well, like the **Decentralized Identity Foundation**, which has gained over 30 company members just within the last year. Or the **Hyperledger Indy project**, which is hosted by one of the world's largest blockchain-focused open source alliances called Hyperledger. These organizations are great ways to learn more and share ideas with people that are passionate about blockchain identity solutions and other technology.

V CHALLENGES OF BLOCKCHAIN

1. Initial Costs

Though the adoption of blockchain technology promises long-term benefits with regard to productivity, efficiency, timeliness and reduced costs, it is expensive to initially put it in place.

2. Integration with Legacy Systems

In order to make the move to a blockchain-based system, an organization must either completely overhaul their previous system or find a way to integrate their existing system with the blockchain solution.

3. Energy Consumption

The Bitcoin network,as well as the Ethereum network, both use the proof-of-work mechanism to validate transactions made on the blockchains.

4. Public Perception

The majority of the public is still oblivious to the existence and potential uses of this technology.

5. Privacy and Security

Blockchains, as in the original design, are made to be publicly visible. Take, for instance, the Bitcoin blockchain, which is designed to be

accessible to all those who have made a transaction on the network.

Fig.2 Challenges of Blockchain Technology

- example of public blockchain [1]
- example of consortium of blockchain [2]

VI CONCLUSIONS

We regard BT as just one building block among other and we believe that the ideas behind open science can only we implemented if all pieces are put together in a meaningful way and complement each other. The combination of well known characteristics like hashing decentralization and immutability makes the BT unique and explain the increasing interest of science and industry in it.

ACKNOWLEDGEMENT

I take this opportunity to express my profound gratitude and deep regards to my guide **Ms. Rohaila Naaz** for her exemplary guidance, monitoring and constant encouragement throughout the course of this thesis. The blessing, help and guidance given by her time to time shall carry me a long way in the journey of life on which I am about to embark

REFERENCES

1. Abeyratne, S., and Monfared, R. (2016). Blockchain ready manufacturing supply chain using distributed ledger. Int. J. Res. Eng. Technol. 5, 1–10. doi: 10.15623/ijret.2016.0509001
2. Abraham, I., and Malkhi, D. (2017). The blockchain consensus layer and BFT. Bull. EATCS 123, 1–22. Available online at: https://dahliamalkhi.files.wordpress.com/2016/08/blockchainbft-beatcs2017.pdf
3. Ahn, J.-w., Chang, M. D., Kokku, R., and Watson, P. (2018). Blockchain for Open Scientific Research. Patent Number: 20180323980, Armonk, NY.
4. Gipp, B., Meuschke, N., and Gernandt, A. (2015). "Decentralized trusted timestamping using the crypto currency bitcoin," in Proceedings of the iConference 2015 (Newport Beach, CA).
5. Gnosis (2017). Gnosis - Crowdsourced Wisdom. Available online at: https://gnosis.io/pdf/gnosis-whitepaper.pdf
6. Golem (2016). TheGolem Project - Global Market for Idle Computer Power. Available online at: https://golem.network/crowdfunding/Golemwhitepaper.pdf
7. Gray, J. (2009). "A transformed scientific method," in The Fourth Paradigm: Data-Intensive Scientific Discovery, eds T. Hey, S. Tansley, and K. Tolle (Mountainview, CA: Microsoft Research).
8. https://www.bing.com/search?FORM=INCOH1&pc=IC03&ptag=ICO-9f9c38107d44f695&q=challenge%20of%20blockchain
9. https://feed.2-pdf.com/?q=blockchain&publisher=2-pdf&barcodeid=553100000000000
10. https://blockgeeks.com/guides/what-is-blockchain-technology/

TRENDS AND TECHNIQUES IN DATA MINING

Amrita Kumari[1], Anu Sharma[2]
[1]STUDENT, [2]ASSISTANT PROFESSOR

FoE& CS, Computer science Department, Teerthanker Mahaveer University, Moradabad, 244001

Abstract— Data mining is the process of discovering of projecting information from large data sets. It is a collaborative subfield of Computer Science with an overall goal to essence information from a data set and transfer the information into the coherent structure for further use. Websites contains billions of unused raw data. By considering this data new knowledge can be achieved. Since this data is changing and unstructured traditional data mining techniques will not be appropriate.
In this paper we will discuss about trends and techniques in data mining. We will also discuss about works done in the field of social network analysis.

Keywords— Data mining techniques, Social network analysis, Web data mining.

1. Introduction

Data mining is the compelling tool that can help to find patterns and relationship within our data. It discovers hidden information from large databases. The generic goal of the data mining process is to extract information from a dataset and transform into an understandable structure for further use.[7]

Data mining involves following classes of tasks:

a. Anomaly detection
b. Association rule learning
c. Clustering
d. Classification
e. Regression
f. Summarization

There are following data mining techniques:

a. Characterization- It is used to summarize and possibly differentiate data characterstics.
b. Classification- It is the process in which given data is classified into different classes according to classification model.
c. Regression
d. Association
e. Clustering
f. Change detection
g. Deviation detection
h. Link analysis
i. Sequential pattern mining

2. LITERATURE REVIEW:

Anu Sharma [7] suggested that in recent years, social media have experienced tremendous growth in their user base. For example, there are more than one billion members belonging to the Facebook network, while Twitter now has more than 280 million monthly active users. There are a large number of different social media applications or platforms which in general can be categorized as weblogs, microblogs, social network sites, location-based social networks, discussion forums, wikis, podcast networks, picture and video sharing platforms, ratings and reviews communities, social bookmarking sites,

and avatar based virtual reality spaces. Recent studies and surveys have revealed an emerging need to continuously collect, monitor, summarize, and visualize relevant information from social interactions and user generated content in various domains such as business, public administration, politics, or consumer decision-making. These activities, however, are considered difficult tasks due to the large number of different social media platforms as well as the vast amount, dynamics, and complexity of social media data. More specifically, social media communication generates an enriched and dynamic set of data and meta data, which have not been treated systematically in the data literature. Tomoyuki NANNO[2] present a system that tries to automatically collect and monitor Japanese blog collections that include not only ones made with blog software's but also ones written as normal web pages. This approach is based on extraction of date expressions and analysis of HTML documents. System also extracts and mines useful information from the collected blog pages. This approach obtained 39,272 blogs(pages) and 466,809 entries.

SI.	AUTHOR'S NAME	PAPER TITLE	TECHNIQUES	FINDINGS	YEAR
1	ANU SHARMA	Literature review and challenges of data mining techniques for social network analysis	Clustering	Different interaction pattern can be observed.	2017
2	S.G.S Fernando	Empirical analysis of data mining techniques for social network websites.	Markov models	Hybrid approach by combining social network analysis with content mining would be more useful.	2014
3	Sanjeev Dhawan, Kulvinder Singh, Vandana khanchi	Critical analysis of social network with web data mining.	Web mining techniques	How to utilize the web mining techniques to some real online social networking websites.	2014

4	M.Vedanayaki	A study of data mining and social networking analysis	Knowledge based network analysis	Difficult to collect data	2014
5	Meenu Sharma	Clustering In Data mining: A brief review	Neuro and fuzzy logic approaches	FCM methods responds better in the real-life situations	2014
6	Santosh C. Pawar, Ranjana S. Solanki	Research issues and future directions in web mining: A survey	Web mining	Mining rules from semi-structured as in the semantic web becomes a great challenge	2016
7	Pooja Sikka	DATA MINING OF SOCIAL NETWORKS USING CLUSTERING BASED-SVM	K-Means Clustering Based SVM (KMCBSVM).	SVM have not been favoured for large data sets for mining • K-means micro-clustering technique will be implied with SVM.	2015

3. CONCLUSION

Literatures have been reviewed based on different aspects of social network analysis. This paper studies the application of the techniques and concept of Web mining for social networks analysis, and reviews the related literature about Web mining and social networks.

REFERENCES

1. Sankar K. Pal, Varun Talwar, Pavitra Mitra, "Web Mining in Soft Computing Framework: Relevance, State of the Art and Future Directions", IEEE TRANSACTIONS ON NEURAL NETWORKS, VOL. 13, NO. 5, SEPTEMBER 2002

2. Tomoyuki NANNO, Toshiaki FUJIKI, "Automatically Collecting, Monitoring, and Mining Japanese Weblogs", WWW2004, May 17–22, 2004, New York, New York, USA.ACM1-58113-912-8/04/0005.

3. Ralph Gross, Alessandro Acquisto. John Heinz III, "Information Revelation and Privacy in Online Social Networks (The Facebook case)", Preproceedings version. ACM Workshop on Privacy in the Electronic Society (WPES), 2005.

4. Huan Liu and Lei Yu, "Toward Integrating Feature Selection Algorithms for Classification and Clustering,IEEE Transactions on Knowledge and Data Engineering Volume 17 Issue 4, April 2005.

5. Andrea Fabrizio"SENTIWORDNET: A Publicly Available Lexical Resource for Opinion Mining", Proceedings of the 5th Conference on Language Resources and Evaluation, 2006.

6. Marcelo Maia, Jussara Almeida, Virgílio Almeida, "Identifying User Behavior in Online Social Networks", SocialNets'08, April 1, 2008, Glasgow, Scotland, UK Copyright 2008 ACM ISBN 978-1-60558-124-8/08/04.

7. Anu Sharma, "Literature review and challenges of data mining techniques for social network analysis" , Advances in Computational Sciences and Technology ISSN 0973-6107 Volume 10, Number 5 (2017) pp. 1337-1354

COMPARATIVE STUDY ON SOFTWARE PROCESS MODELS

Asma Anees, Chirag Gupta, Aatur, Shakti Kundu

[1]*CCSIT, Teerthanker mahaveer university ,Moradabad*
asmanaees.mkp@gmail.com, chirag9080g@gmail.com, aaturbansal@gmail.com, shaktikundu@gmail.com

***Abstract*:**

The software engineering process can be considered at two distinct levels. At the start or first level activities related to the gaining information, development and maintenance of software; in the next stage or second level the activities related to the dentition, functioning, measurement, and upgrading the software process itself. This paper present the comparative study of various process models in software development based on various parameters; also listed various factors for choosing partial software model in the world of software development.

Keywords: Design, Analysis, Process Model, Software, Engineering.

I. INTRODUCTION

The term software specifies to the set of computer programs, procedures and associated documents (flowcharts, manuals, etc.) that describe the program and how they are to be used. A software process is the set of activities and associated outcome that produce a software product.

Any software process must include the following four activities:

1. Software specification (or requirements engineering): Define the main functionalities of the software and the constraints around them.
2. Software design and implementation: The software is to be designed and programmed.
3. Software verification and validation: The software must conforms to it's specification and meets the customer needs.
4. Software evolution (software maintenance): The software is being modified to meet customer and market requirements changes.

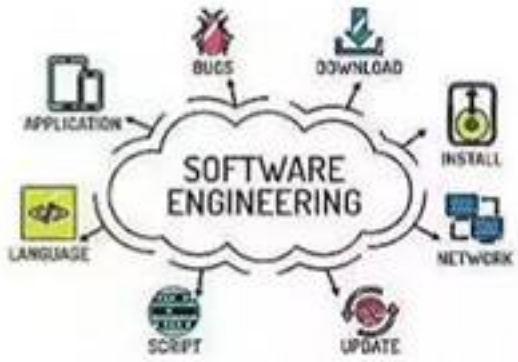


Figure 1: Software Engineering [1]

II. SOFTWARE PROCESS MODELS

A software process model is an abstraction representation of process which is using to develop the software. It simply follow the software development life cycle (SDLC) methodology which includes analysis, design, implementation, testing and maintains.

III. BENEFITS OF USING SOFTWARE PROCESS MODELS

There many benefits of software process models are as follows:-

- It improves the productivity of the development team.
- It reduces the number of errors in final code.
- It increases the decomposition and modularization of the system.
- It improves the understandability of the system.

IV. DISCUSSION ON SOFTWARE PROCESS MODELS

WATERFALL MODEL

The waterfall is the oldest model and also known as mother of all models. It is also called as 'linear sequential model 'or 'classic life cycle model'. It is very simple to understand and use. This model is used for small projects. In this each phase must be completed before the next phase can be begin and there is no overlapping in this phase. In this model, feedback is taken after each phase to ensure that the project is on right path.

Figure 1: Steps in Waterfall Model [2]

INCREMENTAL MODEL

The Incremental model combines the elements of waterfall and they are applied in an iterative model.

It is the process of software development where requirement divided into multiple module of SDLC model.

In this model each module goes through requirement, design, implementation and testing phase every self sequent release of the module add function to the previous release. This process continuous until the complete system achieves. The process is repeated until the product is completed.

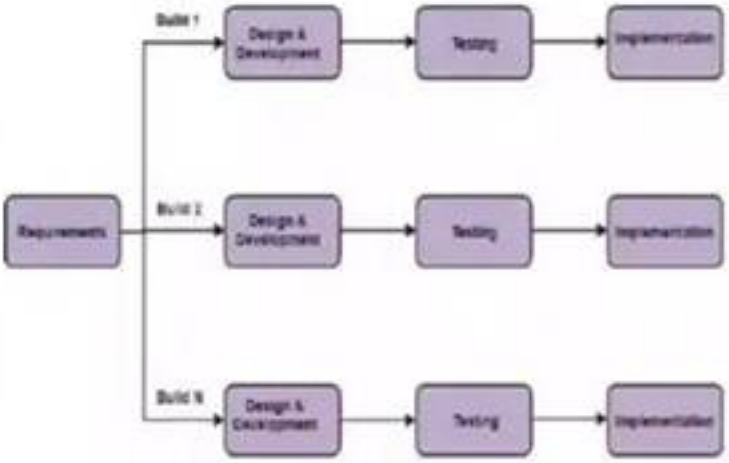


Figure 2: Phases of Incremental Model [3]

SPIRAL MODEL

The spiral model combines the idea of iterative development with systematic control aspects of the waterfall model. The waterfall with a very high emphasis or risks analysis. It allows incremental releases of the product.

A software projects repeatedly passes through these phases in iteration called spirals. At the initial spiral, starting with the planning, requirements are gathered and risk is considered. Each consequent spiral builds on the initial spiral. Requirement are collected during the planning phase, a process is going on to identify risk and their alternate solution. A prototype is produced at the end of the risk analysis. The evaluation phase permits the customer to access the output of the project to date before the project goes to the next spiral.

Figure 3: Layout of Spiral Model [4]

ITERATIVE MODEL

Iterative process starts with simple implementation of subset software requirement and iteratively and enhance the evolving version until the full system is implemented and each iteration design and modification are made and new function capabilities are added. The basic idea behind this model is to develop a system.

Iterative or incremental development is a combination of both design and iterative methods and incremental width model during software development.

More than one iteration of software development cycle may be in a program at the same time. This process may be described as incremental approach.

Figure 4: Steps in Iterative Model [5]

PROTOTYPE MODEL

The prototyping model is one of the most popular used software development life cycle models. This model is used when the costumer do not know the exact project requirement before end. In the model prototype of product is first develop, tested as per the customer feedback. Repeatedly, till the final acceptable prototype is achieved which form the basis for developing the final project.

A prototype model requirement gathering start with requirement analysis. In this phase the requirement of the system are defined in details during the process the user of the system is interviewed to know what expectation from the system.

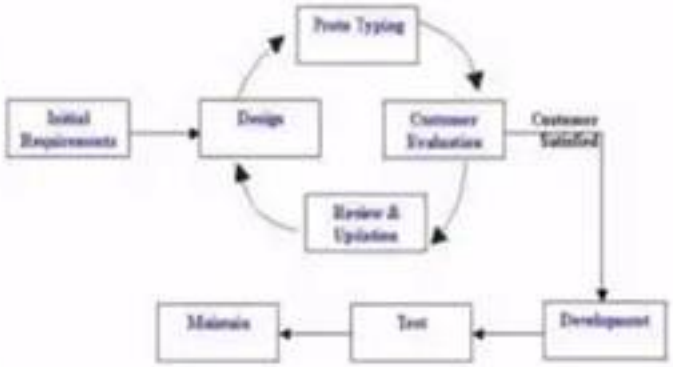


Figure 5: Steps in Prototyping Model [6]

CONCLUSIONS

The paper discussed the various software process models which help us in building the software system under the environment of software engineering. Each and every software process model has its advantages and disadvantages. The comparative study on the behavior and characteristics of discussed software process models in the paper help the software engineer in deciding the appropriate model as per their requirement in development of the proposed software system.

REFERENCES

1] Software Engineering. Available at: https://www.bing.com/search?q=software+engineering&qs=LS&pq=software+&sk=AS3LS2&sc=8-9&cvid=239678713FA44139AA81148A3888E961&FORM=QBRE&sp=6. Accessed 12-Dec-2019.

[2] Waterfall Model. Available at: https://www.bing.com/search?q=waterfall+model&form=ANNTH1&refig=6ad0d9d2e5554d5da487e7be58ead345&sp=-1&pq=waterfall+model&sc=8-15&qs=n&sk=&cvid=6ad0d9d2e5554d5da487e7be58ead345 Accessed 13-Dec-2019.

[3] An Approach of Incremental Model. Available at:https://www.bing.com/search?q=incremental+model&qs=AS&pq=incremental+model&sc=8-17&cvid=36846C78151842CF86CF9EF847D737E2&FORM=QBRE&sp=1. Accessed 13-Dec-2019.

[4] Concepts of Spring Model. Available at:https://www.bing.com/search?q=spring+model&form=ANNTH1&refig=5914185f86c74976fa24f79a4f13c469. Accessed 14-Dec-2019.

[5] An Overview of Iterative Model. Available at: https://www.bing.com/search?q=iterative+model&qs=AS&pq=iter&sk=LS1&sc=8-4&cvid=CB1DD26FE35343CF88556F865DB630B1&FORM=QBRE&sp=2.

Accessed 14-Dec-2019.

[6] Concepts of Prototype Model. Available at:https://www.bing.com/search?q=prototype+model+in+software+engineering&qs=n&form=QBRE&sp=-1&ghc=2&pq=prototype+model&sc=8-15&sk=&cvid=D87626C83B2D4DB58956EC4EE87111ED. Accessed 15-Dec-2019.

Review on Impact of Construction and Demolition Waste on the Properties of Concrete

DrShekharSaxena, Arbaz khan, Mohd Nadir, Ankit Kumar
[1]*CCSIT, Teerthankermahaveeruniversity, Moradabad*

Shekhar.saxena23@gmail.com

***Abstract*: Construction and Demolition (C&D) waste constitutes a major portion of total solid waste production in the world, and most of it is used in landfills. It is also becoming a serious environmental problem in many countries in the world. Construction and demolition debris frequently makes up 10-30% of the waste receive at many landfill sites around the world. This study reviews about the Recycled Aggregates (RA) produced from C&D waste and their use in concrete construction. Along with a brief overview of the engineering properties of recycled aggregates, the presentstudy also gives a summary of the effect of use of recycled aggregate on the properties of fresh and hardened concrete. The paper concludes by identifying some of the major barriers in more widespread use of RA in recycled aggregate concrete.**

***Keywords:*Construction and Demolition Waste; Strength; Workability; Sustainability**

1. Introduction

Construction and demolition (C&D) waste is generated from construction, renovation, repair, and demolition of houses, large building structures, roads, bridges, piers, and dams. C&D waste is made up of wood, steel, concrete, gypsum, masonry, plaster, metal, and asphalt. C&D waste is notable because it can contain hazardous materials such as asbestos and lead. Estimates vary, but a commonly accepted estimate is that between 15% and 20% of municipal solid waste comes from construction and demolition projects.Shahidan et al., (2017) investigated that the research is focused on the effectiveness of using treated or recycled aggregates as a replacement for common aggregates to produce a concrete structure.The values of the slump test falls within the range of 30mm to 60mm. The highest value recordedapproximately 50mm for aggregate size of 5 mm and 10 mm and the lowest slump value was 40mm for sizeof 20mm and 37.5mm.

Based on the research ofzuki et al.,(2017) the highest rate of water absorption is at about 10.60 % for aggregates size 37.5mm. Meanwhile, the lowest rate of waterabsorption is at 2.26 % for the 5 mm size of aggregates. As for the size of 10 mm, 14 mm and 20 mmaggregates, the results are 3.20 %, 4.00 % and 5.00 % respectively.

Construction and Demolition (C&D) waste constitutes a major portion of total solid waste production in the world. Research by concrete engineers has clearly suggested the possibility of appropriately treating and reusing such waste as aggregates in new concrete, especially for lower level applications. Recycled aggregates were also treated with epoxy resin to reduce the water absorption. The recycled aggregates that are obtained from site-tested concrete specimen make good quality concrete. Recycled aggregate concrete was found in the close proximity to normal concrete in terms of split tensile strength and compressive strength. The slump value of recycled aggregate concrete was low and that can be improved by using saturated surface dry (SSD) coarse aggregate(Zuki et al., 2017).

Research by concrete engineers has suggested the possibility of use of appropriately treating and reusing C & D waste as aggregate in new concrete, especially in lower level applications. Rao et al., (2005) also discusses different aspects of the problem beginning with a brief review of the international scenario in terms of C&D waste generated, recycled aggregates (RA) produced from C&D waste and their utilization in concrete. In the study of trocoliabdondantas et al., (2017), Artificial Neural Networks (anns) models were developed for predicting the compressive strength, at the age of 3, 7, 28 and 91 days, of concretes containing Construction and Demolition Waste (CDW). The experimental results used to construct the models were gathered from literature. The results obtained in both, the training and testing phases strongly show the potential use of ANN to predict 3, 7, 28 and 91 days compressive strength of concretes containing CDW.

2.Properties of construction and demolition waste

The review of properties of recycle aggregate is shown in Table 1.

Table 1.Properties of Recycled Aggregate

Properties	Rao et al., (2005)	Katz et al., (2003)	Shahidanet al., (2017)
Nominal max size mm	20	20	20
Fineness modulus	6.79	6	6.2
Bulk densitykg/m3	12.50	12	11.5
Specific gravity	2.53	2.6	2.42
Porosity%	5.03	6	6.5
Absorption%	2.03	2.5	2.7
Moisture content %	1.57	1.9	2.2

3. Effect of C & D waste on the properties of concrete

3.1Effect on fresh properties of concrete

3.1.1 Workability

According to the results obtained by Katz et al., (2003) the values of the slump test falls within the range of 30mm and 60mm. The highest value recorded approximately 50mm for aggregate size of 5 mm and 10 mm and the lowest slump value was 40mm for size of 20mm and 37.5mm. The small scale sizes of aggregates were absorbed less water compared to the larger size of aggregates. This happened because of the less surface area for small scale size aggregates will be less water absorption in the aggregates.The workability of RAC recycle aggregate for the same water content in the concrete is lower as reported by many researchers, especially when the replacement levels exceed 50%. The air content of the RAC is found slightly higher (~4% to~5.5%) than concrete made with NA at 100% replacement.The variation of workability is shown in Figure 1.

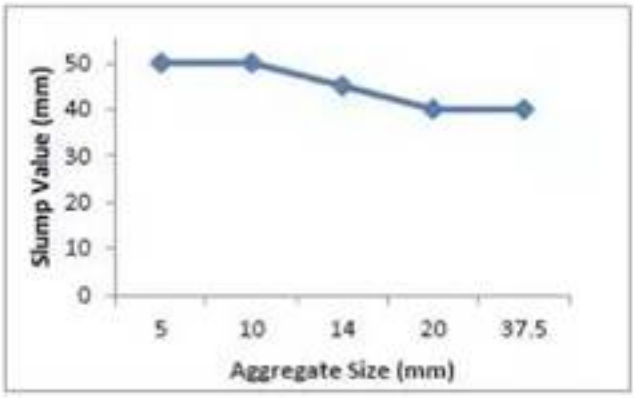


Figure 1. Variation of Slump (Katz et al., 2003)

3.2Effect on hardenedproperties of concrete

3.2.1 Compressive strength

Though researchers have reported a reduction in strength in RAC, it should be noted thatthe extent of reduction is related to the parameters such as the type of concrete used for making the RA (high, medium or low strength), replacement ratio, water/cement ratio andthe moisture condition of the recycled aggregate (Crentsil et al., 2001; Ajdukiewiczandkliszczewicz, 2002). Katzet al., (2003) found that at a high w/c ratio (between 0.6 and0.75), the strength of RAC is comparable to that of reference concrete even at a replacement level of 75%. Rao (2005) found the strength of RAC and

reference concrete to be comparable even at 100% replacement, provided that the water–cement ratio was higher than 0.55. However, as the water–cement ratio is reduced to 0.40, the strength of RAC was only about 75% of the reference mix. Apart from the water–cement ratio, the moisture condition of the RA also appears to affect the compressive strength. Limited work has been reported attempting to relate the strength to the condition of the aggregates (oven dried, air dried, saturated surface dry, etc.), though the findings are inconclusive (Poon et al., 2004).The variation of compressive strength is shown in Figure 2.

Shahidan S et al., (2013) found thatthe results for compressive strength in 7 days increased dramatically from 14 mpa (5 mm) up to 29.6 mpa (10 mm). The size of 20mm aggregate was recorded the highest strength at 33.1 mpa, followed by the second highest strength achieved approximately 32.5 mpa for size of 37.5 mm. For the specimens cured for 28 days, the compressive strength sharply changed from size of 5 mm (13.8 mpa) up to aggregates size 10 mm (41.1 mpa).Kudus et al., (2012)and Hao W.,(2016) found that the bigger mean size of aggregates result in the greater compressive strength of concrete.The bigger aggregates result in a larger ITZ (Inter-facial Transition Zone) which refers to the weak binder zone around the aggregates which is more susceptible to cracks.This increases the chances of cracks occurring. Internal bleeding can take place when water gets trapped on the underside of large size aggregates.

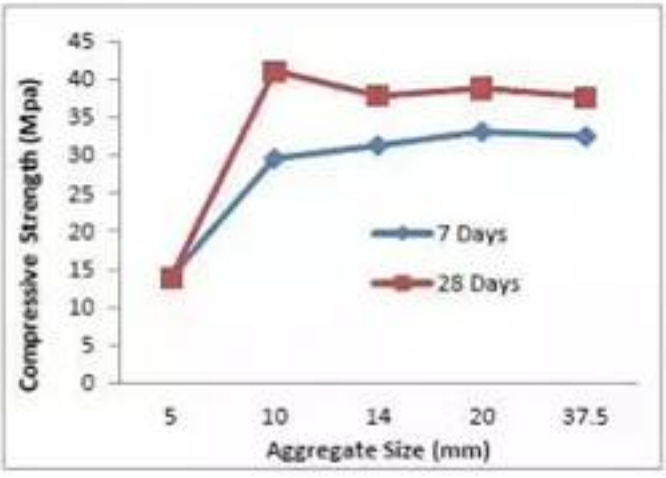


Figure 2. Variation of Compressive strength (Poon et al., 2004)

3.2.2Water Absorption

Rao et al., (2005) studied that the water absorption in RA ranges from 3 to 12% for the course and the fine fractions with the actual value depending upon the type of concrete used for producing the aggregate. It may be noted that this value is much higher than that of the natural aggregates whose absorption is about 0.5–1%. The high porosity of the recycled aggregates can mainly be attributed to the residue of mortar adhering to the original aggregate. This, in fact, also affects the workability and other properties of the new concrete mix as discussed separately.

Absorption is the moisture measured when every pore is saturated by water, but when the surface is dry. The water absorption rate can influence both fresh and hardened concrete properties (Etxeberria M; 2007). Concrete made of recycled aggregate had less compressive strength and resistance to freezing and thawing than concrete made of natural aggregate (Tam VWY 2008). However, the absorption capacity of aggregate also affects the workability of concrete (Rao A,2002).The absorption capacity of aggregates depends either upon a consistent degree of particle porosity or represents an average value for a mixture of variously high and low absorption materials (Tam VWY, 2008).The variation of water absorption is shown in Figure 3. Normally, recycled aggregate is more absorptive than natural aggregate. Due to its high absorption capacity, recycled coarse aggregate must be wet before its use in making concrete. If the recycled coarse aggregate is not humid, it absorbs water from the paste, thus losing both its workability in the fresh concrete, and also the control of the effective w/c ratio in the paste. In consequence, the increased absorption of recycled aggregates means that concrete made with recycled coarse aggregate and natural sand typically needs 5% more water than conventional concrete in order to obtain the same workability(Padmini AK, 2009).

Generally, NA has water absorption values between 0.5% and 1.5%, which is normally omitted for most

concrete applications. However, more precautions must be taken when using RA because of their greater porosity. RA will almost always exhibit higher WA values than NA.

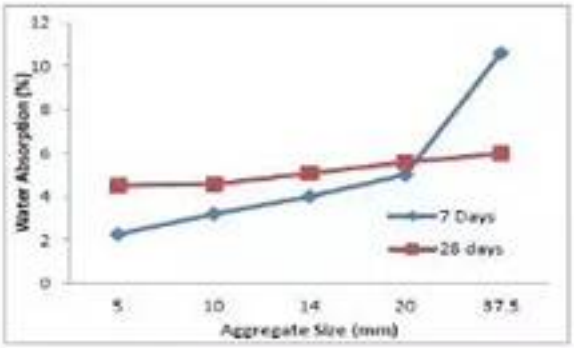


Figure 3. Variation of Water Absorption (Tam VWY, 2008)

3.2.3 Density

Density is an essential property for concrete mix design. It is also crucial for calculating the concrete volume produced from a certain mass of materials. The particle density of an aggregate is the ratio between the mass of the particle material and the volume occupied by the individual particles. The lower the density of the aggregate, the higher its cement mortar content will be. Consequently, the density of the recycled aggregate is significantly lower than that of natural aggregate. Lower particle density in the aggregate increases its absorption capacity and reduces its strength. As a result, a greater amount of water and cement is required, and this makes it more difficult to achieve the required levels of concrete strength and durability (Tam VWY 2008). Different recommendations give limits for this parameter. For example, the Riles recommendations, which provide specifications for concrete made from recycled aggregates, divide recycled aggregates into three categories (Types I–III); Type I pertains to aggregates primarily from masonry rubble, and which, according to these recommendations, should have a minimum dry particle density of 1500 kg/m^3.

4. Conclusion

This paper has demonstrated the significant potential for growth of RCA as an appropriate solution to the anticipated increased world-wide construction activity. There are few (if any) applications issues related to use of RCA. New standards are easing its use in higher value applications. Nonetheless, this is very much limited to few countries and the message has to travel round the world to make a meaningful difference to the suitable use of RCA in concrete. Practice has to catch up with the sound knowledge of use of RCA, which needs to be capable of being packaged in a manner that is easily workable and help to gain confidence on use of RCA.

References

[1] Jose mvgomezSober. Porosity of recycled concrete with substitution of recycled concrete aggregate: an experimental study. Cement and Concrete Research, 2002, 32, 1301–11.

[2] Top cube killer, guncanfuatnedim. Using waste concrete as aggregate.Cement and Concrete Research, 1995, 25(7), 1385–90.

[3] Top cu BI, Stengel S. Properties of concretes produced with waste concrete aggregate. Cement and Concrete Research, 2004, 34(8), 1307–12.

[4] Oliveira M, Barra de, Vazquez E. The influence of retained moisture in aggregates from recycling on the properties of new hardened concrete.Waste Management.1996, 16, 113–7.

[5] Rao A., Experimental Investigation on Use of Recycled Aggregates in Mortar and Concrete. Thesis submitted to the Department of Civil Engineering, Indian Institute of Technology Kanpur; 2005.

[6] Katz A., Properties of concrete made with recycled aggregate from partially hydrated old concrete. Cement and Concrete Research, 2003, 33, 703–11.

[7] Shahidan S, Pullin R, Holford KM, Bunnori NM, and Md Nor N. "Quantitative Evaluation of the Relationship between Tensile Crack and Shear Movement in Concrete beams," Advance Material Research, vol. 626, pp. 355–359, 2013.

[8] Mdnor N, Bunnori N, Ibrahim A, Shahidan S and Saliah SNM. "An investigation on acoustic wave velocity of reinforced concrete beam in-plane source," in Proceedings - 2011 IEEE 7th International Colloquium on Signal Processing

and Its Applications, CSPA 2011, pp. 19–22, 2011.

[9] Kudus SA, Bunnori NM, Basri SR, Shahidan S, mdjamil MN and Md Nor N. "An Overview Current Application of Artificial Neural Network in Concrete," Advance Material Research., vol. 626, pp. 372–375, 2012.

[10] Shahidan S, Kho HB, Alanis AMS and Loon YL.Strength Development and Water Permeability of Engineered Biomass Aggregate Pervious Concrete, MATEC Web Conf., vol. 47, pp. 2–7, 2016.

[11] Etxeberria M, Vázquez E, Marí A, Barra M. Influence of amount of recycle coarse aggregates and production process on properties of recycled aggregateconcrete. Cemconcr Res 2007;37:735–42.

[12] Lomond JF, Campbell RL, Campbell JA, Giraldi A, Halczak W, Hale HC. Removaland reuse of hardened concrete: reported by ACI committee 555. ACI Mater J2002;99:300–25.

[13] Tam VWY, Wang K, Tam CM. Assessing relationship among properties of demolished concrete, recycled aggregate and recycled aggregate concrete using regression analysis. J Hazard Mater 2008;152:703–14.

[14] Kudus SA, Bunnori NM, Basri SR, Shahidan S, mdjamil MN and Md Nor N. "An Overview currentapplication of Artificial Neural Network in Concrete," Advance Material Research,626, 372–375, 2012.

[15] Tam VWY, Gao XF, Tam CM, Chan CH. New approach in measuring water absorption of recycled aggregates.Construction and Building Material, 2008, 22, 364–9.

Development of Reactive Powder Concrete: A Review

Dr. R K Jain, Akshay Mehta, Shudhendu Tripathi, Shashank Kumar, Dr. Shekhar Saxena

[1]CCSIT, Teerthanker mahaveer university ,Moradabad
ravi.engineering@tmu.ac.in

***Abstract*:**

Reactive Powder Composites are new cement-based materials which could be used for the storage of nuclear wastes due to the excellent microstructural properties. Production methodology of Reactive Powder Concrete (RPC) is not clearly established yet, as several parameters have a varied influence on the resulting fresh and hardened properties of RPC. Even for the same composition, properties such as mechanical as well as microstructural properties differ significantly by changing temperature of curing and method of curing with respect to time/duration.The study of several RPC compositions by SEM Analysis and X-ray diffraction made it possible to better understand their microstructural properties. The present study reviews the various mechanical properties of RPC and the effect of different curing temperatures on the properties of RPC.

Keywords: Reactive Powder Concrete; Strength; Durability; Temperature

1. Introduction Different concretes have been developed in the world for different purposes. One of them is Reactive Powder Concrete (RPC). RPC term has been used to describe a fiber- reinforced, super plasticized, silica fume cement mixture with very low water-cement ratio, characterized by the presence of very fine aggregates instead of ordinary aggregateRPC widely used in engineering practice. Since it is not a mixture of normal concrete that is Cement, sand, coarse aggregates, water, but it is a new kind of structural material that includes cement, sand, silica fume, quartz powder, steel fiber with very low water-cement ratio and the size of all material is less than 600micron.RPC due to its superior performance has provoked many construction practitioners throughout the world in its application to special civil engineering structures. The first footbridge made of RPC in the world locates in Sherbrook, Quebec province, Canada. Other structures are nuclear power plant, petroleum plants, municipal, marine and military uses. RPC reduces thickness of concrete members leading to large saving in both material and costs. RPC possesses good durability due to its low porosity nature and dense microstructure. RPC requires low maintenance costs in its service life. Compressive strength of RPC increases significantly after autoclaving and steam curing compared to the standard water curing. Autoclave, steam curing time, temperature and pressure also influenced the mechanical performance of RPC considerably. The dense microstructure of RPC makes it more vulnerable to high temperature spalling and

cracking. However, the addition of steel fibers improves the tensile strength which resists the internal vapor pressure at high temperature. This protects RPC from spalling. A number of studies have been focused on the effect of the heat treatment and pre as well as post-curing of concretes on the microstructure and composition of the inner CHS products. The formation of xonotlite was observed at temperatures above 200°C.The heating rate of autoclave cure treatment was 1.1°C/m and curing period were 4h, 6h, 10h, 12h and 24h at 1mpa, 2mpa and 3mpa pressure, respectively. Some parts of RPC remain unreacted even after 28 days standard water curing. It seems that, there is an optimum pressure and process time for each RPC mixture. Extend times or increased temperature and pressure is likely to increase the crystallinityof the binder which cause increase in the strength up to maximum value, afterwards a slight decrease in mechanical performance was observed. The morphology of C-S-H was generally changed to a fibrous structure by higher pressure, temperature and increasing autoclave, steam curing with duration period.There are two types of RPC. They are RPC 200 and RPC 800. They can be fibered and non-fibered. Fibers are incorporated in RPC in order to enhance the fracture properties of the composite material.

There are many advantages of RPC such as it has very low porosity, very high ductility by using steel fibers as well as its shrinkage limited also decreased and increased in corrosion resistance. There are several applications or uses of RPC such as it is used in long span bridge, Roof of stadium, also used in where pressure of pipes is very high and to make nuclear structure plant. Since RPC is in its developing stage, the long-term properties are not known.

1.1 Development of RPC since 1995

RPC first construction goes to Richard P. And cheyrezym. (1995). They investigated the composition of Reactive Powder Concrete (RPC). According to them two types of RPC were manufactured with target compressive strength of 200 mpa and 800mpa respectively. The result was found that ductile concrete with the basic principles enhanced the homogeneity of concrete by eliminating the coarse aggregate and enhanced the microstructure by post-set heat treatment. The tensile strength of concrete was also found to be increased. Chan and Chu (2002) have studied the effect of silica fume on the bond characteristics of steel fiber in matrix of reactive powder concrete by bond strength, pullout energy etc. Various silica fume contents ranging from 0% to 40% were used in the mix proportions. Results showed that the incorporation of silica fume can effectively enhance the fiber–matrix interfacial properties, especially in fiber pullout energy.Marcel Cheyrezyet al.,(1995) studied the Microstructural studies of RPC. The study of several rpccompositions by mercury porosimetry, thermo gravimetric analysis and X-raydiffraction made it possible to better understand their microstructural propertiesdepending on their heat treatment. Influence of temperature on hydration andpozzolanic reaction were examined. For high temperature, the presence of a crystalhydrate, xonotlite, was observed. Halit Y.(2006) studied the effect of curing conditions on

compressive strength.It can be seen that duration ofhigh pressuresteam curing and preheating period also affectsthe compressive strength of reactive powder concrete.cwirzena. (2007) has studied the effect of the heat-treatment regime on theproperties of reactive powder concrete. Nine different curing procedures were applied in which the start and duration of the heat treatment were varied. The result revealed that longer heating times increased the degree of hydration, refined the microstructure and resulted in higher ultimate compressive strength. Xiaomeng H.et al. (2017) studied the mechanical properties of steel fiber-reinforced reactive powder concrete at high temperature and after cooling.The Result revealed that the hot state and residual mechanical properties decreased gradually with increased temperature. Matte and Moranville(1998) investigated the durability of Reactive Powder Composites: influence of silica fume on the leaching properties of very low water/binder pastes and it was found that the leaching greatly affects the microstructure especially that of the anhydrous cement grains remaining in the paste. Junwei Song and Shuhua Liu(2016) studied the properties of reactive powder concrete and its Application in Highway Bridge under the 80°C steam curing condition. The experiment revealed that RPC200 goes linearly upward long with the increasing strain until explosive failure, also it shows very good ductility and the descending stage is very gentle.

Glenn Washer and Paul Fuchs (2004) studied the microstructure by Ultrasonic Testing of Reactive Powder Concrete. The research reported that due to high density and moduli of RPC, pulse-echo modes of ultrasonic testing are practical over distances of at least 400mm and also cracks in RPC were detected using standard ultra-sonic equipment.Wenzhong Z. Et al. (2012) studied the stress–strain relationship of steel fiber-reinforced reactive powderconcrete after exposure to elevated temperatures. The results indicated that the compressive strength and elastic modulus of RPC increased first increased, then decreased with increased in temperature, and the loss of elastic modulus is quicker than compressive strength.Parameshwar N. Et al. (2017) investigated the influence of mixing method, speed and duration on the fresh and hardened properties of RPC.The results indicated that improved mixing techniques proved beneficial in enhancing fresh and hardened properties of RPC. Microstructure analysis reveals that higher mixing speed and longer mixing duration increases percentage of pores in RPC. Ming-zhe, et al. (2008) studied the coefficient and law of the size effect of reactive powder concrete through experiments and theoretical analysis. Theresults revealed that the bigger the size, the lower the strength. Bassam A. Et al. (2012)investigated the mechanical and permeability properties of the interface between normal concrete and ultra-high performance fiber concrete overlay.The result revealed that the bond strength in the slant shear test was very strong, also the permeability test proved that the interfacial bonding is very good.Halit Y. Et al. (2013) studied the effect of autoclave pressure, temperature and duration time on mechanical properties of reactive powder

concrete. Test result indicated that compressive strength of RPC increases significantly after autoclaved compared to the standard water curing process. Autoclaved time, temperature and pressure also influenced the mechanical performance of RPC considerably. M.K. Maroliya (2012)studied the microstructure analysis of Reactive Powder concrete with variation of fiber content is studied at regular interval of time. The results indicated that steel fiber surface has covered with densely cementations material. From SEM micrographs they had observed the various components of RPC, also microstructure of hot water curried sample is much faster than the normal water curried sample. Yuh-Shiou Tai et al. (2011) Mechanical properties of steel fiber reinforced reactive powder concrete following exposure to high temperature reaching 800°C. Experimental results indicated that the residual compressive strength of RPC after heatingfrom 200–300°C increased more than that at room temperature, but, significantly decreased when the temperature exceeds 300°C. The residual peak strains of RPC also initially increase up to 400–500°C, then decreased gradually beyond 500°C.Ahmad S. Et al., (2015) investigated the effect of key mixture parameters on flow and mechanical properties of reactive powder concrete.The result indicated that natural grading of dune sand available in Saudi Arabia performed well than the modified sand grading also, the W/B ratio affected compressive strength and modulus of elasticity of RPC most significantly, and the cement content had major effect on the modulus of rupture of RPC. Mehmet Canbaz (2014) has studied the effect of high temperature on reactive powder concrete. The properties of reactive powder concrete with different plastic fiber ratios were investigated at different temperatures. The result revealed that Compressive strengths higher than 200 mpa were achieved after water curing at 90°C for 3 days and after applying a pre-setting pressure of 80 mpa to the RPC. However, the addition of polypropylene fiber caused a maximum reduction in strength of140 mpa. The strength of 165 mpa was obtained in the case of 1% fiber ratio usage.

2.Properties of Reactive powder concrete

2.1. Compressive strength of RPC

In the study of P. Bamonte, P.G. Gambarova (2010), the compressive strength of RPC after cooling was high up to 300°C than the hot-state compressive strength. However, above 300°C, their degradation trends are same. The initial decrease in strength in hot-state is due to the vapor pressure inside the sample. The hot and residual compressive strength variation is shown in Figure 1. In the research of D. Qin, L. Zhao (2011), it was noticed that the isotropic tensile stresses and the compressive stresses due to vapor pressure decreased at low temperature. However, at high temperature, the vapor pressure is released due to thermal micro-cracking and increased the same properties. The residual cube compressive strength of RPC at 120°C and 300°C is 168.87 mpa and 191.76 mpa. This is 9% and 24% more than thecompressive strength at room temperature. This increase in strength is due to dry hardening of RPC. Furthermore, according to zhengandwang (2014)the heated vapors improve the internal hydration

reaction, which is called as internal autoclave condition.Figure 1 revealed that the samples were heated at 20°C, 120°C, 300°C, 500°C, 700°C and 900°C target temperatures. A thermocouple was inserted inside specimen to measure the internal temperature. The samples were heated until the internal temperature was reached to the target value.

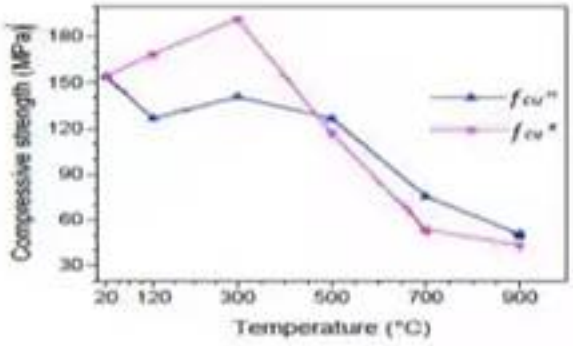


Figure 1. Compressive Strength of RPC (xiaomenghou et al., 2017)

Where $f cu^{H}$, $f cu^{r}$- Hot and residual cubic compressive strength of RPC respectively.

2.2 Flexural Strength of RPC

In the study of xiaomenghou. the flexural strength of RPC was measured by central point bending method after cooling and inside the furnace at high temperature. The absolute and normalized flexural strength of RPC is shown in Figure2. The flexural strength decreased gradually with increasing temperature except at 120°C and 300°C where only the residual strength was increased by 5% and 2%. The degradation at hot-state was faster than residual state above 500°C. The residual and hot-state flexural strength of RPC at 900 was 7.12 mpa and 6.86 mpa which is almost 24% of its original strength at 20°C. According togao et al., (2013)the residual flexural strength of RPC is higher than NSC and HPC.

2.3 Split Tensile Strength of RPC

The tensile strength is very crucial for high temperature studies. It prevents spalling and cracking of concrete by resisting thermal stresses which were produced due to internal vapor pressures at high temperature (300°C-500°C). The split-tensile strength of RPC at 900°C is 6.88 and 7.12 mpa, and 31.43mpa at 120°C the hot-state split-tensile strength is decreasing gradually with increasing temperature whereas the residual split-tensile strength is higher than initial room temperature strength up to 300°C. At a temperature higher than 300°C, the pattern under both test modalities is same. The split-tensile strength was measured by cube samples, which was shown

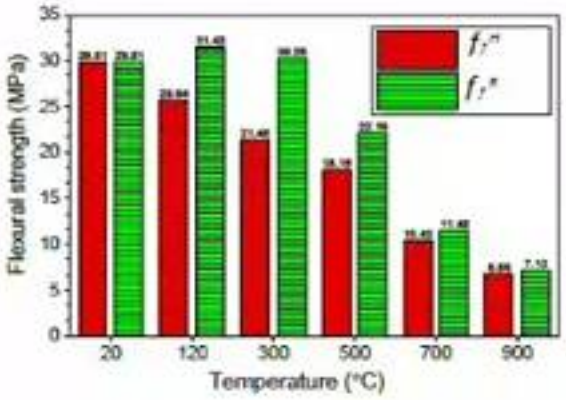
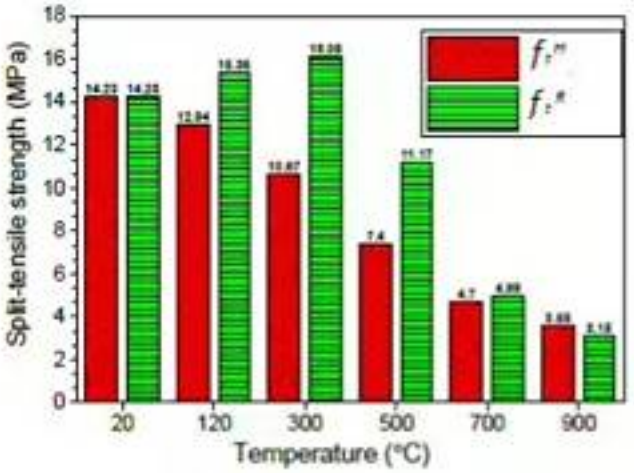


Figure 2.Flexural strength of RPC (xiaomenghou et al.,2017)

Where ff^{h}, ff-Hot and residual flexural strength of RPC respectively.

In Figure 3. The same factors as explained in the aforementioned section can be considered for split-tensile strength degradation.



Where$f\,t^{H}$, $f\,t^{R}$- Hot and residual split-tensile strength of RPC, respectively.

Figure 3. Split tensile strength of RPC (xiaomenghou et al., 2017)

2.4 Elastic Modulusof RPC

The elastic modulus of RPC is much higher than conventional concrete. The elastic modulus was calculated from the gradient of two points at the stress-strain curve at 5% and 40% stress level. The residual and hot-state elastic modulus is plotted in Figure 4. According to xiaomenghou et al., it was found that the elastic modulus of RPC at 20℃was 38.81 gpa. The elastic modulus was affected by same factors as in case of hot and residual compressive strength. The elastic modulus at 900℃ is 2.85-3.01gpa which was 5-8% of its unheated room temperature value. The degradation of elastic modulus is much higher as compared to other mechanical properties. This may be attributed to increasing porous volume at high temperature or the breakage of interfacial transition zone.

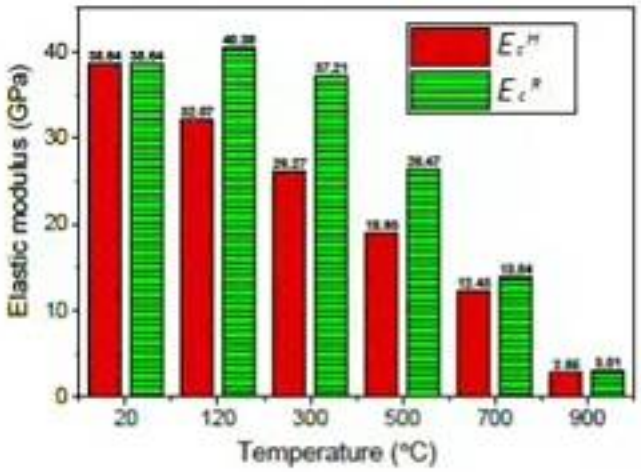


Figure 4.Elastic modulus of RPC (xiaomenghouet al., 2017)

Where$e\,c^{H}$, $E\,c^{R}$- Hot and residual elastic modulus of RPC respectively.

2.5 Microstructure Analysis of RPC

According to the xiaomenghou et al.(2017)the microstructure of the selected RPC mixtures has been investigated by using a JEOL JSM 6060 electron microscope (SEM) at 20 kv. The samples were prepared by taking small pieces fromthe specimens. The general microstructural features of RPC were determined by using backscattered electron (BSE) imaging. Samples were coated with gold. Microstructure investigations revealed the very dense microstructure of RPC. The very low water/binder ratio results in a closer configuration of cement grains. According to Aitcin PC et al. (2003),the RPC matrix is very compact and essentially composed of inner hydration products resembling a gel developed through a diffusion process similar to high performance concrete, also he showed that It can be seen that the light grey areas decreases with the increasing autoclave pressures and temperatures. This situation shows

that cement grains are hydrated.According to halityazıcı(2013), this was valid for RPC mixtures containing SF (Silica Fume) (Figure 5a–d). Unreacted cement grains exist in water cured SF mixture (light grey areas in Figure 5a), and the amount of these grains decreased by autoclave curing (Figure 5b–d) indicating an improvement in the rate of reaction. Although, some parts of the cement grains are unhydrated especially larger ones, these mixtures had superior mechanical performance after autoclave curing. According to Shi C, Hu S.And Zhang S, Huang S, This can attributed to the low water/binder ratio, improved hydration and the CH consumption of the SF to form C–S–H. Entrained or entrapped air pores were also detected in the RPC matrixwhich can be seen in Figure 5. These spherical pores, most of which formedpossibly due to the side effect of high amount of super plasticizer, have different diameters in the range of 10–400 μm. These pores generally were empty in standard cured samples.

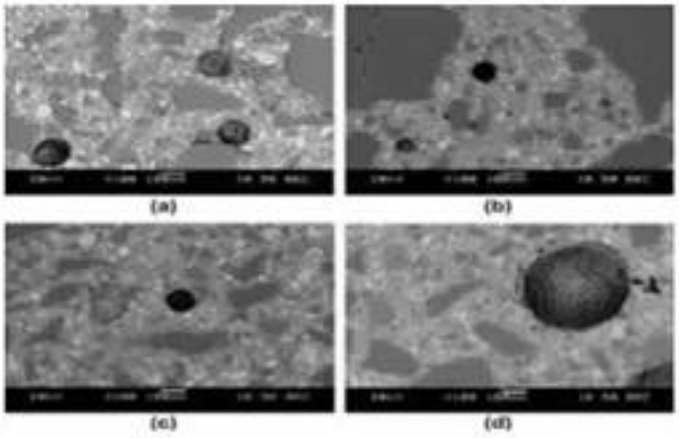


Figure 5. SEM images of SF mixture (a) 28-day standard water cured, (b) autoclave cured (1 mpa, 180℃, 10 h), (c) autoclave cured (2 mpa, 210℃, 10 h) and (d) autoclave cured (3 mpa, 235℃, 10 h) (xiaomenghou et al.,2017).

In the study of Matte andmoranville, (1999),the XRD test was conducted for determining the major minerals in RPC and the patterns shown in Figure 6 correspond to the sound part and to the external layer of the degraded samples after a 6-month leaching. As expected, an unaltered core (the sound part) and several altered zones. The sound part of the cement paste contains $Ca(OH)_2$ which has been leached in the altered part. The cement silica fume paste does not contain $Ca(OH)_2$ due to its high silica fume content.The leaching process leads to the disappearance of the anhydrous compounds in the altered zone.

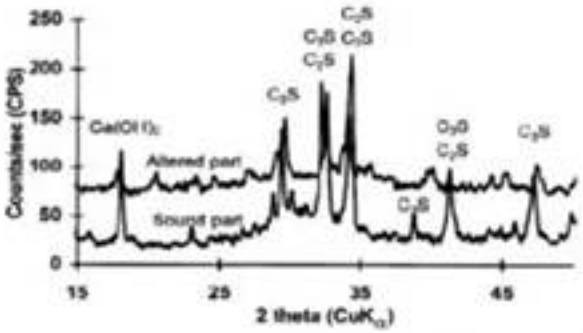


Figure 6. XRD diffractogram of the cement+ silica fume paste after 6-month leaching (Matte andmoranville, 1999)

3. Conclusion

1. In RPC, extend times or increased temperature and pressure is likely to increase the crystallinity of the binder which cause increase in the strength, up to maximum value, afterwards a slight decrease in mechanical performance was observed.
2. The other significant factors from the point of mechanical performance areincorporation of silica fume and steel fibers to RPC mixtures.

3. The residual mechanical properties increased up to 300°C, however above 300°C a sharp decrease in strength was observed.

4. The morphology of C-H-S was generally changed to a fibrous structure by higher pressure, temperature, and increasing autoclave duration period.
5. Entrapped air pores were also detected in the RPC. The spherical pores, most of which formed possibly due to the side effect of high amount of superplasticizer, have different diameters in the range of 10- 400μm.

6. The study of several RPC compositions by X-ray and Scanning Electron Microscope(SEM) show that the high temperature curing improves the microstructure of concrete.

References

[1] Richard P. And Cheyrezy M. (1995), "Composition of Reactive Powder Concrete (RPC)", Cement and Concrete Research, Vol.25, No.7, pp. 1501-1511

[2] Chan, Y.W., Chu, S.H., (2004). Effect of silica fume on steel fiber bond characteristics in reactive powder concrete. Cement and Concrete Research 34 (7), 1167–1172

[3] Marcel Cheyrezy, Vincent Maret, Laurent Frouin (1995), Microstructural analysis of RPC, Cement and Concrete Research, Vol.25, No.7, pp. 1491-1500

[4] Halit Y. (2007), the effect of curing conditions on compressive strength of ultra-high

[5] Strength concrete with high volume mineral admixtures. Building and Environment, 42, 2083–2089

[6] A.Cwirzen (2007), the effect of the heat-treatment regime on theproperties of reactive powder concrete. Advances in Cement Research, 19, No. 1.

[7] Muhammad Abid, xiaomenghou, wenzhongzheng, ghulamqadirwaqar (2017), Procedia Engineering 210, 597–604.

[8] V. Matte, M. Moranville (1999), Durability of Reactive Powder Composites: influence of silica fume on the leaching properties of very low water/binder pastes, Cement and Concrete Composites 21, l-9.

[9] Junwei Song and Shuhua Liu1, (2016), Properties of Reactive Powder Concrete and

[10] Its Application in Highway Bridge, Hindawi Publishing Corporation Advances in Materials Science and Engineering Volume, Article ID 5460241, 7.

[11] Glenn Washer, Paul Fuchs, Member, IEEE, Benjamin A. Graybeal, and Joseph Lawrence Hartmann, Ultrasonic Testing of Reactive Powder Concrete, IEEE transactions on ultrasonic, ferroelectrics, and frequency control, vol. 51, no. 2.

[12] Wenzhongzheng, Haiyan Li, Ying Wang (2012), Compressive stress–strain relationship of steel fiber-reinforced reactive powder concrete after exposure to elevated temperatures, Construction and Building Materials 35, 931–940.

[13] Parameshwar N. Hiremath, Subhash C. Yaragal(2017), Influence of mixing method, speed and duration on the fresh and hardened properties of Reactive Powder Concrete, Construction and Building Materials 141, 271–288.

[14] AN Ming-zhe, ZHANG Li-jun, YI Quan-xin(2008) , Size effect on compressive strength of reactive powder concrete, J China Univ Mining &Technol 18, 0279–0282.

[15] Bassam A. Tayeh , B.H. Abu Bakar , M.A. megatjohari ,Yen Lei Voo (2012), Mechanical and permeability properties of the interface between normal concrete substrate and ultra-high performance fiber concrete overlay, Construction and Building Materials 36 538–548.

.

[16] Halityazıcıſt, engindeniz, bülentbaradan(2013), the effect of autoclave pressure, temperature and duration time on mechanical properties of reactive powder

[19] Temperature reaching 800 ◦C, Nuclear Engineering and Design 241, 2416–2424.

[20] Shamsad Ahmad ſt, Ahmed Zubair, Mohammed Maslehuddin(2015), Effect of key mixture parameters on flow and concrete, Construction and Building Materials 42, 53–63.

[17] M.K Maroliya(2012), Micro Structure Analysis of Reactive Powder Concrete, International Journal of Engineering Research and Development, Volume 4, Issue 2, PP. 68-77.

[18] Yuh-shioutaia,, Huang-hsingpanb, Ying-Nien Kung (2011), Mechanical properties of steel fiber reinforced reactive powder concrete following exposure to high mechanical properties of reactive powder concrete, Construction and Building Materials 99, 73–81.

[21] Mehmet Canbaz (2014), The effect of high temperature on reactive powder concrete, Construction and Building Materials, 70, 508–513.

Artificial Intelligence and Human Intelligence

Suraj Kumar[1], MohitSharawat[2], SubodhSirohi[3], Namit Gupta [4]

TeerthankerMahaveerUniversity,Moradabad

[1]soorajsingh0503@gmail.com

[2]iammohitok@gmail.com

[3]jamesbieb123@gmail.com

[4]namit.k.gupta@gmail.com

***Abstract*: In this , we are doing a deep conversation about human intelligence and artificial intelligence.**
We all know that artificial intelligence is ready to become the need for future generation to make there working easy and secure.
Here we discuss about the effects of artificial intelligence on human beings and how they will affect on human and cause of their extinction.

***Keywords*: Include at least 4 keywords or phrases**

I. About "AI" & "Human Intelligence"

Artificial intelligence (AI) is a term used to describe "intelligence" demonstrated by machines. AI programs may mimic or simulate cognitive behaviours or traits associated with human intelligence such as reasoning, problem solving and learning. Depending on how and if we use it, the future of businesses and the human workforce can be potentially transformed and disrupted by AI as it rapidly evolves, enabling robots and machines to perform the tasks that humans do.From the automation of mundane repetitive tasks to making complex decisions, the opportunities offered by AI can lead us in a variety of directions. As we continue to unlock the potential of AI, we will be changing the way the world works fundamentally and forever.

Human intelligence is the intellectual prowess of humans, which is marked by complex cognitive feats and high levels of motivation and self-awareness.

Through intelligence, humans possess the cognitive abilities to learn, from concepts understand, apply logic, and reason, including the capacities to recognize patterns, comprehend ideas, plan, solve problems, make decisions, retain information, and use language to communicate.

II. Impacts of AI on future of jobs, economy and the workforce of human

1. Automation of tasks:-

The most evident impact of AI is the consequence of the automation of tasks across a broad range of industries, transformed from manual to digital. Tasks or roles that include a degree of repetition or the consumption and interpretation of vast amounts of data are now delivered and processed by a computer, sometimes not needing the intervention of humans.

2. Welcome new opportunities:-

As AI and machine learning execute the manual tasks that humans used to perform, it opens up and breeds new industries and opportunities for the workforce. Digital engineering is an example of an emerging profession that resulted from the rapid development of technology, and it is still evolving. So, while old manual tasks may be out, new jobs and professions will be emerging.

3. Economic growth model:-

When used with a purpose and not for technology's sake, AI can unlock tons of opportunities for businesses and improve productivity and participation within the

organisation. This, in turn, can result in an increase in demand for products and services and drive an economic growth model that delivers and improves the quality of living.

4. More room for creativity and innovation:-

With robots, AI, and automation taking some of the mundane and manual tasks out of our hands, professionals have more time to focus in thinking, delivering creative and innovative solutions, and actions that are beyond the reach of AI and are squarely in the domain of human intelligence.

5. Role of work:-

In the age of AI, understanding the function of work beyond merely sustaining a standard of living is even more important. It becomes a reflection of the fundamental human need for participation, co-creation, contribution, and a sense of being needed; and thus, must not be overlooked. So, in some way, even the ordinary and dull tasks at work become valuable and worthwhile, and if it is removedor has been automated, it should be replaced with something that provides the same opportunity for human expression and discovery.

III. Origin of AI and Human Intelligence

AI is an innovation created by human intelligence; its early development is credited to Norbert Weiner who theorized on feedback mechanisms while the father of AI is John McCarthy for coining the term and organizing the first conference on research projects regarding machine intelligence. On the other hand, human beings are created with the innate ability to think, reason, recall, etc.

IV. Artificial Intelligence vs. Human Intelligence

1. Speed of AI and Human Intelligence:-

As compared to humans, computers can process more information at a faster rate. For instance, if the human mind can solve a math problem in 5 minutes, AI can solve 10 problems in a minute.

2. Decision Making:-

AI is highly objective in decision making as it analyses based on purely gathered data. However, humans' decisions may be influenced by subjective elements which are not based on figures alone.

3. Accuracy:-

AI often produces accurate results as it functions based on a set of programmed rules. As for human intelligence, there is usually a room for "human error" as certain details may be missed at one point or the other.

4. Energy Used:-

The human brain uses about 25 watts while modern computers only generally use 2 watts.

5. Adaptation of AI and Human Intelligence:-

Human intelligence can be flexible in response to the changes to its environment. This makes people able to learn and master various skills. On the other hand, AI takes much more time to adapt to new changes.

6. Multitasking:-

The human intellect supports multitasking as evidenced by diverse and simultaneous roles while AI can only perform fewer tasks at the same time as a system can only learn responsibilities one at a time.

7. Self-Awareness:-

AI is still working on its ability regarding self-awareness while humans become naturally aware of them and strive to establish their identities as they mature.

8. Social Interaction:-

As social beings, humans are much better at social interaction since they can process abstract information, have self-awareness, and are sensitive to others' emotions. On the other hand, AI has not mastered the ability to pick up on pertinent social and emotional cues.

9. General Function:-

The general function of human intelligence is innovation as it can create, collaborate, brainstorm, and implement. As for AI, its general function is more on optimization as it efficiently performs tasks according to how it is programmed.

Human Intelligence is a quality of the mind that enables one to use knowledge — acquired from existence, abstract concepts, several cognitive processes, and more, to manipulate one's environment.

A machine that can, in some way 'mimic' this quality can make our lives much simpler and efficient. This is where artificial intelligence comes into the picture.

Intelligence is a quality that is unique to humans. Even the most complex behaviour exhibited by an insect does not qualify to be called intelligence. Take the case with digger wasps as an example: the wasp that goes out in search of food does not re-enter its burrow without looking for intruders. This is based on the fact that a possible threat could have intruded the burrow while it was gone looking for food. But when, as part of an experiment, the food was left right in front of the burrow itself, the wasp was observed to look for threat before entering the burrow, exactly like how it would have responded in the former situation. Intelligence involves the ability to learn from experiences and adapt to changes — something which is absent here.

Developing a machine having such a complex character is not easy. It is a realm that progresses slowly with the hard work of thousands of dedicated computer scientists and programmers, and it takes decades to reach its culminate.

We achieve more than we know. We know more than we understand. We understand more than we can.

V. What role does AI play in a human world?

AI technologies are constructed by mathematical processes that leverage increasing computing power to deliver faster and more accurate models and forecasts of operational systems, or enhanced representations and combinations of large data sets.

However, while these advanced technologies can perform some tasks with higher efficiency and accuracy, human expertise still plays a critical role in designing and utilising AI technology. Human intelligence is what shapes the emergence and adoption of artificial intelligence and innovative solutions associated with it. It is human intelligence that seeks to ask 'why' and considers 'what if' through critical thinking.

As engineering design continues to be challenged by complex problems and quality of data, the need for human oversight, expertise and quality assurance is essential in using AI generated outputs.

VI. Will AI replace human intelligence?

No overall, AI cannot replace human intelligence. Following are the reason:-

1. Human intelligence is a product of millions of years of learning and fine-tuning.Our cognitive skills and abilities are evolved to a point that we can multi-task, respond to new circumstancesand changes effectively, adapting to a dynamic environment, handle abstract ideas and complicated tasks, process even vague commands, be flexible and so on.

2. Human intelligence includes interpersonal and intrapersonal intelligence which enables humansto process emotions, make observations, respond to sensitive information, make judgments, creativelysolve problems, etc. Both of these are human prerogatives and cannot be mimicked by machines.

3. AI being a replicated version of the human intelligence, will require several times more R&D, instructions and investments to be able to completely mimic the human intelligence or become superior to it. At best, AI can be a powerful tool for humans to use to improve the way the world functions.

VII. Advantages and Disadvantages of Artificial Intelligence

Advantages:

1. Reduction in Human Error:-

The phrase "human error" was born because humans make mistakes from time to time. Computers, however, do not make these mistakes if they are programmed properly. With Artificial intelligence, the decisions are taken from the previously gathered information applying a certain set of algorithms. So errors are reduced and the chance of reaching accuracy with a greater degree of precision is a possibility.

Example: In Weather Forecasting using AI they have reduced the majority of human error.

2. Takes risks instead of Humans:-

This is one of the biggest advantages of Artificial intelligence. We can overcome many risky limitations of humans by developing an AI Robot which in turn can do the risky things for us. Let it be going to mars, defuse a bomb, explore the deepest parts of oceans, mining for coal and oil, it can be used effectively in any kind of natural or man-made disasters.

Example: Have you heard about the Chernobyl nuclear power plant explosion in Ukraine?

At that time there were no AI-powered robots that can help us to minimize the effect of radiation by controlling the fire in early stages, as any human went close to the core was dead in a matter of minutes. They eventually poured sand and boron from helicopters from a mere distance.

3. Available 24x7:

An Average human will work for 4–6 hours a day excluding the breaks. Humans are built in such a way to get some time out for refreshing themselves and get ready for a new day of work and they even have weekly of fed to stay intact with their work-life and personal life. But using AI we can make machines work 24x7 without any breaks and they don't even get bored, unlike humans.

Example: Educational Institutes and Helpline centres are getting many queries and issues whichcan be handled effectively using AI.

4. Helping in Repetitive Jobs:-

In our day-to-day work, we will be performing many repetitive works like sending a thanking mail, verifying certain documents for errors and many more things. Using artificial intelligence we canproductively automate these mundane tasks and

can even remove "boring" tasks for humans and freethem up to be increasingly creative.
Example: In banks, we often see much verification of documents to get a loan which is a repetitivetask for the owner of the bank. Using AI Cognitive Automation the owner can speed up the processof verifying the documents by which both the customers and the owner will be benefited.
5. Digital Assistance:-

Some of the highly advanced organizations use digital assistants to interact with users which save the need for human resources. The digital assistants also used in many websites to provide thingsthat users want. We can chat with them about what we are looking for. Some chat bots are designedin such a way that it's become hard to determine that we're chatting with a chatbots or a human being.
Example: We all know that organizations have a customer support team that needs to clarify the doubtsand queries of the customers. Using AI the organizations can set up a Voice bots or Chatbots which canhelp customers with all their queries. We can see many organizations already started using them ontheir websites and mobile applications.
6. Faster Decisions:-

Using AI alongside other technologies we can make machines take decisions faster than a human and carry out actions quicker. While taking a decision human will analyse many factors both emotionally and practically but AI-powered machine works on what it is programmed and delivers the results in a faster way.
Example: We all have played Chess games in Windows. It is nearly impossible to beat CPU in the hardmode because of the AI behind that game. It will take the best possible step in a very short time according to the algorithms used behind it.
7. Daily Applications:

Daily applications such as Apple's Siri, Window's Cortana, and Google's OK Google are frequently used in our daily routine whether it is for searching a location, taking a selfie, making a phone call, replying toa mail and many more.
Example: Around 20 years ago, when we are planning to go somewhere we used to ask a person who already went there for the directions. But now all we have to do is say "OK Google where is Visakhapatnam".It will show you Visakhapatnam's location on Google map and the best path between you and Visakhapatnam.
8. New Inventions:-

AI is powering many inventions in almost every domain which will help humans solve the majority of complex problems.
Example: Recently doctors can predict breast cancer in the woman at earlier stages using advanced AI-based technologies.

Disadvantages:-

As every bright side has a darker version in it. Artificial Intelligence also has some disadvantages. Let's see some of them
1. High Costs of Creation:-

As AI is updating every day the hardware and software need to get updated with time to meet the latest requirements.
Machines need repairing and maintenance which needs plenty of costs. It's creation requires huge costs as they are very complex machines.
2. Making Humans Lazy:-

AI is making humans lazy with its applications automating the majority of the work. Humans tend to get addicted to these inventions which can cause a problem to future generations.
3) Unemployment:-

As AI is replacing the majority of the repetitive tasks and other works with robots, human interference is becoming less which will cause a major problem in the employment standards. Every organization is looking to replace the minimum qualified individuals with AI robots which can do similar work with more efficiency.
4. No Emotions:-

There is no doubt that machines are much better when it comes to working efficiently but they cannot replace thehuman connection that makes the team. Machines cannot develop a bond with humans which is an essential attributewhen comes to Team Management.
5. Lacking Out of Box Thinking:-

Machines can perform only those tasks which they are designed or programmed to do, anything

out of that they tend to crash or give irrelevant outputs which could be a major backdrop.

VIII. HOW AI IS USEFUL FOR HUMANS?

It is an undeniable fact that AI is a powerful tool. It is also true that the attention level and focus of human beings have shrunk greatly owing to the availability of excess information around us.
The voluminous amounts of data generated cannot be fully understood and analysed by human intelligence and when added with the shrinking attention spans and plateauing cognitive growth in the past few years, accentuates the problem further. With the help of AI and Machine Learning, we can make sense of these data and unearth hidden patterns, trends and correlations.

By leveraging the insights so produced, we can improve our personal and professional lives and engage in better decision-making, improve the overall efficiency of our work and so on. For instance, using AI in education technology, we can create superior learners with higher order skills by making them better understand their strengths and weaknesses, helping them devise methods to overcome their mistakes and effectively understand a given subject.

Conclusion

Artificial intelligence (AI) and human intelligence delve into cognitive functions such as memory, problem-solving, learning, planning, language, reasoning, and perception.
AI is also sometimes referred to as machine intelligence. It was founded as an academic discipline in 1956 which is also the same year when the term "artificial intelligence" was coined by John McCarthy.
The four types of AI are reactive machines, limited memory, theory of mind, and self-awareness.

Human intelligence is commonly measured through IQ tests which typically cover working memory, verbal comprehension, processing speed, and perceptual reasoning. Some of the theories on human intelligence are multiple intelligence, triarchic, and PASS.

As compared to human intelligence, AI can process information faster using less energy. AI is more objective and accurate than human intelligence.

Human intelligence is better at multitasking, adapting, social interaction and self-awareness than AI. The general function of AI is optimization while that of human intelligence is innovation.

REFERENCES

[1] WWW.HACKERNOON.COM
[2] WWW.FUTURE OF LIFE .ORG
[3] WWW.MEDIUM.COM
[4] WWW.AURECONGROUP.COM
[5] WWW.MY GREATLEARNING.COM
[6] WWW.WIKIPEDIA.COM

Li-Fi Technology, the future of Wireless Communication

Adish Jain[1], Priyank Singhar[2], Diksha Jain[3]

[1]*First Department, FirstUniversity, Address*

[*]*Second Company*
Address Including Country Name

[3]*Third Department, ThirdUniversity,Address*

[1]adish21sep@rediff.com

[2]second.author@second.com

[3]third.author@third.com

***Abstract*— Li-Fi i.e. Light Fidelity is a new pathway towards high speed internet. In 2011, while speaking in TED Talks, German Physicist Harald Haas first spoke about it. It is a Visible Light Communication Technology (VLC) which uses LEDs for transmission of the data. The light is used as a medium of high-speed communication just like Wi-Fi. It is extremely useful in handling the heavy amount of data.Li-Fi will take the wireless communication to the next level by overcoming the challenges of the current Wi-Fi technology. It can be used at the places like hospitals, where radio waves can be hazardous. Another advantage of Li-Fi is, the high security of data, which makes it very useful in military operations. It will also play a vital role in the research where conditions can be life threatening for human beings.**

This paper focuses mainly on its technological aspects, features, comparative study with Wi-Fi technology, implementation and new developments based on the studies done so far.

***Keywords*— Li-Fi, Wi-Fi, Radio Spectrum, Wireless Communication, Visible Light Communication (VLC), (Light Emitting Diodes) LEDs**

I. INTRODUCTION

As the communication in today's era has become the key factor in any domain, people are seeking for more efficient ways of communication and Li-Fi is one of them. It uses LED lights to transmit data in wireless mode. The speed of the current wireless networks depends on the number of devices connected to them. It further calls for the issue of the security of the network. Unlike Radio Waves Li-Fi has got a much broader spectrum for transmission of data.

The German Physicist Herald Hass introduced this concept at "data through illumination" in his TED talks, in 2011. Hence, he and his team at University of Edinburg are known as the pioneers of this concept.

It works on Visible Light Communication (VLC). In this technology data is transferred through LED light with modulating light intensities faster than those can be captured by human eyes, by using the Visible Spectrum as well as ultraviolet and infrared radiations. The data is transferred with the modulating frequency of light and is then received by a photo sensitive detector. This light signal is then demodulated in the form of electronic signal. Special LED bulbs are used for the illumination of the data and a photo detector is used on the other end to detect the signal. Hence, these bulbs transmit the data as well as provide the light. Its other advantage is low cost involved and low maintenance required.

It also solves the issue of Data Security as it cannot be accessed without the presence of light. This makes it fit for the use in Military Communications or any other communications which calls for high level of security. Li-Fi is already in use in the fields like Military Operations, Hospitals, Retails, Aircrafts etc. It is also extensively used by the Scuba Divers. Let us further discuss about the various aspects of Li-Fi Technology.

II. DIFFERENCE BETWEEN LI-FI AND WI-FI

The Li-Fi Technology is very new compared to the Wi-Fi Technology, which is in use since last many years. Following table briefly highlights the differences between the two technologies.

Sr. No.	Li-Fi	Wi-Fi
1	Light is used for the transmission	Radio Waves are used for the transmission
2	Technology uses IrDA Compliant Devices	Technology uses WLAN standard compliant devices
3	Is used in Hospitals, Airlines, Under Sea etc.	Is used only with the help of Wi-Fi Hotspots
4	It is more secured as light gets obstructed and then doesn't allow the information to pass ahead	Different security techniques need to be implemented to achieve the security
5	The speed achieved is up to 1Gbps	The Speed achieved is up to 150Mbps with WLAN
6	Can work in the environment with high data	Can work in the environment with low data

	density	density due to high network traffic issues
7	Network coverage is about 10 meters	Network coverage is about 32 meters
8	Component of the System: Lamp Driver, LED Bulb and Photo Detector	Component of the System: Computer and Router Installation

We can further compare both the technologies on the basis of some more technological and non-technological parameters as follows:

Parameter	Li-Fi	Wi-Fi
Speed	***	***
Range	*	**
Data Density	***	*
Security	***	**
Reliability	**	**
Power Availability	***	**
Transmitter / Receiver Power	***	**
Ecological Impact	*	**
Device to Device Connectivity	***	***
Obstacle Interface	***	*
Bill of Material	***	**
Market Maturity	*	***

*- Low, ** - Medium, *** - High

III. FUNCTIONING OF LI-FI

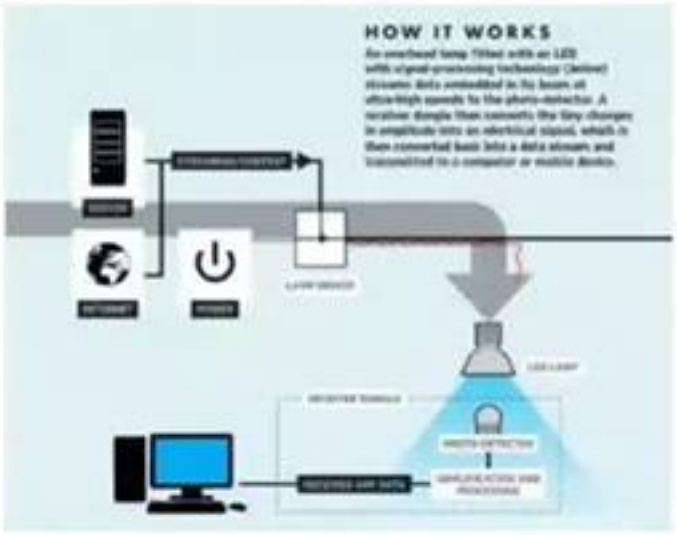
The process of Visible Light Communication (VLC) basically uses the visible light for Data Communication in Li-Fi. It requires a transmitter and a receiver. The transmission of data takes place by switching the lights ON and OFF. The transition between these ON and OFF is so fast, that the normal human eyes cannot sense it.

Harald Haas said in the explanation, "Very simple, if the LED is on, you transmit a digital 1; if it's off you transmit a 0. The LEDs can be switched on and off very quickly, which gives nice opportunities for transmitting data."(1)LED is chosen as it consumes comparatively less power than other visible light sources. Other sources like Solar Cells, LASER can be used in place of the LED.

Harald Haas said in EDINBURGH UNIVERSITY "… a solar cell has become a receiver for high speed wireless signals encoded in light, while maintaining its primary function as an energy harvesting device…"(1)Thus, the energy from solar cells on roof or translucent window glass can also be used as a receiver in Li-fi wireless communication.

Following is a structure of Li-Fi:

Transmitter:LED is used as a transmitter of the signal. The ON state of LED transmits 1 and the OFF state transmits 0. For more complex Data communication multiple LEDs or LEDs of different colours can be used.



REAL LIFE APPLICATIONS OF LI-FI(2)

Receiver:As the data transmitted is in light form, it is needed to be modulated in digital signal. It is done with the help of a silicon photo diode. Following are the modulation techniques which are commonly used:

- **OFDM:** Orthogonal frequency-division multiplexing
- **OOK:** On-off keying
- **PWM:** Pulse-width modulation
- **PPM:** Pulse-position modulation
- **SIM-OFDM:** Sub-carrier Index Modulation(3)

Working of Li-Fi instrument:

As we discussed, Li-Fi technology is a wireless communication system which uses the visible light frequencies between violet (800Thz) to red (400THz). Whereas the Wi-Fi technology uses the electromagnetic spectrum. Li-Fi sends the amplitude modulated data in a standardized way. The operating speed of an LED is less than 1μS, which is much faster than what the human eye can detect. The switching of the LED is used for the transmission of the data in Binary Code. The ON state of the LED transmits 1 and OFF state transmits zero. The lamp driver shown in the figure above, drives the output intensity of the LED based on the input signal. Unlike Fiber Optics, Li-Fi protocol layers are

suitable for wireless communication over a very short distance of 10 meters. Hence it is an extremely fast and efficient way of wireless communication over a short distance.

On the receiving end, the date in the form of light signal is received and decoded for the information. It is further displayed on the device connected to the receiver. Photo detector is used here as a receiver, which registers binary '1' and '0' as per the state of the transmitting LEDs. An array with numerous LEDs can be used to transmit the data, that helps in achieving the speed of hundreds of Mbps.(4)

IV. Limitations and Challenges of Li-Fi

1. As the visible light acts as a data carrier, LI-Fi can work only in the direct source of light.

2. As light gets obstructed and cannot pass through many mediums, there should not be any barrier between sender and the receiver.

3. There should not be other sources of light as they will disrupt the signal, which is the most prominent drawback of the Li-Fi. Even sun rays are not an exception to this.

4. Infrastructure required for the implement of this mode of communication is entirely different.

5. Li-Fi can be only used in point to point communication as a high frequency (400-800 THz) used here leads to short distance coverage.

6. Li-Fi enabled devices can be installed only in limited type of places as the constant line of sight needs to be maintained between the sender and the receiver.

7. It is yet to be developed for the use on mass scale.(5)

V. Myths of Li-Fi Technology

The technology also has some myths, like:

1) It is 100 time faster than Wi-Fi: This is not true. The highest speed received with the current Li-Fi Standards is 7Gbps, and that of Wi-Fi is 224Mbps.
2) Heady files videos etc. can be downloaded within a minute or two: This is not true. Speed of Li-Fi also depends on the speed of internet and server. Currently there are no servers or internet available which can support such a high speed.(6)

VI. Future Scope

Still, Li-Fi technology not a widely spread technology and also not much known to the people unlike Wi-Fi. It is still in an implementation phase. It will be definitely helpful in solving the current network issues and help in overcoming the limitations of current wireless network. Radio frequencies are harmful and cannot be used at many places like hospitals etc.Radio waves are not only dangerous to the patients but can also affect readings of machines like MRI machines etc. Li-Fi can help solving this problem. Also, in the military operations which calls for the higher level of security and secrecy, RF communication cannot be used, in such cases Li-Fi could be used to transmit data. Li-Fi also provide total privacy of data, hence it is used extensively where the data secrecy is of paramount importance. RF communication underwater is not possible as water absorbs such signals and they also affect the marine life. Li-Fi can be used here effectively, though only for the transmission range will be shorter. Use of Li-Fi in traffic systems looks difficult immediately, due to the challenge of interreference of the other light sources, however if it could be used through the street lamps and it would serve as Li-Fi hotspot too.(7)

Thus, Li-Fi could be used to provide a better communication in various ways. Data transmission could be more efficient and faster. It would be a great solution for the transmission of the heavy data.

VIII. Conclusion

The advancement in research on Li-Fi technology promises its accessibility to the common man in near future. It will be highly beneficial for the research work in life threatening areas, medical field and in military operationswhere secured communication is a primary need.

Though Li-Fi technology will open new avenues of communication if it successfully replaces Wi-Fi and other broad band networks,theinterfering atmospheric and other sources of lights can lead to the data loss over different access points.

References

1. *Wireless data from every light bulb.* **Haas, Herald.** Edinburgh ,Scotland : s.n., July 2011. TED Global.
2. **Anwesha Chakraborty, Ashoke Nath, Trina Datta.** Research gate. [Online] https://www.researchgate.net/publication/322616897.
3. *Scope and Challenges in Light Fidelity (LiFi) Technology in Wireless Data Communication.* **Shubham Chatterjee, Shalabh Agarwal, Asoke Nath.** Kolkata, India : s.n. Department of Computer Science St. Xavier"s College (Autonomous) St. Xavier"s College (Autonomous).
4. *A review paper on Li-Fi Technology.* **Nischay.** Jaipur, India : VIMPACT, 2017. International Journal of Engineering Research & Technology (IJERT).

5. *Recent Advancements in LI-FI Technology.* **A. M. Sonnad, A. Gopan, Sailakshmi N R, Divya S, Ambika R.** Dec. 2013, International Journal of Electrical, Electronics and Data Communication, pp. vol. 1, issue. 10, pp. 61-63.
6. **What is Li-Fi? *Youtube*. [Online] https://www.youtube.com/watch?v=8FfZ5j1RKgA&feature=share.**
7. **Gothi Tharunn, G Dixith Reddy, Virisha Timmaraju.** ***Li-Fi: The future of wireless technology*. Hyderabad,Telangana,India : ENTC Department, GITAM University Rudraram,.**

Monowheel

Research paper submitted in partial fulfillment of the requirement for the degree of

Bachelor of technology
in
mechanical engineering

Paras Jain, ashhad Ali, Mr. K.b anand, Mr. Harish Kumar

[1]*CCSIT, Teerthanker mahaveer university, Moradabad*

Introduction

A **monowheel** is a one-wheeled single-track vehicle similar to a unicycle. Instead of sitting above the wheel as in a unicycle, the rider sits either within the wheel or next to it. The wheel is a ring, usually driven by smaller wheels pressing against its inner rim. Most are single-passenger vehicles, though multi-passenger models have been built. Hand-cranked and pedal-powered monowheels were patented and built in the late 19th century; most built in the 20th century have been motorized. Some modern builders refer to these vehicles as **monocycles**, though that term is also sometimes used to describe motorized unicycles. Today, monowheels are generally built and used for fun and entertainment purposes, though from the 1860s through to the 1930s, they were proposed for use as serious transportation.

The world speed record for a motorized mono wheel is 98.464 km/h (61.18 mph).

1. Design

1.1 design of mono wheel

Then mono wheel with an effective power transmission system has to be designed such that it can be handled and controlled by a single person even in the rest position. The main and basic constraints that are being taken into consideration are :-

1. Height of the person riding the vehicle

2. Maximum weights that the vehicle can withstand

3. Power transmissions

1.2 height of the person riding the vehicle

According to the survey conducted an independent research organization average height of the person in india is 1.67m.this includes the people from both the genders .so the vehicle has been designed for people whose height lies in the range of 1.6m (5' 2")-1.8m (5' 9").the average length of a leg person is 1.0m and the height variation is mainly due to the variation in the growth of upper part of the body. So the vehicle accounts to a mean diameter of 1.4m of which 0.6m consists of the transmission system and the lower part of the body i.e. The legs and the lower abdomen manage this area of the vehicle and the upper part of the body occupy the rest of the

area. The key advantage of this design is that the rider can easily balance the entire vehicle with the help of his legs and the person can feel comfortable while riding the vehicle.

1.3 maximum weight the vehicle canwithstand

The vehicle that is fabricated should be able have a specification of the weight that it can bear. This is the maximum weight bearing capacity of the vehicle. So, we have taken into consideration that the maximum weight of the rider to be 80kgs.

2. Statement of the problem or hypothesis

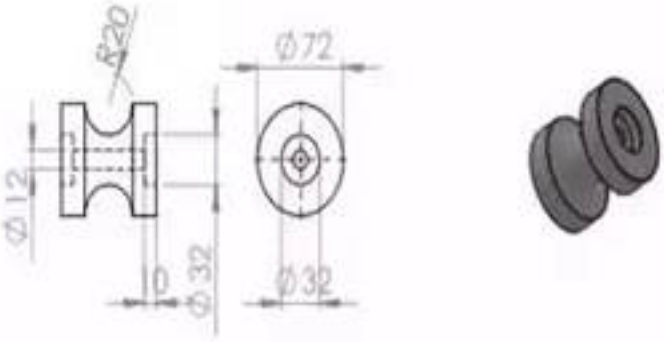
1. The monowheels are very unstable in low speed but very stable in speeds over 30km

2. As we are talking about a stability of the vehicle we have to ensure that center of gravity and center of mass stays low so rider don't feel unstable when taking turn or vehicle doesn't falls to one direction.

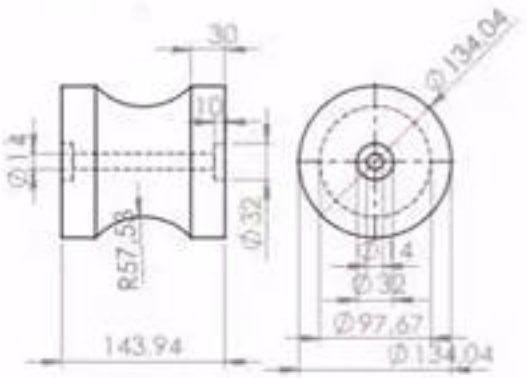
3. As for braking system instead of using hard braking we have to use soft braking.

3. Progress

We have completed design phase 1 which includes main design of mono wheel and some parts design. Case study have to be done and proper analysis needed which will take around i week.

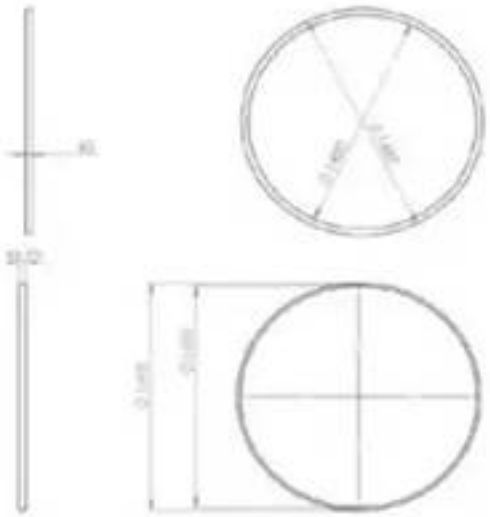


Supporting wheel



Driven wheel

basic design of mono wheel



Main wheel andtyre dimension

3.1 whatisclaimedits:

1.avehiclecomprising:awheelhavingadiameter,ano uterperipheryofthewhelforcontacting asurfacefor movingrelativetothesurfaceasupportstructurecircum scribed bythe wheel,wherein thewheelrotatesaboutthesupportstructure;a propulsion systemcircumscribedbythewheelandconnectedtoth esupportstructure,thepropulsion system beingcoupledtothewheelforrotatingthewheelaround thepropulsion system,thuspropellingthewheelalong thesurface;andanautomaticbalancingsystemcircums cribedbythewheelandconnected tothe supportstructure,thebalancing systemcomprising:aflywheelthatiscontrollabletospi naroundaflywheelspinaxis,theflywheelspinaxisbein gconnected to the supportstructurebyapivotthat isrotatable to orientthe flywheel indifferentdirections, whereby changingadirectionoftheflywheelspinaxis placesa torqueonthesupportstructure;andacontrolsystemcon figuredtoreceivesignalsfromoneormoresensorsinthe vehicle providingbalancingapropulsionmotor;atransmissio n systemcoupledtothepropulsionmotor;thetransmissi on system providingadrivetorque;adifferentialgearassembly coupled tothetransmissionsystemandtothefirstwheelandthes econdwheel,the differentialgearassemblysplitting thedrivetorque between the firstwheel and the secondwheel while allowingthefirstwheelandthesecondwheeltorotateat differentspeeds;andasteeringassemblycoupletothedi fferentialgearassembly,thesteeringassemblycompri singasteeringmotor,thesteeringassemblybeingconfi guredtosupplyasteeringtorquetothedrive torque,wherethesteeringtorque isoppositelyappliedtothefirstwheelandsecondwheel tocontrol relativerotations ofthefirstwheel andthesecondwheel,enablingthefirstwheel andtheseCondwheeltorotateinoppositedirectionstotu rnthevehicle.

2.the vehicle ofclaim1whereinthewheelisafirstwheel,thevehiclefu rthercomprising

asecondwheel,whereinthesupportstructure,propulsi on systemandbalancing systemarecircumscribedbythefirst wheelandthesecondwheel, whereinthefirstwheelandthesecondwheelarecoupled to thepropulsionsystemsuchthatthefirstwheelandthese cond wheel

3.Thevehicleof claim**1** whereinthepropulsion systemcomprisesa propulsionmotorandtransmission couplingthe propulsionmotortothewheel.

4.Thevehicleofclaim**1**whereinthecontrolsystemorie nts theflywheelindifferentdirectiontosteerthevehicle.

5.Thevehicle ofclaim**1** wherein theflywheelisafirst flywheel, thevehicle furthercomprising asecondflywheel thatiscontrollabletospinarounditsassociatedflywheel spin axis,theassociatedflywheelspinaxisbeingconnectedt otheseCondwheelare coaxial andthewheelarepiratedbyalmost20o%1 ofonewheeldiameter.

6. thevehicleofclaimwhereinthesecondflywheelis configured tocancelanyunwantedtorquegenerated bythe firstflywheel.

7.
thevehicleofclaim**1**whereinthecontrolsystemcompri sesaflywheelorientation motorcoupledtotheflywheel spinaxistochange the directionoftheflywheelspinaxis.

8.thevehicleof claim**1**whereinthecontrolsystemcomp rises abraking structurethat decelerates rotation ofthe flywheel toprovideatorqueonthe supportstructurefor changingatiltothevehicle.

9.the vehicleof claim**1**whereintheflywheel comprisesamotorthatrotates abouttheflywheel spinaxis,thecontrol systemcomprisingapowersystemcoupledtothemotor ,thecontrol systembeingconfiguredtosupplydifferentdrivesig nalstothemotortovaryarotationalspeedofthemotorto adjusttheattitudeofthevehicle.

10. Thevehicle of claim **1** wherein thewheel is afirstwheel, the vehicle further comprising a secondwheel, whereinthesupportstructure,propulsionsystem,andb alancingsystemarecircumscribedbythefirstwheelan dthesecondwheel,whereinthefirstwheelandthesecon dwheelare coupledtothepropulsionsystemsuchthatthefirstwhee land thesecondwheelmayrotateatdifferentspeeds,andwhe reinthepropulsionsystemcomprises:thefirstwheelfo rcontactingafirst portionofasurface;asecond wheelhavingadiameterequaltothefirstdiameter,anout erperipheryofthesecondwheelcontactinga secondportionofthesurface;asupportstructurecircu mscribedbythefirstwheelandthe secondwheel,wherein thefirstwheel andthesecond wheelrotateaboutthesupportstructure;apropulsionsy stemcircumscribedbythefirstwheelandthesecondw heelandconnectedtothesupportstructure, thepropulsion system beingcoupledtothefirstwheel andthesecondwheelforrotatingthefirstwheelandthe second wheelaroundthepropulsion systeminasame directiontopropelthevehicleinaforwarddirection,th e propulsion system providingadrivetorquetothefirst wheelandthesecondwheel;anda steering assembly coupled tothe firstwheel andthe secondwheel,thesteeringassemblycomprisingasteeri ngmotor,the steeringassembly being configured to supplyasteering torquetothedrivetorque,wherethe steeringtorque isoppositely appliedtothefirstwheel andsecondwheeltocontrolrelativerotationsofthefirst wheelandthesecondwheel,enablingthefirstwheeland thesecond wheeltorotateinoppositedirectionstoturn

thevehiclewhenthefirstwheelandthesecondwheelare bothincontactwiththesurface.

11.thevehicle of claim **1** wherein thevehicle hasroll,pitch,andyawaxes,andwherein theautomatic balancing systemprovidestorquesabouttheroll,pitch,andyawax es.information,thecontrolsystembeingcoupledtothe 20pivottoorientthe flywheelin differentdirectionsto adjustanattitudeofthevehicleformaintaining balanceofthevehicle.

12.thevehicleof claim**1**whereintheoneormoresensors compriseaplurality ofattitudesensorsfordetermining orientationofthevehicle.

13.thevehicleof claim**1**whereinacenterofmassofthe vehicleislocatedbelowanaxisofrotationofthewheel.

14. Thevehicle of claim **1** wherein thewheel is afirst wheel, the vehicle further comprising a second wheel, whereinthesupportstructure,propulsionsystem,andb alancingsystemarecircumscribedbythefirst wheelandthesecondwheel,whereinaxesofrotationoft hefirstwheelandthewheelmayrotateatdifferentspeed s.

15.thevehicleof claim**1**whereinthewheelcomprisesa tire,wherein aprofileofthetireperpendiculartothetire's diameter isacurve,thecurvebeingconvexawayfromthecenterof massofthevehiclesuchthatthevehicle'scenterofmass isataminimum gravitationalpotential energystateat zeroleanofthevehicle.

16.avehiclecomprising:afirstwheelhavingafirstdiam eter,anouterperipheryofsupportstructurebyanassoci ated pivotthatisrotatable to orientthesecondflywheel indifferentdirections,whereby changing adirection ofthe associated flywheel spinaxis placesatorqueonthesupportstructure.

17.thevehicle ofclaim**16**wherein thedrivetorqueis substantially zerowhenthesteering assemblyrotatesthefirst wheelandthesecondwheelinoppositedirections.

18.thevehicleof claim**16**whereinthepropulsion system comprises:apropulsionmotor;atransmission systemcoupledtothepropulsionmotor,the transmission systemprovidingthedrivetorque;anddifferentialgea rassembly coupled tothetransmission systemandtothefirstwheelandthesecondwheel,the differentialgear assembly splittingthe drive torque between thefirstwheel andthesecondwheelthereby allowingthefirstwheelandthesecondwheeltorotateat differentspeeds,whereinthesteeringassemblyiscoupl edtothedifferentialgearassembly.

19.thevehicleof claim**16**whereinthepropulsionsyste m comprises:adifferentialgearassembly,thedifferential gearassemblycomprisingafirst differentialgearcoupledtothefirst wheelandasecond differentialgearcoupledtothesecondwheel,thedifferе ntialgearassembly splittingthedrive torquebetween the firstwheel andthe second wheelthereby allowingthefirstwheelandthesecond wheeltorotateatdifferentspeeds;whereinthesteeringa ssembly comprises asteeringgearengagingthefirstdifferentialgearandth eseconddifferentialgear,the steeringgearbeing coupled tothe steeringmotorforrotatingthesteeringgeartocausethef irstdifferentialgearandtheseconddifferentialgearto rotateinoppositedirections.

20.thevehicleof claim**19**whereinthesteeringgearisa piniongearthatengagesteethofthefirstdifferentialgea rand theseconddifferentialgear,whereinthepiniongearrot ates

aboutitsaxisofrotationtorotatethefirstdifferentialgea randtheseconddifferentialgearinoppositedirections.

21.thevehicleofclaim**20**whereinthepiniongearalso rotates inaplane parallel tofirstdifferentialgearandthe seconddifferentialgear when the vehicle is moving ina forwarddirection.

22.amethod foratomaticallybalancingavehicle, thevehicle being ofthe type comprising awheel, the wheel havingadiameter,anouterperiphery ofthewheelforcontactingasurfaceformovingrelativet othesurface,thevehicle furtherincludingasupportstructurecircumscribedby the wheel,whereinthewheelrotatesaboutthesupportstruct ure,the vehicle furtherincludingapropulsionsystemcircumscribed bythewheelandconnectedtothesupportstructure,thep ropulsionsystembeingcoupledtothewheelforrotating thewheelaroundthepropulsionsystem,thuspropellin gthewheelalongthesurface,thevehiclerequiring anautomatic balancing systemtobeinabalanced state,themethodcomprising:providingaflywheel, circumscribed bythe wheel, that spinsaroundaflywheelspinaxis,theflywheelspinaxis beingconnectedtothesupportstructurebyapivot;sensi nganimbalanceinthevehicle;andinresponsetosensin gtheimbalance,automaticallyrotatingtheflywheelaro undthepivottochangeadirectionof the flywheel spinaxis so astoplace atorqueonthe supportstructuretoadjustanattitudeofthevehicle.

23.themethodofclaim**22**furthercomprisingchanging arotational speedoftheflywheelaroundthespinaxistherebyplacin gatorqueonthesupportstructuretoadjust anattitude ofthevehicleformaintaining balanceofthevehicle.

24.themethodofclaim**23**whereinchangingarotationa lspeedoftheflywheelaroundthespinaxis comprisesrollaxis beingparalleltothesurfaceincontactwiththewheel andinthedirectionofmovementofthevehicle.

25.themethodofclaim**22**whereinrotatingtheflywheel aroundthepivotcorrectsforimbalanceaboutarollaxis,t hedirection topropelthe vehicle inaforwarddirection,the propulsionsystemprovidingadrivetorquetothefirst wheel andthesecondwheel;themethodcomprising:providin g asteeringassembly coupledtothefirstwheel andthesecondwheel,thesteeringassemblycomprisin g asteeringmotor;separatefrom thepropulsionsystem; andactuatingthesteeringmotortosupplyasteeringtor quetothedrive torque,wherethesteering torqueisoppositely appliedtothefirstwheel andsecondwheeltocontrol relativerotationsofthefirstwheelandthesecondwheel enablingthefirstwheelandthesecondwheeltorotatein opposite directions totumthevehicle when the firstwheelandthesecondwheelarebothincontactwitht he surface.

26.the methodofclaim**22**furthercomprisingrotatingthe flywheel around thepivot, so astoplace atorqueonthe supportstructure,causingthevehicletolean in ordertosteer thevehicle.

27.themethodofclaim**22**furthercomprisingchanging arotationalspeedoftheflywheelaroundthespinaxis,so asto placeatorqueonthesupportstructure,causingthevehic leto leaninordertosteerthevehicle.

28.the methodofclaim**22**furthercomprisingperforming atleastoneofrotating the flywheel around thepivot and changingarotational speedoftheflywheelaroundthespin axisforrightingthevehiclefromahorizontalposition.

29. Themethodofclaim**28**whereinthevehiclehasarollaxis,whereinrightingthevehiclefromahorizontalposition comprises:establishingafirstangularmomentumoftheflywheelorientedsubstantiallyparalleltotherollaxis;and changingtheangularmomentumtocausereactionarytorque,rightingthevehicle.

30. Themethodofclaim**29**whereinchangingtheangularmomentum comprisesbrakingtheflywheel.

31. Themethodofclaim**30**whereinbrakingtheflywheelis sufficientlyrapid tocause the vehicle toexperience an aerialphaseasitisrighted,wherethevehicleistemporarily notincontactwiththesurface.

32. Themethodofclaim**22**whereinsensinganimbalanceinthe vehicle androtating the flywheel around the pivot comprises:determining apresentattitudevectoroftheVehicle;determining anet torquevectorthat, if providedtothe vehicle,wouldprovidean accelerationaboutroll,pitch, andyawaxesofthevehicle;determining controlsignalsneededtochangeanangularmomentumoftheflywheel;andapplying said control signals to produce a desired net torquevector.

33. Themethodofclaim**22**whereinsensinganimbalance inthe vehicle androtating the flywheel around the pivot comprises:determining apresentattitudevectoroftheVehicleandatimerateofchangeoftheattitudevector;determining anet torquevectorthat, if providedtothe vehicle,wouldprovidean accelerationaboutroll,pitch, andyawaxesofthevehicle;determining controlsignalsneededtochangeanangularmomentumoftheflywheel;andapplying said control signals to produce a desired net torquevector.

34.amethodforsteeringavehicle,thevehiclebeingofthe typehaving afirstwheel having afirstdiameter, anouter periphery of thefirstwheel contacting afirstportion of a surface,thevehiclealsoincludingasecond wheelhavinga diameterequaltothefirstdiameter,anouterperipheryof the secondwheelcontactingasecondportionofthesurface ,the vehiclealsoincludingasupportstructurecircumscribedby thefirstwheelandthesecondwheel,whereinthefirstwheel andthesecond wheelrotateaboutthesupportstructure,the vehiclealsoincludingapropulsionsystemcircumscribedby thefirstwheel andthe secondwheel andconnected tothe supportstructure,thepropulsionsystembeingcoupled tothe firstwheelandthesecondwheelforrotatingthefirstwheel andthesecondwheelaroundthepropulsion systeminasamemechanically brakingtheflywheel.

35. Themethodofclaim**34**whereinthepropulsion systemcomprises adifferentialgearassembly,thedifferentialgear assembly comprisingafirstdifferentialgearcoupledtothefirstwheelandaseconddifferentialgearcoupledtothesecondwheel,thedifferentialgearassembly splittingthedrivetorquebetweenthefirstwheelandthesecondwheelwhileasecondoutputshaftcoupledtoasecondwheelforrotatingthe secondwheel, the secondoutput shaftbeing coupledtotheseconddifferentialgearsuchthatrotation oftheseconddifferentialgearrotatesthesecondwheel adifferentialgearcouplingengagingboththefirst differential gear and the second differential gear so asto substantiallyevenly splitafirstinputtorquefromthe

firstrotatingelementbetweenthefirstoutputshaftand thesecondoutputshaft;andasecondrotatingelementdr ivenbyaseconddrivesystem, thesecond rotatingelementengagingthefirstdifferentialgearandt hesecond differentialgear,whereinrotatingthesecondrotatingel ementchangesatorqueapplied tothe firstdifferential gearby afirstmagnitude and changesa torqueappliedtothesecond differentialgear byasecondmagnitude oppositetothefirst magnitude.

36. Themethodof claim**35**whereinthesteeringgearisapi nongearthatengagesteethofthefirstdifferentialgeara ndtheseconddifferentialgear,whereinthepiniongearr otates aboutitsaxisof rotationtorotatethefirstdifferentialgea randtheseconddifferentialgearinoppositedirections.

37. Themethodof claim**36**whereinthepiniongearalso rotatesinaplaneparalleltothefirstdifferentialgearandt he seconddifferentialgear when the vehicle is moving ina forwarddirection.

38.adifferentialgearassemblycomprising:afirstrotati ng elementdrivenbyafirstdrivesystem;afirstdifferential gearcoupledtothefirstrotatingelement.

39. Thedifferentialgearassemblyof claim38whereinth e secondrotatingelementcomprisesapiniongearthateng ages teeth ofthe first differential gear and teeth of the second allowing the first wheel and the second wheel to rotate at different speeds, and wherein the steering assembly compasses a steering gear engaging the first differential gear and the second differential gear, the steering gear being coupled to the steering motor, the method further comprising: differential gear, wherein the pinion gear rotates about its axis of rotation to change the torque applied to the first differential gear by the first magnitude and change the torque applied to the second differential gear by the second magnitude opposite to the first magnitude actuating the steering motor for rotating the steering gear to cause the first differential gear and the second differential gear to rotate in opposite directions.

40. Thedifferentialgearassemblyof claim39whereinth e teethofthefirstdifferentialgearandtheteethoftheseco nddifferentialgearfaceeachother,andwhereinthepini ongear issandwichedbetweenthefirstdifferentialgearandthe seconddifferentialgear.

41. Thedifferentialgearassemblyof claim40whereinth e piniongearhasashaftthatextendsbeyondaperipheryoft he firstdifferential gearandtheseconddifferentialgear,whereintheshafti sengagedandrotatedbythesecondrotating element.

42. Thedifferentialgearassemblyof claim41wherein the pinion gear, by simultaneously engaging the teeth of the first differential gear and the teeth of the second differential gear, revolves around an axis of rotation of the first differential gear and the second differential gear while also allowing thepin whereinrotationofthefirst rotatingelementrotatesthefirstdifferentialgear;afirst outputshaftcoupledtoafirstwheelforrotatingthe firstwheel,thefirstoutputshaftbeingcoupledtothefirst differentialgearsuchthat rotationofthefirstdifferential gearrotatesthefirst wheel;asecond differentialgearcoupledtothefirstdifferential gearsoastoallowthesecond differentialgearandthe firstdifferentialgeartorotateatdifferentspeeds; angeartoindependently rotateaboutitsaxisof rotation.

43. Thedifferentialgearassemblyof claim42whereinth e secondrotating elementcomprisesaringgearthatcircumscribesthefirs tdifferentialgearandthesecond differential gear,theringgearengagingteethformedaroundthepini

ongearshaft,wherein rotation oftheringgearbytheseconddrivesystemrotatesthepin iongearaboutitsaxisofrotation.

4. Working methodology

We have to start our structure by making a big, metallic wheel with 140cm diameter using a tube of 40mm diameter. Then, we have to line the metallic wheel with a rubber in order to achieve having the benefits that all the tyres have on the street. Also, due to the fact that the wheel is big in size, we took 4 tyres from small motorbikes and we cut they as well as we glued the one with the other in order to form a tyre. Afterwards, we made 3 wheels with a bearing using teflon ptfe and on which the big wheel rolls. These three wheels were attached with the inside part of the wheel on a framework. On this framework, another machine 110cc 4 stroke was placed. This machine using a chain, enables a rubber wheel to move so this wheel enables the big

Deepfakes - a boon or a threat: A Review

Naman Mishra[1], Priyank Singhal[2], Shakti Kundu[3]
[1,2,3]*FOECS, Teerthanker Mahaveer University, Moradabad*
[1]namanmishra007@gmail.com
[2]priyanksinghal1@gmail.com
[3]shaktikundu@gmail.com

***Abstract*— Camera never lies used to be a popular saying but with the rise Image editing tools like Photoshop that quote was put into question a long back but Videos, videos were still solemn if you have a video of any person doing/saying something it has to be true. But all this was put into question with the rise of the Deepfake technology. With the availability of free to use apps, it is becoming very easy to create seamless Deepfakes. All you need is some relevant data and the software does all the heavy lifting. Deepfake technology if used with caution can change lives and save millions of dollars, but until now it seems to be doing more harm than good. It has been used in defamation, pornography, blackmail, and extortion. Therefore, we must be aware as to where we stand with the Deepfake technology and all it has the potential to do. Which is why through this paper, we tried to review this relatively new yet infinitely powerful tech and examine where we stand in a world where Deepfakes exist.**

Keywords— **Deepfakes, fake videos, Threats to leaders, scams, healthcare and Virtual Humans.**

I. INTRODUCTION

Manipulation of images, audio and video is not a new concept, the film industry has been doing it for decades but it has always been a time-consuming activity that can cost studios millions of dollars while having mixed results. This is where AI-driven Deepfake technology can help, Yes Deepfakes, a technology which many prominent personalities in the literary world have said, they see as a threat Democracy. Deepfake technology seems to be a big concern as it has the potential to generate fake news and give power to scammers. It at the same time also has the potential to become the next big thing in the world of Artificial Intelligence as it is extremely easy to use. Basically, anyone with a computer, an internet connection, and general knowledge can create a Deepfake. Many researchers have been able to create Deepfake videos which seemed almost real. What we found even more interesting is what the technology behind Deepfakes has the potential to do.

A. What are Deepfakes?

Fig. 1 Deepfake image of Donald Trump

In the term Deepfake, the word deep comes from the involvement of deep learning and the fake often refer to forged videos or audio. Deepfake are usually trained using the Generative Adversarial Networks(GANs), or autoencoders. Any video or audio which has been altered entirely or partially to give the impression that something happened, which in reality, did not happen is an example of Deepfake [1 , 2]. To create a Deepfake you need some image data of the person you want to add into a particular video as dataset A and then images of the face that will be replaced as Dataset B, these Data sets will be used to train our network to morph the two faces. The Faceswap.py software which is powered by Tensorflow, Keras, and Python can be used by normal users to create good Deepfakes [20]. In simple words, Deepfake can be any manipulated video that is created by an Artificial Intelligence and the intent of which is to appear real.

II. Impact of Deepfakes

Even though we are anticipating that the technology behind Deepfakes will be responsible for some great advancements in the world of Video Editing and Artificial Audio generation, the sad truth is until now this powerful technology has been associated with scammers, hacks, and Trolls. The technology has affected some in a very adverse way be it scamming companies out of millions using a fake voice module or using pornographic videos to blackmail women. What is even more worrisome is that some experts think this is the surface of what this tech can do in the hands of the wrong people. But all is not so grey as companies like Google, Adobe and numerous Silicon Valley start-ups are trying to come up with ways, the Deepfake technology can be positively utilized by the masses.

A. Content Creation

Fig. 2 Humen.ai at work

The truth is Deepfake technology is a gift to individual creators, who don't have huge budgets and teams for making and editing videos. The company Humen.ai is the best example of how Deepfake technology will one day become the epicenter of content generation, Humen is known for creating Deepfakes of people with no rhythm dancing perfectly, shown in fig 2 [3]. The amount of funny content already created with Deepfakes is enough of a sign that this technology will become popular with the creator community as more user-friendly Apps become available.

B. Cybercrimes and Deepfakes

Audio Deepfake has been used by scammers to get people to transfer money by pretending to be someone else over the phone. According to a report published on The Verge, "A UK energy company's chief executive was tricked into wiring €200,000 (or about 220,000 USD) to a Hungarian supplier because he believed his boss was instructing him to do so[4,5]. But the energy company's insurance firm, Euler Hermes Group SA, told the WSJ that a clever AI-equipped fraudster was using Deepfake software to mimic the voice of the executive and demand his underling pay him within the hour." This is just one of many instances and as the service gets more easily accessible it will only rise. Many startups across the globe are working towards the same tech and with the introduction of free to use Apps/Websites like LyreBird, FakeApp, Deepnude, and Faceswap.py, the bad seed of the world will continue to take advantage of these advancements.

C. Politics

Fig.3 Sample (A) Real (B) Comedien (C) Faceswap

Many believe that Deepfake will be used by politicians for their gain, as one wrong move and careers of many leaders can end not only this it is feared that corrupt politicians may use Deepfakes as an excuse to deny real evidence against them [6]. With the US Presidential election just around the corner experts are

worried that Deepfakes will be playing a prominent role to swing voters towards certain candidates [7].

III. How to Spot Deepfakes

[8]Deepfake detection is currently the priority of tech giants like Facebook, Google who are taking the approach of fighting AI created Deepfakes with their own respective AI's. This is becoming a major concern for various Government agencies and lawmakers all over the world as well who are turning to academic institutions to develop measures to detect Deepfakes [9]. We have a few methods currently used to spot Deepfakes

A. Human Moderators

The idea is simple companies hire human moderators who on the basis of few inconsistencies like inconsistent head poses, unnatural blinking, and inconsistent skin tones, decide whether a video is real or has been altered [10,11]. This is what was the basis of Deepfake detection for some time but as Deepfake AI Algorithms become better they are able to trick moderators so we needed more modern methods to spot Deepfakes.

B. Recurrent Neural Networks

This is as of yet is an experimental concept that has not been applied on a large scale. David Guera and Edward J. Delp of Purdue University used a temporal-aware system to automatically detect Deepfake videos and found a large collection of manipulated videos have shown that using a simple convolutional LSTM structure, they were able to accurately predict if a video had been subject to manipulation or not with as little as 2 seconds of video data [12]. The idea behind the method seems to be what can be the key to spot Deepfakes with less effort.

C. Browser plugins

We see a lot of content on our screen on a daily basis and it's hard to detect what's real and what's not this is where these plugins come, once added they will scan each page and tag any AI-generated content, Reality Defended by AI Foundation and Sursafe created by Ash Barth and Rohan Phadte are a great examples of how normal people can be alerted about Deepfakes [16, 17].

IV. Future of Deepfakes

Deepfakes came into mainstream attention in late 2017 when people's social media feed was filled with famous movies where faces of some actors were replaced with that of Nicolas cage. This made people think of Deepfakes as a technology that will save possibly millions of dollars and will bring advancements that could have never been thought of [18]. We have only being to understand how we can utilize this technology

A. The Film Industry

Fig. 4 Editing by professionals vs Deepfake made by fan

Warner Brothers reportedly spent over 25m Dollars and to remove some facial hair from Henry Cavil's face and even then the result came was horrible, which made a fan so furious that he trained deep learning algorithms with images of Cavil and ended up with a better result with-in 24 hours. Now imagine what a trained professional would be able to with this technology. We are yet to see the utilization of this tech by any major Film studios but sooner or later this technology will most probably replace all its more expensive counterparts [13, 19].

B. Educational Applications

This technology can be used to make learning more fun for future generations, think about it a video/hologram of Steve Jobs us about how we can create better products or Nicola Tesla

himself teaching about his accomplishments. This is possible if we put efforts of Deepfake towards this. This is how we can work towards making the prominent figures of our time immortal for generations to come.

C. Virtual Humans

Fig. 5 Human avatars created at Samsung labs

Every single person in fig.5 is a Digital avatar created by Samsung and not a real human being, So, Deepfake can be used to create specific Virtual humans for specific people and can act as an assistant, friend or as compadre. Taking the idea of virtual assistants such as Google Assistant or Cortana to the next level [14] .

D. Healthcare

Suggesting use of Machine Learning and AI in healthcare is often considered controversial as it will affect patient privacy [6,15]. But in research conducted by NVIDIA, MGH & BWH Center for Clinical Data Science and the Mayo Clinic it was found that using Deepfake Application such as GANs can potentially create medical images based on 10% real data which could be used to train Algorithms, yet the technology is very new and its too early for any use on a larger level.

Conclusion

Deepfake technology is now already among us which means that no matter what is done to control it, advancements in this field will be happening. What we need is for our world leaders to come together and create rules and regulations which will help in regulating the use of Deepfake technology, so that we can utilize the tech for all the good it has the potential to do. As for detection of Deepfakes, we think developing an AI while also maintaining human involvement in the process of detecting Deepfakes will be our best bet in this fight against Deepfakes. As for the future of the technology the possibilities are limitless, what made us most excited is the recent research finding of how tech Deepfake technology has the potential to contribute towards advancements in healthcare. Even with all the good and bad that comes with Deepfakes we are excited for what the future holds for Deepfake technology. We hope with this paper we were able to draw some of your attention to all that is happening with Deepfakes and were able to remove some stigma around the topic.

References

[1] The Emergence of Deepfake Technology: A Review November 2019 Mika Westerlund https://timreview.ca/article/1282

[2] Deep Learning for Deepfakes Creation and Detection by Thanh Thi Nguyen, Cuong M. Nguyen, Dung Tien Nguyen,Duc Thanh Nguyen and Saeid Nahavandi

[3] https://www.humen.ai/ Humen visited on 14/02/2019

[4] Deepfakes: A Looming Challenge for Privacy, Democracy, and National Security by BOBBY CHESNEY AND DANIELLE CITRON

[5] https://www.theverge.com/2019/9/5/20851248/deepfakes-ai-fake-audio-phone-calls-thieves-trick-companies-stealing-money

[6] Protecting World Leaders Against Deepfakes Shruti Agarwal and Hany Farid University of California, Berkeley Berkeley CA, USA

[7] https://observer.com/2019/06/deepfakes-combat-2020-elections/

[8] .https://www.nytimes.com/2019/11/24/technology/tech-companies-deepfakes.html

[9] https://edition.cnn.com/interactive/2019/01/business/pentagons-race-against-deepfakes/

[10] https://www.wired.com/story/ai-deepfakes-cant-save-us-duped/
[11] EXPOSING DeepfakeS USING INCONSISTENT HEAD POSES Xin Yang , Yuezun Li and Siwei Lyu
[12] Deepfake Video Detection Using Recurrent Neural Networks David Guera Edward J. Delp
[13] https://www.nydailynews.com/entertainment/movies/justice-league-reshoots-superman-mustache-removal-cost-25m-article-1.3351896
[14] https://thenextweb.com/artificial-intelligence/2020/01/07/samsung-is-working-on-lifelike-ai-powered-avatars-to-fill-in-for-humans/
[15] Medical Image Synthesis for Data Augmentation and Anonymization using Generative Adversarial Networks Hoo-Chang Shin, Neil A Tenenholtz, Jameson K Rogers, Christopher G Schwarz, Matthew L Senjem, Jeffrey L Gunter, Katherine Andriole, Mark Michalski
[16] https://www.wired.com/story/surfsafe-browser-extension-save-you-from-fake-photos/
[17] https://aifoundation.com/responsibility/ visited on 13/02/2020
[18] https://www.weforum.org/agenda/2019/11/advantages-of-artificial-intelligence/
[19] https://analyticsindiamag.com/can-deepfakes-be-used-for-the-good-of-humanity/
[20] https://faceswap.dev/ for Faceswap.py information visited on 10/02/2020

Research on grinding wheel characteristic

Pawan kumar Sharma [1], Rajesh Singh[2]
Scholar Department of Mechanical Engineering, Faculty of Engineering, Moradabad
Scholar Department of Mechanical Engineering, Faculty of Engineering, Moradabad

***Abstract*— Grinding of metals is a complex material removal operation. Research on cutting process of a single abrasive grain is the basis of further understanding of grinding mechanism. In this investigation, the simulation and analysis for the non-uniform thermo-mechanical coupling intense stress fields in cutting zones of a single abrasive with negative rake are conducted by means of the FEM techniques. The cutting forces, the cutting temperature distribution and the strain rate in cutting zone are numerically demonstrated. Grinding mechanics are analyzed from microscopic view according to the simulation results. Research results facilitate a better understanding on the mechanics of grinding.**

Keywords- Cutting simulation; FEM; Grinding mechanism, cutting speed

Introduction

Grinding is a very complex material removal operation. Compared to conventional machining, grinding differs in many ways, including the use of high wheel speeds, fine depths of cut, a large number of multiple cutting points of unknown geometry which varies continuously with time, the high negative rake angles presented by the abrasive grains. As a simplified model of the grinding, the grinding technique with a single abrasive grain is an effective way to explore the mechanism of the complex grinding. Komanduri[1] investigated machining with high negative rake angles to simulate grinding and made an attempt to provide an alternate explanation for some of the anomalies, such as the force ratio, specific energy, subsurface deformation by comparing grinding with machining with high negative rake angle tools. Research on cutting process of single abrasive is the basis of further understanding of grinding mechanism.Experimental research on grinding with single abrasive grain is difficult to conduct because of the non-uniform thermo-mechanical

coupling intense stress fields in cutting zones of single abrasive with negative rake. With the development of computer technology, the finite element method(FEM) was widely used in machining simulations. In recent years, the finite element method has particularly become the main tool for simulating metal cutting processes[2]. The finite element models are widely used for calculating the stress, strain, strain-rate and temperature distributions in the primary, secondary and tertiary sub-cutting zones. In consequence, temperatures in tool, chip and workpiece, as well as cutting forces, plastic deformation(shear angles and chip thickness) , chip formation and possibly its breaking can be determined faster than using costly and time consuming experiments. At the same time, the ability to characterize the mode of material removal through simulations provides an alternative approach to understanding the effect of varying machining parameters such as rake angle, cutting-edge radius, and depth of cut. In this paper, machining simulations of a single abrasive with negative rake are conducted on the basis of the thermo-elastic-plastic deformation theory and FEM techniques, which contribute to a better understanding of grinding mechanism.

Cutting temperature and power

The influence of rake angle on the cutting temperature and power is summarized in Fig.4. It could be seen that both cutting temperature and power increased as the rake angle decrease and reach the maximum value for -45º case.

High negative rake angle will cause great shear strain, which has been proved by research results[1]. Rapid adiabatic shearing phenomenon will occurs in the cutting deformation zone when cutting with abrasive of high negative rake angle. In that case, the cutting temperature is very high because that the material deformation time is very short and the vast majority of plastic deformation power/friction power has no time to dissimilar property of grinding wheel Cutting force/cutting temperature and power, From Fig.5, we can see that both the cutting temperature and power increase with the cutting speed increasing, which conforms to the general cutting principle. The cutting temperature distribution was showed in Fig.6, from which we can see the temperature change in work piece and chip clearly and the highest temperature appeared in the tool tip or zone of rake face close to the second deformation zone. In cutting case with tool of -45° rake angle, with cutting speed increasing from 60m/min to 240m/min, the highest temperature in the tool tip increase from 1078°C to 1467°C. When V 300m/min, maximum cutting temperature reaches 1539°C, which is close to the temperature value of abrasive point measured in the experiment[4] and reaches the melting temperature of TC4 alloy(about 1600°C).

The cutting temperature distribution with the distance from original point is showed in Fig.7, from which shows that temperature gradient are mainly concentrated in the range of 0.5mm from the tool tip, and the work piece surface temperature gradually dropped with distance from tool tip increasing.

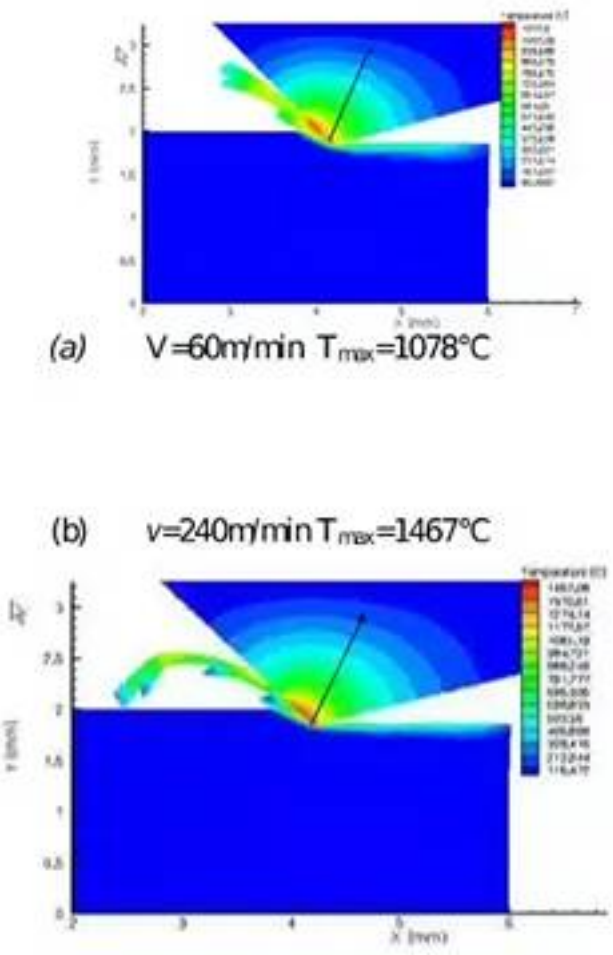


Fig.6 The cutting temperature distribution for different cutting speed

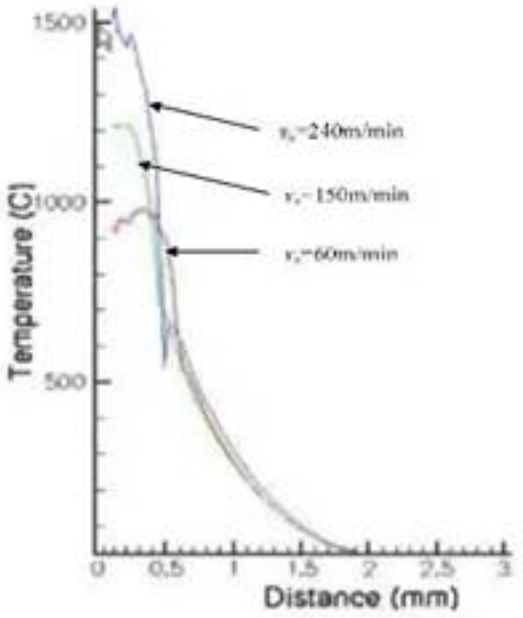


Fig.7 The cutting temperature gradient for different cutting speed

Influence of the cutting speed on strain rate-

Fig.8 presents some strain rate values of different cutting speed, from which we can see that the increase of cutting speed leads to strain rate declines dramatically. That is because the abrasives interacts with the work piece at extreme high speed in grinding process, which lead to severe plastic deformation of the material in contact zone. Therefore the material strain rate in the grinding exceeds that of the cutting process significantly, and the strain rate hardening effect is enhanced greatly.

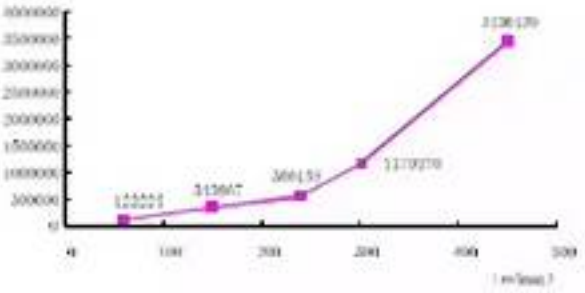


Fig.8 Strain rate for different cutting speed

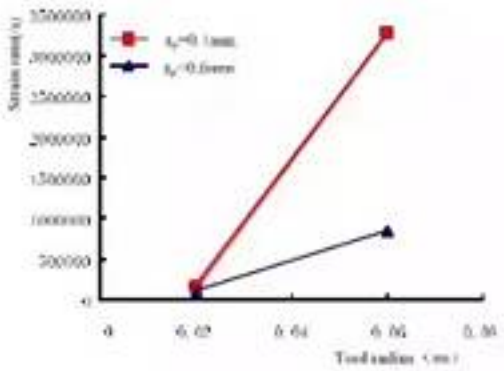


Fig.9 Strain rate for different tool radius

Cutting simulation results of different tool radius-

According to the characteristics that the abrasive grain has a larger cutting-edge radius, cutting simulations of different tool radius are conduct. As showed in Fig.9, with tool radius increasing, the cutting temperature rises and strain rate declines dramatically. The influences of the cutter radius variation on grinding process are made more significant with the reduction of cutting depth, and it is especially obvious when the cutting depth is close to the cutter radius.

Conclusion

With the value of negative rake angle increasing, the cutting forces/ the ratio of thrust force to cutting force/the cutting temperature and power consumed increase at the same time.Both the cutting temperature and power increase with the cutting speed increasing. When Vic=300m/min, maximum cutting temperature is close to the temperature value of abrasive point measured in the experiment and approaches the melting temperature of TC4 alloy.The increase of cutting speed leads to strain rate declines dramatically. The abrasives interact with the work piece at extreme high speed in grinding process, which leads to severe plastic deformation of the material in contact zone. Therefore the material strain rate in the grinding exceeds that of the cutting process significantly, and the strain rate hardening effect is enhanced

greatly. With tool radius increasing, the cutting temperature rises and strain rate declines dramatically. The influences of the cutter radius variation on grinding process are made more significant with the reduction of cutting depth.

References

[1] R. Komanduri. Some aspects of machining with negative rake angles simulating grinding[J]. Int.J Mach. Tool. Des. Res. 1971, Vol. 11:223-233

[2] F.Kloke, T.Beck, S.Hoppe, T.Krieg. Examples of FEM application in manufacturing technology,J.Mater.Process.Technol.120(2002):450-457

[3] Hou Z B, Komanduri R. On a thermo-mechanical model of shear instability in maching[J].Annals of the CIRP, 1995, 44(1):69-72

[4] Zhang Hongxia, Chen Wuyi, Chen Zhitong. Temperature Measurement in Grinding Titanium Alloys[C]. Proceeding of the Eighth International Conference on Progress of Machining Technology, 2006,

Home & Enterprise Security Solutions Using Vision Intelligence

Aditya Jain, Rupal Gupta
CCSIT, TMU, Moradabad
vvasujain@gmail.com
rupal.gupta07@gmail.com

Abstract— **Security is something that is essential for us in today's world where crime rate is very high. The purpose of this paper is to provide a reliable, secure and low cost security system for middle class people. Idea of the proposed system is to use vision intelligence using Artificial Intelligence (AI) and Machine Learning (ML) to detect any kind of criminal activity. The proposed system will prevent it with fog canons that are used to make the visibility zero in few seconds and it also do IVR calls to nearest police station which will ultimately make conditions worse for intruder victim in that situation. So it is expected that the intruder will leave the situation/place immediately.**

Keywords— **Fog Canons, Alarm, Zero Visibility, IVR Calls, AI, Vision Intelligence and Security.**

I. Introduction

As due to excessively high crime rate we are proposing this security system which provides an advanced security system which uses AI, ML & Fog Canons. It is mainly focused on the middle class people who can't afford expensive security systems. This is only a proposed model about this security system.

Vision: - "If we can make intruders blind they can't do anything".

This Security system creates dense harmless fog, which makes zero visibility, fires alarm and also do IVR calls to the nearest police station in an emergency condition.

II. Limitations of Study

It is not yet tested in practical environments but our system once completed, it's accuracy will be good enough to handle those and it will be keep increasing as it always be learning from the massive amount of data incoming through all node camera's in the network.

III. Methodology

1. This Security System is using camera's enabled with live machine learning algorithms and artificial intelligence (Vision Intelligence) to recognize if there is any kind of breakout or crime happening at the moment in home, shops and other places.
2. The fog canons to fire up whenever there is a breakout, it usually takes 1 or 2 seconds to make zero visibility in a 40 sq. ft. room.
3. It uses Arduino to fire up the alarm, it might change because of the reliability & security purpose. Only for the demo it is using an Arduino Uno board but in practical implementation with implemented vision intelligence it will use a raspberry pi device.
4. System will do an automated detailed emergency IVR calls to nearest police station once completed.

IV. Need of a better Security System

As there are too many camera's generating huge amount of data, further monitoring of all those

systems is very tough manually, that's why there is a requirement to have an intelligent surveillance system to replace the older ineffective systems [4].

According to NCRB (National Crime Records Bureau), the people of India are facing too many crimes like theft, housebreak, robbery and burglary. According to same report, it was proven that in 2017, there was 1 case every 3 minute of robbery, theft, burglary and banditry.

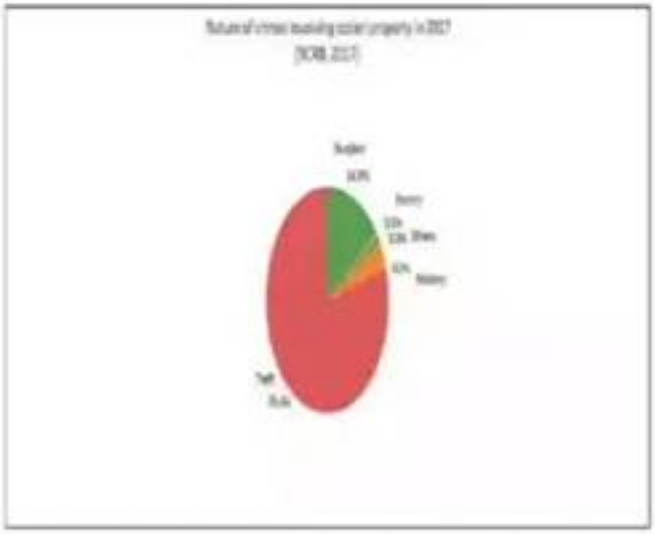


Fig 1: Latest Crime Report by NCRB [1].

In Figure 1, the snapshot of a report shows that most of the crimes were cases of theft (the red area) of which many were attempted in house, shops and other residential and working places. Our product is the best tool for such condition. It will help to move from passive surveillance to active defence from these intruders.

Security of a security is system is also very necessary especially when some advanced technologies like AI & ML are involved because once completed it will work itself no one will be monitoring it manually [5].

Once completed this will be able to detect:-

1. Intruder Detection.
2. Threatening Detection.
3. Weapon Threatening Detection.
4. Glass Break Detection.
5. Gas leakage detection.
6. Due to compatibility with all security systems our system is very versatile.

V. WORKING PRINCIPLE

This security system is equipped with a motion detector, fog machine, Alarm, night vision camera, gas detector, fire detector and raspberry pi. So, the vision system will keep searching for the any suspicious activity and the motion detector can be activated when there is no one at home or it can be used as a boundary for a restricted area.

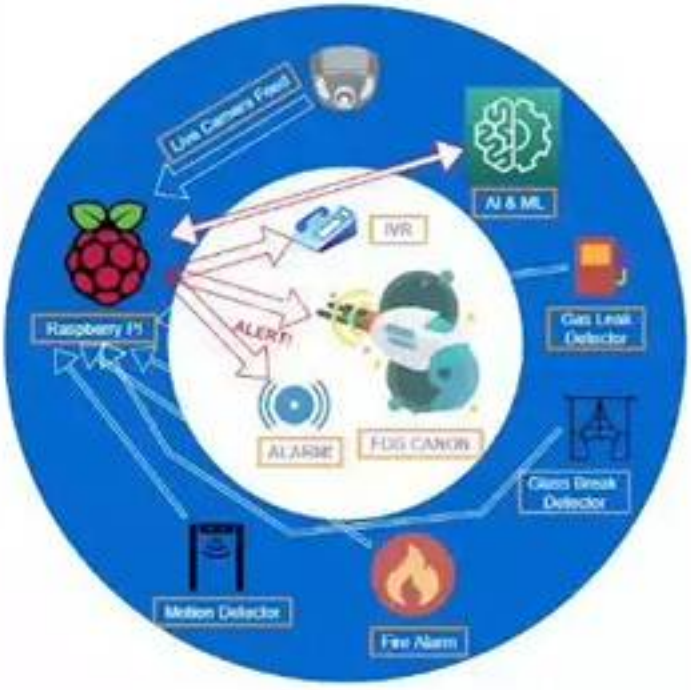


Fig 2: Our Security System Model

In the above it is shown that every device will be connected to the Raspberry Pi or Jetson Nano device to control them, as soon as the system will detect any kind of breakout it will first hit the raspberry pi and it will verify with vision intelligence before firing alarm and in any case if vision intelligence found to be not working in that case it will just fire the alarm.

It has been seen that using web technologies portability of surveillance can also be provided as some other systems has already did [10].

VI. Components of System

These are all components which are used to make a demo of this security system while implementing in practical conditions some of them might change but the working will be exactly same.

Using IOT components in a security system also creates a concern for user privacy and attacks such as spoofing, denial of service, jamming, and eavesdropping [7].

Many security challenges and vulnerabilities to IOT in security systems were understood like physical attacks, link layer security issues, network layer attacks and many more [6][9]. As it is just a demo so it's not a problem for now.

Some other security techniques with proven results were also studied for making the best approach to make a reliable security system one of the techniques was pre-alarm system based on real-time monitoring [8].

I. Arduino Uno Nano BOARD:-

It is used for receiving signals from the sensors, as it will receive any signal it will fire the alarm.

II. Ultrasonic Sensor:-

It is used as a motion detector.

III. Gas Leak Sensor:-

It is used for detecting any gas leakage.

IV. Camera:-

It is very crucial element for this system. In the demo implementation mobile camera is used but in real implementation something more reliable will be used.

V. Fire Sensor:-

It is used for detecting fire.

VI. Alarm with Led:-

As Arduino will fire up a signal the alarm and the led will be on, it can be switched off manually in case of a false alarm.

VII. Fog Canon:-

It's the main component of our system it fires fog whenever any threat is detected.

VIII. Glass Break Detector:-

It is used whenever someone breaks the window glass, so it will alert the system.

Fig 3: Fog Canon with Glycerol Solution

In the above image fog canon & glycerol solution is shown. Glycerol solution is used to make the fog, when glycerol is heated up to a temperature of more than 170° degree Celsius it creates heavy white fog which stay there for at least 15 minutes making the visibility zero.

VII. Implementation

A demo module is created to show the actual process that will happen during the real implementation of our system, the intruder detection system is under process due to too much work on accuracy but for now it has used unknown face detection for some time. Some techniques has

been understood and analysed for a better approach [2].

Every sensor is connected with the Arduino Uno board and python library (serial) is used to control Arduino for the vision intelligence system. As any detection will happened from vision intelligence it will send the alarm signal to the Arduino and it will fire up all the alarms.

IVR call system is not yet implemented in the demo but it will be implemented it in real system . From previous related research it was understood that it will cost higher to make a well communicating & reliable security system that's why the real implementation is in still work [3].

Fig 4: Demo Module Image

Fig 5: Gun detection in video using Python OpenCV

Fig 5: Unknown face detection using Python OpenCV

VII. Conclusion and Future Scope

This security system model is designed to face the Indian criminal situations. It has been analysed that the proposed system may work very well specially with the concern of a costing model. Though the model has been analysed further the implementations is to be considered as a future scope which can be published further.

VIII. References

[1]. Latest National Crime Report Bureau Crime Report. "https://factly.in/ncrb-theft-data-up-to-2017/"

[2]. N. Naga Swathi, K. Alekhya, D. Pavithra, D and Kalyan Babu., "Implementation of Vision Based Intelligent Home Security System Using ARM7", International Research Journal of Engineering and Technology (IRJET), 2017.

[3]. Kuo-Hsien Hsia and Jr-Hung Guo, "Fusion-Algorithm-Based Security System with Multiple Sensors", Sensors and Materials, Vol. 29, No. 7 1069–1080 MYU Tokyo, 2017.

[4]. Leanne Attard and Reuben A. Farrugia, "Vision Based Surveillance System", Proceedings of EUROCON 2011, International Conference on Computer as a Tool, 27-29 April 2011, Lisbon, Portugal.

[5]. Claudio Cilli, Ph.D., CISA, CISM, CRISC, CGEIT, "On the security of the AI systems", Sapienza University of Rome, 2018.

[6]. Fatima Hussain, Rasheed Hussain, Syed Ali Hassan and Ekram Hossain, "Machine Learning in IoT Security: Current Solutions and Future Challenges", 33rd International

Conference on. Advanced Information Networking and ApplicationsAt: Matsue, Japan, 2019.

[7]. Liang Xiao, Xiaoyue Wan, Xiaozhen Lu, Yanyong Zhang and Di Wu," How Do IoT Devices Use AI to Enhance Security?" IEEE Signal Processing Magazine (Volume: 35, Issue: 5, Sept. 2018).

[8]. Longjun Dong, Weiwei Shu, Daoyuan Sun, Xibing Li and Lingyun Zhang, "Pre-Alarm System Based on Real-Time Monitoring and Numerical Simulation Using Internet of Things and Cloud Computing for Tailings Dam in Mines", IEEE Access (Volume: 5), 18 September 2017.

[9]. Elike Hodo, Xavier Bellekensm, Andrew Hamilton, Pierre-Louis Dubouilh, Ephraim Iorkyase, Christos Tachtatzis and Robert Atkinson, "Threat analysis of IOT networks using artificial neural network intrusion detection system", 2016 International Symposium on Networks, Computers and Communications (ISNCC).

[10]. Mrutyunjaya Sahani, Chiranjiv Nanda, Abhijeet Kumar Sahu and Biswajeet Pattnaik, "Web-based online embedded door access control and home security system based on face recognition", 2015 International Conference on Circuits, Power and Computing Technologies [ICCPCT-2015].

AN ANALYSIS OFHARDCLASSIFICATIONAND SOFT CLASSIFICATION APPROACHESIN REMOTE SENSINGDATA

Ranjhana Sharma[1], Abeer Masroor[2], Vandana khanna[3]
[1]Assistant Professor,FOECS, TMU, Moradabad
[2]BCA4[th]sem,FOECS, TMU,Moradabad
[3]BCA4[th]sem,FOECS, TMU,Moradabad
[1]sharmaranjana04@gmail.com
[2]07abeerkhan@gmail.com
[3]Vandnakhanna1010@gmail.com

***Abstract*—In the process of designing real word applications, Hard classification and Soft classification approaches are now becoming prominent techniques. The information regarding thematic maps can be easily extracted with the reinforcement of appropriate algorithm for image classification. Pure and mixed pixels constitute remote sensing images. In digital image analysis, a pixel is generally considered as a unit association to a single land cover class. Nonetheless, due to limited resolution, pixels often represent ground areas which comprises of two or more different land cover classes. Because of this reason, it has been recommended that fuzziness should be domicile in the classification procedure so that pixels may have multiple or partial class membership. In this scenario, a measure of the strength of membership for each class is output by the classifier, resulting in a soft classification technique. This paper bull's eye on hard and soft classification approaches in Remote Sensing Data.**

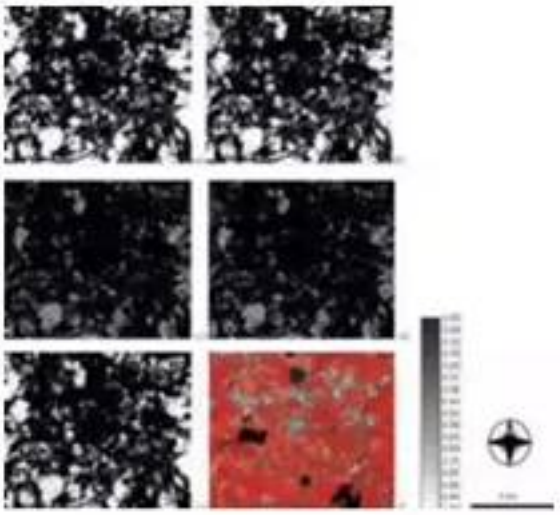
***Keywords*—Remote Sensing, Hard classification approaches, Soft classification approaches, bull's eye, fuzzy means.**

INTRODUCTION

Remote sensing fraternity has used digital image classification for many applications, such as resource utilization, environmental impact analysis and other socio-economic applications. Remote Sensing(RS)can be defined as the science of classification of earth layer characteristics and inference of their graphical and physical properties using electromagnetic mission as a standard of communication. Classification of remotely sensed data into the maticmaps remains a challenge due to many factors, such as, selection of sensed data, features types present ,image processing and classification approaches. The term classification is defined by Chambers Twentieth Century Dictionary as the "act of forming into a class as per a rank or order of person or things".

In Remote Sensing, basically two Classification methods are used-

1. **Soft Classification-**
   Soft classification provides more information and potentially more accurate result, especially for coarse spatial resolution.



Fig(1) Soft Classification mapping

2. **Hard Classification-**
   It make a definitive decision about the l and cover class that each pixel is allocated to a single class .

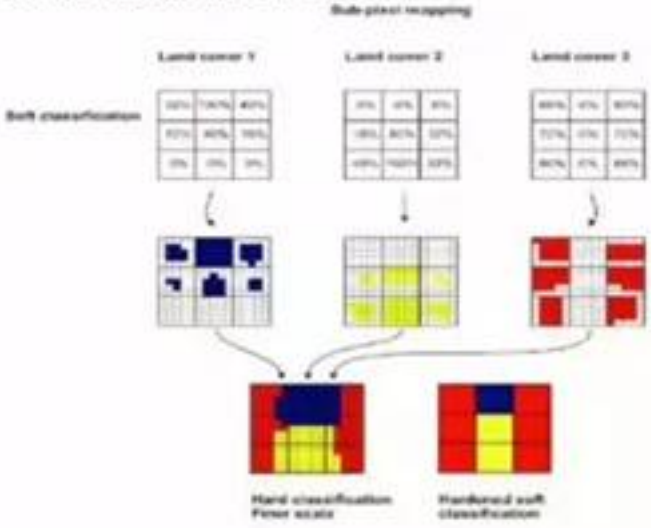
Fig (2) Hard classification mapping

3- General Review-

In hard classification, class is assigned to pixel is crisp i.e. pixel belongs to one of the class from all classes. The classified pixel is either completely belongs to a class or not [4]. This is called hard classification (Ghosh, 2013). Although in real world the pixel has some spatial resolution and can cover a mixture of two or more class features on ground. The pure pixels are rare. Most likely, boundaries of classes have the mix pixel. Therefore the soft classification approach was developed [5][4]. Soft classification is used to produce class proportions within a pixel ill order to increase the classification accuracy [2][4] and to produce meaningful and appropriate land cover composition [8][28] .One of the most popular fuzzy clustering [15] methods are the fuzzy c- means (FCM) [5] which is an unsupervised classifier that in an iterative process assigns class membership values to pixels of an image by minimizing an objective function. Although, a few studies on the use of FCM have been reported, the major limitations of FCM are the probabilistic sum to one constraint. Therefore, besides using this classifier, another fuzzy set clustering method, namely possibilistic c- means (PCM) (Krishnaparam and Keller, 1993,1996), which relaxes this constraint so as to be robust to the noise (i.e. Pixels with a high degree of class mixtures) present in the dataset, has also been implemented[4].Remote sensing images contain a mixture of pure and mixed pixels. In digital image classification, a pixel is frequently considered as a unit belonging to a single land cover class.

Types of Classification Techniques with their classifiers-

1 Hard classification Approaches- Recent advances in supervised image classification have shown that conventional „hard" classification techniques, which allocate each pixel to a specific class, are often inappropriate for applications where mixed pixels are abundant in the image (Foody et al. 1996). . The conventional hard classification methods, which assume that the pixels are pure, force the mixed pixels to be allocated to one and only one class. This may result into a loss of pertinent information present in a pixel. Mixed pixels may thus be treated as error, noise or uncertainty in class allocation for hard classification methods. The conventional use of hard classification methods that allocate one class to a pixel may tend to over- and under estimate the actual aerial extends of the classes on ground and thus may provide erroneous results (Foody,
2002). Different statistical algorithms in past have been used for allocating mixed pixels.
Hard Classification techniques can be further classified into two main types :-
1. Maximum Like Hood Classifier-
2. K-Mean Classifier
3. Minimum Distance-to-mean Classifier Mixed pixels are assigned to the class with the highest proportion of coverage to yield a hard classification. Due to which a considerable amount of information is lost (11).To overcome this loss, soft classification was introduced.



Fig(3)-pixel diagram of hard classification approaches

Hard classifiers-

Hard classifiers make a definitive decision about the land cover class that each pixel is allocated to a single class. maximum likelihood, minimum distance, artificial neural network, decision tree, and support vector machine are basically hard classifiers. Basically hard classification techniques are of two types-

1. Linear mixture modeling
2. Fuzzy classification

II.SOFTCLASSIFICATION APPROACHES

The extraction of land cover from remote sensing Images [22],[23]has traditionally been viewed as a classification problem where each pixel in the image is allocated to one of the possible classes. So remotely sensed data of the earth may be analysed sensing has thus be come an important data source for providing effective land use land cover information particular at regional to global scales. Digital image classification is usually performed to retrieve this information using arrange of statistical pattern recognition or classification technique (supervised and unsupervised) such as maximum like hood classifier, k- mean classifier, the minimum Distance to mean classifier etc. There classifiers allocate each pixel of the remote sensing image to a single land use land cover class.

Artificial Neural Network:

Until recently, supervised classification of space-borne remotely sensed data has been achieved traditionally with Maximum Likelihood(ML)approach.

2) FCM Fuzzy c- Mean(PCM) Clustering FCM- is FCM is a method of clustering which allows one piece data to be long to two or more clusters that may be employed to partition pixels of remote sensing images into different class membership values [1][40].The objective function FCM is

$$J_m(U,V)=\sum_{i=1}^{N}\sum_{j=1}^{C}(\mu_{ij})^m \|x_i-v_j\|_A^2$$

[9][10]

(1)

Subject to constraints

Where xi is the vector denoting spectral response I (i.e. a vector of spectral response of a pixel), V is the collection of vector of cluster centers, and vj, µij are class membership values of a pixel(members of fuzzy c-partition matrix),c and n are number of cluster and pixels respectively, m is a weighting exponent($1<m<\infty$) ,$\|x_i - b_j\|^2_A$,thesquared distance (dij) between xi and vj , and is given by,

$$d_{ij}^2=\|x_i-v_j\|_A^2=(x_i-v_j)^T A(x_i-v_j)$$ [9][

3] (3)

3) **Possibilities C-Mean(PCM) Clustering-**

The formulation of PCM is based on a modified FCM objective function, whereby an additional term called is regularizing also included. PCM is also an iterative process where the class membership values are obtained by minimizing the generalized least- square error objective function [5][40],
given by,

$$\sum_{i=1}^{N} \mu_{ij} > 0 \text{ for all j}$$

$0 \le \mu_{ij} \le 1$ For all i,j [7][9]

where ηj is the suitable positive number..

and, η j depends on the shape and the average size of the cluster j and its value may be computed as;

$$\eta = K \frac{\sum_{i=1}^{N} \mu_{ij}^{m} d_{ij}^{2}}{\sum_{i=1}^{N} \mu_{ij}^{m}}$$ [7][9]

Where K is a constant and is generally kept as 1. The class memberships, μ_{ij} are

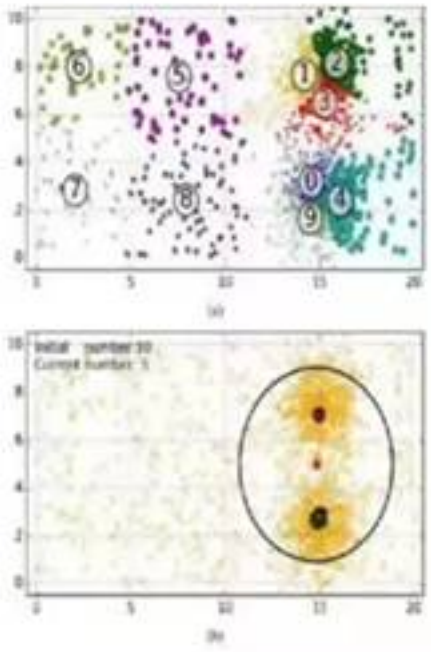
$$\mu_{ij} = \frac{1}{1+\left(\frac{d_{ij}^{2}}{\eta_j}\right)^{\frac{1}{(m-1)}}}$$

$$\mu_{ij} = \frac{1}{1+\left(\frac{d_{ij}^{2}}{\eta_j}\right)^{\frac{1}{(m-1)}}}$$ [5][13]

IV. DISCUSSION AND CONCLUSION

The expected outcomes from this research work would be as follows:

In this paper is focused on soft classification approaches and uncertainty problem for classification and introduce a new entropy(without reference) based criterion.



REFERENCE

[1] Yannis, S. A., and Stefanos, D. K.: Fuzzy Image Classification Using Multi-resolution Neural with Applications to Remote Sensing. In: Electrical Engineering Department, National Technical University of Athens,Zographou15773, Greece, (1999).

[2] LARK R. M., and BOLAM H. C Uncertainty in Prediction of Spatially Variable Data on Soils, Geoderma, vol.77, pp.263- 282,(1997).

[3] Ranjana Sharma , and R.K Dwivedi A Review of Soft Classification Approaches on Satellite Image & Accuracy Assessment In Proceeding of Fifth International Conference on Soft Computing for Problem Solving. Vol 437 of the series Advances in intelligent System and Computing pp 629-639,(2015)

[4] ADAMS, J.B., SMITH, M.O. and GILLESPIE, A.R.: Imaging Spectroscopy: Interpretation based On Spectral Mixture Analysis. In: C.M. Pieters and P..A.J. Englert (Eds), Remote Geochemical Analysis: Elemental and miner a logical composition, pp. 145–166 (1993)

[5] Kumar, A., Ghosh, S. K., and Dadhwal V. K.:A Comparison of The Performance of Fuzzy Algorithm Versus Statistical Algorithm Based Sub-Pixel Classifier for Remote Sensing Data. In: Proceedings of mid-term symposium ISPRS,ITC-The Netherlands. ,(2006)

[6] Bezdek, J. C.: Pattern Recognition with Fuzzy Objective Function Algorithms. In: Plenum, New York, USA, (1981)

[7] Mertens K. C., Verbeke L. P. C., Ducheyne E. I. and Wulf R. R. De.: Using Genetic Algorithms in Sub-Pixel Mapping. In: International Journal Remote Sensing, Vol. 24,no. 21,pp.4241–4247,(2003)

[8] Shalan, M. A., Arora M. K,Ghosh S. K.: An Evaluation of Fuzzy Classification from IRS IC LISS III Data. In: International Journal of Remote Sensing In: vol. 23,pp. 3179-3186,(2003)

[9] 10.PAL, M. and MATHER, P.M.: An Assessment Of The Effectiveness Of Decision Tree Methods For Land Cover Classification. In: Remote Sensing of Environment, vol.86, pp.554–565,(2003)

[10]A Review of Soft Classification Approaches on Satellite Image and Accuracy

Assessmenthttps://link.springer.com/chapter/10.1007/98-981-10-0451-3_56
[11]Alpine P., Atkinson P. M.: Sub-Pixel Land Cover Mapping For Per-Field Classification. In: International Journal Remote Sensing

Artificial Intelligence and its Application in Different Areas

Ayushi saxena ,Animesh jain
Namit gupta

***Abstract*— In the future, intelligent machines will replace or enhance human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. It is the subfield of computer science. Artificial Intelligence is becoming a popular field in computer science as it has enhanced the human life in many areas. Artificial intelligence in the last two decades has greatly improved performance of the manufacturing and service systems. Study in the area of artificial intelligence has given rise to the rapidly growing technology known as expert system. Application areas of Artificial Intelligence is having a huge impact on various fields of life as expert system is widely used these days to solve the complex problems in various areas as science, engineering, business, medicine, weather forecasting. The areas employing the technology of Artificial Intelligence have seen an increase in the quality and efficiency. This paper gives an overview of this technology and the application areas of this technology. This paper will also explore the current use of Artificial Intelligence technologies in the PSS design to damp the power system oscillations caused by interruptions, in Network Intrusion for protecting computer and communication networks from intruders, in the medical areamedicine, to improve hospital inpatient care, for medical image classification, in the accounting databases to mitigate the problems of it and in the computer games.**

Keywords— **Artificial Intelligence, Intrusion Detection Systems, Neural Networks (computer), Power System Stabilizer.**

Introduction

It is claimed that artificial intelligence is playing an increasing role in the research of management science and operational research areas. Intelligence is commonly considered as the ability to collect knowledge and reason about knowledge to solve complex problems. In the near Future intelligent machines will replace human capabilities in many areas. Artificial intelligence is the study and developments of intelligent machines and software that can reason, learn, gather knowledge, communicate, manipulate and perceive the objects. John McCarthy coined the term in 1956 as branch of computer science concerned with making computers behave like humans. It is the study of the computation that makes it possible to perceive reason and act. Artificial intelligence is different from psychology because it emphasis on computation and is different from computer science because of its emphasis on perception, reasoning and action. It makes machines smarter and more useful. It works with the help of artificial neurons (artificial neural network) and scientific theorems (if then statements and logics). AI technologies have matured to the point in offering real practical benefits in many of their applications. Major Artificial Intelligence areas are Expert Systems, Natural Language Processing, Speech Understanding, Robotics and Sensory Systems, Computer Vision and Scene Recognition, Intelligent ComputerAided Instruction, Neural Computing. From these Expert System is a rapidly growing technology which is having a huge impact on various fields of life. The various techniques applied in artificial intelligence are Neural Network, Fuzzy Logic, Evolutionary Computing, and Hybrid Artificial Intelligence. Artificial intelligence has the advantages over the natural intelligence as it is more permanent, consistent, less expensive, has the ease of duplication and dissemination, can be documented and can perform certain tasks much faster and better than the human. The Turing Test Approach: The Turing test was proposed Alan Turing (1950) .This test was designed to test that whether a particular machine can think or not. The test involves a human interrogator who interacts with a human and with a machine and has to tell who is human and which one is machine. The computer passes the test if an interrogator after posing some written questions, cannot tell whether the written response is coming from human or from the machine..

AREAS OF ARTIFICIAL INTELLIGENCE

A. Language understanding-

The ability to "understand" and respond to the natural language. To translate from spoken language to a written form and to translate from one natural language to another natural language.

1.1 Speech Understanding
1.2 Semantic Information Processing (Computational Linguistics)
1.3 Question Answering
1.4 Information Retrieval
1.5 Language Translation

B. Learning and adaptive systems-

The ability to adapt behavior baged on previous experience, and to develop general rules concerning the world based on such experience.
2.1 Cybernetics
2.2 Concept Formation

C. Problem solving-

Ability to formulate a problem in a suitable representation, to plan for its solution and to know when new information is needed and how to obtain it.
3.1 Inference (Resolution-Based Theorem Proving, Plausible Inference and Inductive Inference)
3.2 Interactive Problem Solving
3.3 Automatic Program Writing
3.4 Heuristic Search

D. Perception (visual)-

The ability to analyse a sensed scene by relating it to an internal model which represents the perceiving organism's "knowledge of the world." The result of this analysis is a structured set of relationships between entities in the scene.
4.1 Pattern Recognition
4.2 Scene Analysis

E. Modeling-

The ability to develop an internal representation and set of transformation rules which can be used to predict the behavior and relationship between some set of real-world objects or entities.
5.1 The Representation Problem for Problem Solving Systems
5.2 Modeling Natural Systems (Economic, Sociological, Ecological, Biological etc.)
5.3 Hobot World Modeling (Perceptual and Functional Representations)

F. Robots-

A combination of most or all of the above abilities with the ability to move over terrain and manipulate objects.
6.1 Exploration
6.2 Transportation/Navigation
6.3 Industrial Automation (e.g., Process Control, Assembly Tasks, Executive Tasks)
6.4 Security
6.5 Other (Agriculture, Fishing, Mining, Sanitation, Construction, etc.)
6.6 Military
6.7 Household

G. Games-

The ability to accept a formal set of rules for games such as Chess, Go, Kalah, Checkers, etc., and to translate these rules into a representation or structure which allows problem-solving and learning abilities to be used in reaching an adequate level of performance.
7.1 Particular Games (Chess, Go, Bridge, etc.) [11]

APPLICATIONS OF ARTIFICIAL INTELLIGENCE

A. Application of Artificial Intelligent Techniques in Power system stabilizers (PSSs) Design

Since the 1960s, PSSs have been used to add damping to electromechanical oscillations. The PSS is an additional control system, which is often applied as a part of an excitation control system. The basic function of the PSS is to apply a signal to the excitation system, producing electrical torques to the rotor in phase with speed differences that damp out power oscillations. They perform within the generator"s excitation system to create a part of electrical torque, called damping torque, proportional to speed change. A CPSS can be modeled by a two stage (identical), lead-lag

Inference System, for the design of an Intrusion Detection System. They used SNORT to perform real time traffic analysis and packet logging on IP network during the training phase of the system. They constructed a signature pattern database using Protocol Analysis and Neuro-Fuzzy learning method. They then tested and validated the models using the 1998 DARPA Intrusion Detection Evaluation Data and TCP dump raw data. The data set contains 24 attack types. The attacks fall into four main categories viz. Denial of Service (DOS), Remote to User (R2L), User to Root (U2R), and Probing. From the results, it was shown that the Fuzzy Inference System was faster in training, taking few seconds, than the Artificial Neural Networks which took few minutes to converge. Generally, both techniques proved to be good, but with the Fuzzy Inference System having an edge over Artificial Neural Networks with its higher classification accuracies. Their experiment also showed the importance of variable selection, as the two techniques performed worse when all the variables were used without selection of the variables. Good results were recorded when a subset (about 40%) of the variables were used [12].

c) Application of Artificial Intelligence Techniques in Medical Area

Artificial intelligence techniques have the potential to be applied in almost every field of medical area.
3.1) Artificial Intelligence in Medicine

3.1.1) Fuzzy Expert Systems in Medicine-

Fuzzy logic is a data handling methodology that permits ambiguity and hence is particularly suited to medical applications. It captures and uses the concept of fuzziness in a computationally effective manner. The most likely area of application for this theory lies in medical diagnostics and, to a lesser extent, in the description of biological systems[14].Fuzzy expert systems use the structure of a series of „if – then" rules for modeling.The techniques of fuzzy logic have been explored in many medical applications. Fuzzy logic is preferred over the multiple logistic regression analysis in diagnosing lung cancer using tumour marker profiles. Fuzzy logic is also used in the diagnosis of acute leukaemia and breast and pancreatic cancer and also predict patients" survival with breast cancer. They can also characterize MRI images of brain tumours ultrasound images of the breast, ultrasound. Fuzzy logic controllers have been designed for the administration of vasodilators in the peri-operative period to control blood pressure.

3.1.2) Evolutionary Computation in Medicine-

Evolutionary computation is the general term for several computational techniques based on natural evolution process that imitates the mechanism of natural selection and survival of the fittest in solving real-world problems. The most widely used form of evolutionary computation for medical applications are „Genetic Algorithms" [8]. „Genetic Algorithms" based on the natural biological evolution are the most widely used form of evolutionary computation for medical applications. The principles of Genetic algorithms have been used to predict outcome in critically ill patients. MRI segmentation of brain tumours to measure the efficacy of treatment strategies is also done through evolutionary computation. They have also been used in computerized analysis of mammographic micro calcification.

3.2) Using Artificial Intelligence to Improve Hospital Inpatient Care: Clinical decision support systems (CDSS) were one of the first successful applications of AI, focusing

Primarily on the diagnosis of a patient"s condition given his symptoms and demographic information [4].Mycin a rule-based expert system for identifying bacteria causing infections and recommending antibiotics to treat these infections was developed in 1970 under the work of CDSS for medical diagnosis. Pathfinder, which used Bayesian networks to help pathologists more accurately diagnose lymph-node diseases. AI has also been useful for computer-aided detection of tumors in medical images. Such approaches help in the

diagnosis of various forms of cancer, and congenital heart defects.

3.3) Artificial Intelligence Approaches for Medical Image Classification-

Artificial intelligence techniques are used for diagnostic sciences in biomedical image classification. Model-based intelligent analysis and decision-support tools are important in medical imaging for computer-assisted diagnosis and evaluation. CAD helps radiologist who uses the output from a computerized analysis of medical images as a second opinion in detecting lesions, assessing extent of disease, and improving the accuracy and consistency of radiological diagnosis to reduce the rate of false negative cases [12].

3.3.1) Artificial Neural Networks Approach on Diagnostic Science–

The following subsections will discuss how ANN is utilized for image classification over generations.

3.3.1.1) Endoscopic Images-

Image classification is an important step in CAD. In classification of endoscopic images a hybrid implementation by advanced fuzzy inference neural network which combines fuzzy systems and Radial Basis Function (RBF) was proposed. The concept of fusion of multiple classifiers dedicated to specific feature parameters with an accuracy of 94.28% but RBF was characterized by a very fast training rate than fuzzy. It extracted both texture and statistical features [13].

3.3.1.2) MRI Brain Tumour Analysis

For the MRI brain tumour images a general regression neural network (GRNN) based automatic three dimensional classification method was proposed. This method had good time consuming rate and classification accuracy. Another intelligent classification technique proposed was Least Squares Support Vector Machines (LS-SVM). It identifies normal and abnormal slices of brain MRI data. This technique had a higher accuracy of classification over other classifiers as the false negative in LS-SVM was very low compared. Due to automatic defects detection in MR images of brain, extensive research is being performed.

D) Application of Artificial Intelligence in Accounting Databases-

The use of artificial intelligence is investigated as the basis to mitigate the problems of accounting databases. The following are some difficulties with existing accounting database systems. The needs of decision makers are not met by accounting information. Humans do not understand or cannot process the computerized accounting databases. Systems are not easy to use. There is focus on the numeric data. Integrating intelligent systems with accounting databases can assist (either with the decision maker or independent of decision maker) in the investigation of large volumes of data with or without direct participation of the decision maker. Thus, the systems can analyze the data and assist the users understanding or interpreting transactions to determine what accounting events are captured by the system [5].With the artificial intelligence we store and retrieve knowledge in natural language. There are some artificial intelligence tools or techniques that help in the broader understanding of events captured by the accounting system. There is more emphasis on symbolic or text data rather than just numeric data to capture context. The artificial intelligence and expert system builds intelligence into the database to assist users. Without users direct participation such models help the users by sorting through large quantities of data. Such models also assist the decision makers under time constraints; suggest alternatives in the searching and evaluation of data.

E) Application of Artificial Intelligence Techniques in the Computer Games

Playing games is one of the most popular uses for computer technology. In the evolution of computer games, they have grown from modest text based to the three dimensional graphical games with complex and large worlds. The systems as graphics rendering, playing audio, user input and game artificial intelligence (AI) when put together provide the expected entertainment and make a

worthwhile computer game. Artificial intelligence is the most important part of every computer game and playing the game without artificial intelligence would not be any fun!. If we remove artificial intelligence from computer games, the games will be so simple that nobody will be interested in playing the computer games anymore!. Without the game AI, the winning would not be difficult at all. Artificial intelligence is used to solve common problems in the computer games and provide the features to the games. Specifically, non-playing character (NPC) path finding, decision making and learning are examined. There are several ways that AI contributes to modern computer games. Most notably are unit movement, simulated perception, situation analysis, spatial reasoning, learning, group coordination, resource allocation, steering, flocking, target selection, and so many more. Even context dependent animation and audio use AI [2].

Computer Game Problems Solved with AI: Artificial intelligence solves the three common problems: nonplaying character (NPC) movement, NPC decision making, and NPC learning. The four artificial intelligence techniques used are Path Finding, Bayesian Networks, Fuzzy Logic, and Genetic Algorithms which help a computer game provide non-playing character path finding and decision making as well as learning.

5.1) NPC Movement Using Path-Finding

Artificial intelligence computer game must provide a way for a non-playing character to move throughout the game world. For example, When then player is on one side of the building and the monster is on the other, through which path through the building the monster will reach the player? This is the NPC movement problem.AI Search Methods are used to find the path in computer games. A* algorithm is the most widely used for path negotiation because of its flexibility and also because it determine the shortest path between two points. Typical A* algorithms have three main attributes, fitness, goal, and heuristic or f, g, and h respectively. g is the cost to travel from the start node to some node between the goal. h is the heuristic or estimated cost to get from this node to the goal. f is the sum of g and h, or the total estimated cost of a path going through this node. The A* algorithm also maintains an Open list of the nodes that have not been explored yet and a Closed list of nodes that have been explored. The following is pseudo code for the A* algorithm [9].

1. Let P = the starting point.
2. Assign f, g, and h values to P.
3. Add P to the Open list. At this point P is the only node on the Open list.
4. Let B = the best node from the Open list (best node has the lowest f-value).
   a. If B is the goal node, then quit. A path has been found.
   b. If the Open list is empty, then quit. A path has been found.
5. Let C = a valid node connected to B.
   a. Assign f, g, and h values to C.
   b. Check whether C is on the Open and Closed list.
      i. If so, check whether the new path is more efficient (lower f-value).
         1. If so, update path.
      ii. Else, add C to open list.
   c. Repeat step 5 for all valid children of B.
6. Move B from the Open list to the closed list and repeat
   From step 4.[9]

5.2) NPC Decision Making Using Bayesian Networks

In the previous example of the monster negotiating a path to the player, a different problem must be solved first before negotiating the path. The problem is does the monster even know the player is present in the building? If the game designers give the full information of the game world to the non-playing character then there would be no fun in playing the game. This is an example of NPC Decision making. In this AI is needed to make the nonplaying character to act in a human like way. When the player enters the building from the other side, the monster will be unaware of the presence of the player because of the wall between them. If the player enters causing a noise disturbance, then the

monster will sense the player and will start negotiating the shortest path as discussed in the NPC movement using path finding. One AI technique that is used to implement this is a Bayesian Network. It helps NPC to perform complex reasoning in a human like fashion. In this the computer calculates the probability of the monster sensing the player if the player has entered the building. This expression can be written as; P (B|A) = P (B|A) P (A) / P (B) [2]
Where P (B|A) is the probability that the monster would sense the player if the player had actually tripped. and P (A) is the probability of the monster sensing the player. and P (B) is the probability of the player tripping [2].

5.3) NPC Learning
Computer games use the Artificial Intelligence Genetic Algorithms to try and implement learning in NPC"s. A genetic algorithm works in the following way [7].
1. Create a first generation population of random organisms.
2. Test them on the problem that is being solved and rank them according to fitness. If the best organisms have reached our performance goals then stop.
3. Take the best performers and mate them by applying genetic operators such as crossover and mutation. Add a few brand-new random organisms to the population to introduce new variety and help ensure against convergence on a local maximum.
4. Loop to step 2.
Genetic Algorithms try and build the perfect specimen and are very complex. This AI technique has not found itself into many modern computer games because it takes a lot of computer resources and time to evolve a specimen or NPC into something worthwhile.

CONCLUSION

The field of artificial intelligence gives the ability to the machines to think analytically, using concepts. Tremendous contribution to the various areas has been made by the Artificial Intelligence techniques from the last 2 decades. Artificial Intelligence will continue to play an increasingly important role in the various fields. This paper is based on the concept of artificial intelligence, areas of artificial intelligence and the artificial intelligence techniques used in the field of Power System Stabilizers (PSS) to maintain system stability and damping of oscillation and provide high quality performance, in the Network Intrusion Detection to protect the network from intruders, in the medical area in the field of medicine, for medical image classification, in the accounting databases, and described how these AI techniques are used in computer games to solve the common problems and to provide features to the games so as to have fun. There is bright future in the analysis of Network Intrusion Detection and there is also definite future in the area of Power System Stabilizers. We conclude that further research in this area can be done as there are very promising and profitable results that are obtainable from such techniques. While scientists have not yet realized the full potential and ability of artificial intelligence. This technology and its applications will likely have far-reaching effects on human life in the years to come.

REFERENCES

[1] N Ramesh, C Kambhampati, JRT Monson, PJ Drew, "Artificial intelligence in medicine", 2004.

[2] Charles Weddle, Graduate Student, Florida State University "Artificial Intelligence and Computer Games", unpublished.

[3] C. Sampada,, et al, "Adaptive Neuro-Fuzzy Intrusion Detection Systems", Proceedings: International Conference on Information Technology: Coding and Computing (ITCC"04),2004.

[4] Daniel B. Neill, "Using Artificial Intelligence to Improve Hospital Inpatient Care".

[5] Daniel E.O."Leary Artificial Intelligence and Expert System in Accounting Databases: Survey and Extensions", Expert Systems with Applications, vol-3, 1991.

[6] Fatai Adesina Anifowose, Safiriyu Ibiyemi Eludiora, "Application of Artificial Intelligence in Network Intrusion Detection", World Applied Programming, Vol (2), No (3), March 2012.

[7] F. D. Laramee, Genetic Algorithms: Evolving the Perfect Troll, AI Game Programming Wisdom, Charles River Media, Inc., Hingham,MA,2002

[8] Holland JH, "Adaptation in Natural and Artifical System",1975.

[9] J. Matthews, Basic A* Path finding Made Simple, AI Game Programming Wisdom, Charles River Media, Inc., Hingham, MA, 2002.

[10] Mahdiyeh Eslamil, Hussain Shareef, Azah Mohamed, "Application of artificial intelligent techniques in PSS design: a survey of the state-of-the-art methods".

[11] Oscar Firschein, Martin A. Fischler, L.Stephen Coles, Jay M. Tenenbaum, "FORECASTING AND ASSESSING THE IMPACT OF ARTIFICIAL INTELLIGENCE ON SOCIETY", unpublished.

[12] S.N. Deepa, B. Aruna Devi, "A survey on artificial intelligence approaches for medical image classification", Indian Journal of Science and Technology, Vol. 4 No. 11 (Nov 2011).

[13] Vassilis S Kodogiannis and John N Lygouras (2008) Neuro-fuzzy classification system for wireless capsule endoscopic images. J. World Acad. Sci.Engg. & Technol., 45, 620-628.

[14] Zadeh L, "Fuzzy sets Inf Control", 1965.

Security Issues in Cloud Computing

Ayushi Saxena, Aarushi Jain

***Abstract*— In the last few years, cloud computing has grown from being a promising business concept to one of the fastest growing segments of the IT industry. It offers an on demand and scalable access to a shared pool of resources hosted in a data centre at providers' site. It reduces the overheads of up-front investments and financial risks for the end-user. The qualitative services and lower cost of services are the key requirements of this technology. Regardless of the fact that cloud computing offers great advantages to the end users, there are several challenging issues that are mandatory to be addressed. This paper discusses security issues, requirements and challenges that cloud service providers face during cloud engineering.**

Keywords— **Cloud computing, SOA and SLA.**

Introduction

The variety of new services started to emerge that permitted computing resources to be accessed over the Internet termed cloud computing. Cloud computing encompasses activities such as the use of social networking sites and other forms of interpersonal computing. However, most of the time cloud computing is concerned with accessing online software applications, data storage and processing power. Cloud computing is a way to increase the capacity or add capabilities dynamically without investing in new infrastructure, training new personnel, or licensing new software. It extends Information Technology's existing capabilities. But as more and more information on individuals and companies are placed in the cloud, concerns are beginning to grow about just how safe an environment it is. Despite of all the hype surrounding the cloud, customers are still Reluctant to deploy their business in the cloud. Security issues in cloud computing has played a major role in slowing down its acceptance, in fact security ranked first as the greatest challenge issue of cloud computing. In one aspect, security could improve due to centralization of data and increased security-focused resources. On the other hand concerns persist about loss of control over certain sensitive data, and the lack of security for stored kernels entrusted to cloud providers. If those providers have not done good jobs securing their own environments, the consumers could be in trouble. Measuring the quality of cloud providers' approach to security is difficult because many cloud providers will not expose their infrastructure to customers. This work is a survey more specific to the different security issues and the asocial challenges that has emanated in the cloud computing system. The following section highlights a brief review on cloud characteristics, service models and deployment models and the remaining sections are organized as follows. Section 3.0 discusses security issues and challenges in cloud computing. And Section 5.0 presents the conclusion.

Cloud Computing–
Is a style of computing over internet where shared servers provide resources software and data to computers/other devices on demand

Cloud Services-
IaaS (Infrastructure as a service) – Is the delivery of computer architecture over internet. It involves the use of remote computers(O.S , database , middle ware , applications) and storage. SaaS (Software as a service) –
Is the delivery of Applications (e.g., CRM or ERP) as a service to end users over internet through browsers.

PaaS (Platform as a service) – Is the delivery of application development and deployment platform (e.g., Pega) as a service to developers over internet through browsers, who use the platform to build , deploy and manage SaaS applications.

Cloud Types-
Private cloud is also called internal or corporate cloud, which provides hosted devices to a limited number of people behind firewall.
Public cloud is also called external cloud, where resources are dynamically provisioned on a self-services over internet.

Cloud Monitor-
Is a kind of dashboard that provides monitoring for cloud resources and provides visibility into resource utilization, operational performance including CPU utilizations, disk read/writes and network traffic.

Cloud Storage-
Is a model of networked data storage where data is stored in multiple virtual servers rather than being hosted on dedicated server. Hosting companies operate large data centers, who virtualizes the resources according to customer requirements and expose them as virtual servers, which customers can manage.

Security-
Security on physical, virtual and cloud environments. Roles/User management for authentication and authorization. Firewall settings to control network access between group of instances Virtual private cloud by specifying IP range for the access. Backups and Monitoring. Logs and Reporting.

Availability and Performance-
Multiple locations – Cloud instances will be hosted Available in multiple locations to ensure high availability Load Balancer–Automatically distributes incoming traffic to multiple cloud instances for fault tolerance and load balancing for higher performance.

Benefits-
Cost is greatly reduced as infrastructure is provided by third party. Device and Location independence. Scalability via dynamic provisioning of resources on a fine-grained, self-service basis. Reliability is improved if multiple redundant sites used. Maintenance is easier since they don't have to be installed on each user's computer.

Providers-
Amazon http://aws.amazon.com/ec2// Oracle http://www.oracle.com/us/technologies/cloud/
Google http://code.google.com/appengine// Microsofthttp://www.microsoft.com/windowsazure //

II. OVERVIEW OF CLOUD COMPUTING

To properly understand cloud, it is important to know what it is, some essential characteristics that a system must possess to qualify as a cloud along with various services that can be offered using it through various deployment models. Cloud computing is in its infant form and numerous definitions have been proposed by many scientists. One of them is —A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment modelsl [8].

A. Characteristics

The cloud computing must have some characteristics in order to meet expected user requirements and to provide qualitative services. According to NIST [8], these five essential characteristics can be classified as:

a) **On-demand self-service-** A consumer can access different services such are computing capabilities, storage services, software services etc. as needed automatically without service provider's intervention.

b) **Broad network access-** To avail cloud computing services, internet works as a backbone of cloud computing. All services are available over the network and are also accessible through

standard protocols using web enabled devices such are computers, laptops, mobile phones etc.

c) Resource pooling- The resources that can be assigned to users can be processing, software, storage, virtual machine and network bandwidth. The resources are pooled to serve the users at a single physical location and/or at different physical location according to the optimality conditions (e.g. security, performance, consumer demand). The cloud gives an impression of resource location independence at lower level (e.g. server, core) but not at the higher level (e.g. data enter, city, country).

d) Rapid elasticity- The beauty of cloud computing is its elasticity. The resources appear to users as indefinite and are also accessible in any quantity at any time. The resources can be provisioned without service provider intervention and can be quickly scale in and scale out according to the user needs in a secure way to deliver high quality services.

e) Measured service- A metering capability is deployed in cloud system in order to charge users. The users can achieve the different quality of services at different charges in order to optimized resources at different level of abstraction suitable to the services.

B. Cloud Service Models

The cloud services are delivered in three forms such are Infrastructure as a Service (IaaS), Software-as-a-Service (SaaS) and Platform-as-a-Service (PaaS). The services are delivered over the network by using Web browser, Web Based mail etc.

The service models are as follows:

Software-as-a-Service (SaaS): In this multitenant service model, the consumers use application running on a cloud infrastructure. The cloud infrastructure including (servers, OS, Network or application etc.) is managed and controlled by the service provider with the user not having any control over the infrastructure [8, 9]. Some of the popular examples are SalesForce.com, NetSuite, IBM, Microsoft and Oracle etc. Platform-as-a-Service (PaaS): With this model, the provider delivers to user a platform including all the systems and environments comprising software development life cycle viz. testing, deploying, required tools and applications. The user does not have any control over network, servers, operating system and storage but it can manage and control the deployed application and hosting environments configurations [8, 9]. Some popular PaaS providers are GAE, Microsoft's Azure etc.

Infrastructure-as-a-Service (IaaS): In this service model, the provider delivers to user the infrastructure over the internet. With this model, the user is able to deploy and run various software's including system or application softwares. The user has the ability to provision computing power, storage, networks. The consumers have control over operating systems, deployed applications, storage and partial control over network. The consumer has no control over underlying infrastructure [8, 10]. Some important IaaS providers are GoGrid, Flexiscale, Joyent, Rackspace etc.

C. Cloud Deployment models

Cloud systems can be deployed in four forms such are private, public, community and hybrid cloud as per the access allowed to the users and are classified as follows:

Private cloud-

This deployment model organization and is exclusively used by their employees at organizational level and is managed and controlled by the organization or third party. The cloud infrastructure in this model is installed on premise or off premise. In this deployment model, management and maintenance are easier, security is very high and organization has more control over the infrastructure and accessibility [8, 10].

Public cloud-

This deployment model is implemented for general users. It is managed and controlled by an organization selling cloud services. The users can be charged for the time duration they use the services. Public clouds are more vulnerable to security threats than other cloud models because all

the application and data remains publicly available to all users making it more prone to malicious attacks. The services on public cloud are provided by proper authentication [8, 10].

Community cloud-
This cloud model is implemented jointly by many organizations with shared concerns viz. security requirements, mission, and policy considerations. This cloud is managed by one or more involved organizations and can be managed by third party. The infrastructure may exist on premise to one of the involved organization or it may exist off premise to all organizations [8, 10].

Hybrid cloud-
This deployment model is an amalgamation of two or more clouds (private, community, public or hybrid). The participating clouds are bound together by some standard protocols. It enables the involved organization to serve its needs in their own private cloud and if some critical needs (cloud bursting for load balancing) occur they can avail public cloud services [8, 10].

III. RESEARCH ISSUES

The existing computing paradigms viz. distributed computing, SOA, networking etc. are building blocks of cloud computing. There are numerous issues associated with theses computing paradigms and some new challenges emerged from cloud computing are required to be addressed properly in order to realize the cloud to its full extent. Current cloud adoption is associated with numerous challenges and 3 depicting the specific business risk of adopting cloud services and biggest barriers. Therefore, these issues must be addressed in order to provide high quality services to the users while complying with the service provider's needs. The issues can be organized into several different categories varying from security, protection, identity management, resource management, power and energy management, data isolation, availability of resources, heterogeneity of resources. Although, there are several issues that demand attention but the following could be treated as of prime concern [11-14].

A. Performance-
The cloud must provide improved performance when a user moves to cloud computing infrastructure. Performance is generally measured by capabilities of applications running on the cloud system. Poor performance can be caused by lack of proper resources like disk space, limited bandwidth, lower CPU speed, memory, network connections etc. Many times users prefer to use services from more than one cloud where some applications are located on private clouds while some other data or applications being on public and community cloud. The data intensive applications are more challenging to provide proper resources. Poor performance can results in end of service delivery, loss of customers, reduce bottom line revenues etc. [2, 11, 13].

B. Security-
The critical challenge is how it addresses security and privacy issues which occur due to movement of data and application on networks, loss of control on data, heterogeneous nature of resources and various security policies. Data stored, processing and movement of data outside the controls of an organization poses an inherent risk and making it vulnerable to various attacks. The security threats can be of two types such are internal and external. The external risk is posed by various persons and organizations e.g. enemies or hackers that do not have direct access to the cloud. The internal security risk is a well-known issue which can be posed by organizational affiliates, contractors, current or former employees and other parties that have received access to an organization's servers, networks and data to facilitate operations. Cloud computing poses privacy concerns because the service providers may access the data that is on the cloud that could accidentally or deliberately be changed or even removed posing serious business trust and legal consequences [8, 11-14].

C. Reliability and Availability-

Any technology's strength is measured by its degree of reliability and availability. Reliability denotes how often resources are available without disruption (loss of data, code reset during execution) and how often they fail. One of the important aspect that creates serious problems for the reliability of cloud computing is down time. One way to achieve reliability is redundant resource utilization. Availability can be understood as the possibility of obtaining the resources whenever they are needed with the consideration to the time it takes for these resources to be provisioned. Regardless of employing architectures having attributes for high reliability and availability, the services in cloud computing can experience denial of service attacks, performance slowdowns, equipment outages and natural disasters. Data shows that some of the current cloud computing providers have some frequent outages last year. e.g Amazon EC2 outage. In order to remove FUDD (fear, uncertainty, doubt, and disinformation), probably the reliability, availability and security are the important and prime concern to an organization. Therefore, the level of reliability and availability of cloud resources must be considered as a serious issue into the organization's planning to set up the cloud infrastructure in order to provide effective services to consumers [19].

D. Virtualization-

Virtualization is the creation of a virtual version of a storage device, an operating system, a server or network resources. The virtualization divides the resource into multiple execution environments and hides the physical characteristics of computing resources to simplify the way in which other systems, applications or end users interact with those resources. Virtualization is used in two forms are Type 1 hypervisors / Bare-Metal Virtualization and Type2 hypervisors / OS virtualization. Virtualization is one of the key technology in order to make it possible to realize the cloud computing. Virtualization realization typically enables consumers to migrate their computation and data to a remote location with some varying impact on performance. There are numerous benefits of virtualization which could not otherwise be achieved. However, virtualization provides many benefits to users, while on the other hand it poses many challenges to cloud computing. It has many critical issues to be address viz. VM sprawl challenges, workload characterization of VMs, security issues in hypervisor based cloud communication, Live migration security, unnecessary migration to a private cloud etc. Virtualization makes infrastructure management more complex, and massive automation is required in order to support the key aspects such as automation, on-demand and elasticity requirements.

E. Scalability and Elasticity-

Scalability and elasticity are the most amazing and unique features of the cloud computing. These features provide users to use cloud resources being provisioned as per their need in unlimited amount as required. Scalability can be defined as the ability of the system to perform well even when the resources have been scaled up. Elasticity, on the other hand, is the ability to scale resources both up and down as and when required. Elasticity goes one step further, though, and does also allow the dynamic integration and extraction of physical resources to the infrastructure. The elastic cloud computing means that allocation of resources can get bigger or smaller depending on the requirement. Elasticity enables scalability— which means the system can easily scale up or down the level of services to which the user has subscribed. Scalability can be provided in two ways- horizontally and vertically whereby horizontal scalability (Scale Out) refers to addition of more nodes to the system such as adding a new computer to an existing service provider system while vertical scalability (scale up) refers to addition of resources to a single node in the system, typically involving the addition of memory or processors to a single computer [19].

F. Bandwidth Cost -

High speed communication channels work as a backbone of cloud computing. With cloud

computing, business gets the ability to save money on hardware and/or software but still requires spending more on the bandwidth. It is almost impossible to fully exploit the services of cloud computing without high speed communication channels. Migration to cloud almost removes the up-front cost, while it increases the cost of data communication on network i.e. the cost involved in transfer of data to and from the private and other clouds [17]. This problem is prominent if consumer application is data intensive and the consumer's data is distributed amongst a number of clouds (private/public/community). Cloud computing provides lesser cost for CPU intensive jobs than data intensive jobs with gray's argument —Put the computation near the datal still applicable for data intensive jobs still finding relevance [18]. In other words, data intensive applications can perform better being employed on private cloud rather than public/hybrid cloud.

G . Resource Management-

Resources management can be consider at various levels viz. hardware, software, virtualization level with performance, security and other parameters being dependent on the management and provisioning of resources. It includes the management of memory, disk space, CPU's, cores, threads, VM images, I/O devices etc. Resource provisioning can be defined as allocation and management of resources to provide desired level of services. Job scheduling is a type of resource provisioning where jobs execution order is established in order to finish job execution to optimize some parameters viz. turnaround time, response time, waiting time, throughput and resource utilization. Since cloud computing is a combination of many existing technologies, existing job scheduling strategies are eligible to be applied on cloud system. The major issues of job scheduling on cloud systems are partitioning of jobs into parallel tasks, interconnection network between clouds or processors, assigning priority to jobs and selection of processors or cloud to allocate the job(s), job flexibility, level of pre-emption supported, workload characteristics, memory allocation, task execution monitoring, recourse allocation requirements, topology, nature of the job, effect of existing load, load balancing, parallelism, job migration policy, redundant Resource selection, synchronization, communication overheads, job pre processing requirements etc. The job scheduling is one of critical process that must be decided very carefully and wrong selection of scheduling strategy can lead to devastating effect on performance leading to wastage of resources while falling to meet Quality of Service (QoS) standards.

Whatever, various issues and challenges of cloud computing have been taken up in this section still there are many other compelling issues that needs to be considered. Some of these like capacity planning, management of additional and remaining resources, management of automation of resources, costing model, Service Level Agreement (SLA) etc. are also there demanding an early attention. These issues should not be considered as road blocks in the pursuit of cloud computing, it is rather important to give serious consideration to these issues and explore the possible ways out before adopting this technology.

CONCLUSION

Cloud computing can be seen as a new phenomenon which is set to revolutionize the way we use the Internet, there is much to be cautious about. There are many new technologies emerging at a rapid rate, each with technological advancements and with the potential of making human's lives easier. However, one must be very careful to understand the security risks and challenges posed in utilizing these technologies. Cloud computing is no exception. In this paper key security considerations and challenges which are currently faced in the Cloud computing are highlighted. Cloud computing has the potential to become a frontrunner in promoting a secure, virtual and economically viable IT solution in the future.

REFERENCES

[1] E. Anderson et al., Forecast overview: Public cloud services, worldwide, 2011-2016, 4Q12 Update, Gartner Inc., February 2013.

[2] IBM, Google and IBM announced university initiative to address internetscale computing challenges, October-2007.

[3] S. Lohr, Google and I.B.M. join in Cloud computing research, October2007.

[4] IBM, —IBM introduces ready-to-Use Cloud computingl, November-2007

[5] R. Buyya, C. S. Yeo, S. Venugopal, J. Broberg and I. Brandic, Cloud computing and emerging ITplatforms: Vision, hype, and reality for delivering computing as the 5th utilityl, Future generation computer systems, vol. 25, no. 6, pp. 599–616, June 2009.

[6] J. Geelan, Twenty one experts define cloud computing, August 2008. Article available at http://virtualization.syscon. com/node/612375.

[7] L. Badger, T Grance, R. P. Comer and J. Voas, DRAFT cloud computing synopsis and recommendations, Recommendations of National Institute of Standards and Technology (NIST), May-2012.

[8] D. A. Menasce and P. Ngo, Understanding cloud computing: Experimentation and capacity planning,l in Proc. of computer measurement group conf., pp. 1-11, December 2009.

[9] IBM Global Services, Cloud computing: defined and demystified explore public, private and hybrid cloud approaches to help accelerate innovative business solutions, April2009.

[10] Y. Ghanam, J. Ferreira and F. Maurer, —Emerging issues & challenges in Cloud-A hybrid approachl, Journal of software engineering and applications, vol. 5, no. 11, pp. 923-937, November 2012.

[11] M. A. Vouk, —Cloud computing – Issues, research and implementationsl, Journal of computing and information technology, Vol. 16, no. 4, pp. 235-246, June- 2008.

[12] T. Dillon, C. Wu and E. Chang, —Cloud computing: Issues and challengesl, 24th IEEE International Conference on Advanced Information Networking and Applications. pp. 27-33, 2010.

[13] European CIO Cloud Survey, Addressing security, risk and transition, May -2011.

[14] Energy Star, Report to congress on server and data centre energy efficiency, Public Law 109-431, U.S. Environmental Protection Agency, August - 2007.

[15] J. Hamilton, —Cooperativeexpendablemicro-slice servers(CEMS): Low cost, low power servers for internet-scale servicesl, Proc. 4th Biennial Conf. Innovative Data Systems Research (CIDR), Jan 2009.

A Review of World Economic Growth in India Digital

Ranjana Sharma[1], Chirag Malhotra[2], Manshika Khera[3]
[1]*First Department, First University, Address*
[*]*Second Company*
Address Including Country Name
[2]*Third Department, Third University, Address*
[1]Sharmaranjana04@gmail.com
[2]chiragmalhotra770@gmail.com
[3]manshikakhera8@gmail.com

***Abstract*— Knowledge is the important aspect related to level of productivity, economic growth and lead a new focus on role of information, technology learning in economic performance. The term 'Knowledge-based economy acquires an important place of knowledge and technology in all modern economics.This paper is based on understanding of the dynamic of knowledge based economy and its relation to traditional economy and shows a "new growth theory". The growing level of knowledge and its transmission of information through computer network has led to the formation of information society. It emerge the use of all latest AI tools &technologies like Artificial Neural Network, Fuzzy ogic, Genetic algorithm etc.**

***Keywords*—Knowledge, Economy, Learning, Knowledge indicator, AI.**

INTRODUCTION

The need of worker to acquire a range of skill led to the emergence of learning economy. Understanding of knowledge and technology. Many question are raised on the knowledge economy for employment and government did a lot for the development and maintains of knowledge base. The focal point of attention in the field of science, technology and industry is to identify "best practice" for the knowledge based economy. The role of the science and the development of knowledge based statistics.

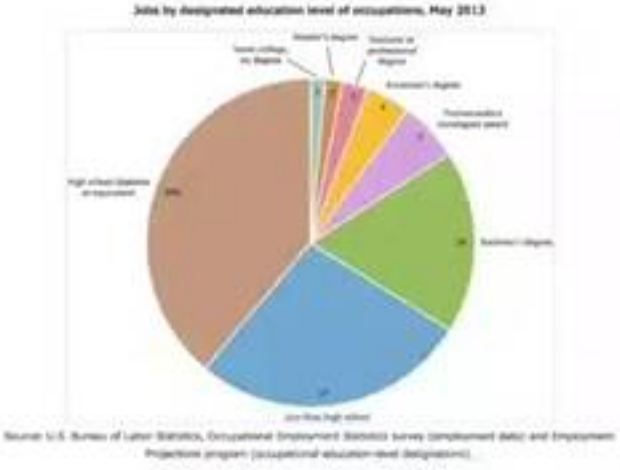
I. KNOWLEDGE BASED ECONOMY

The policies of science, technology and industry should be change to matrix the level of performance in knowledge based economic the growth in high technology industries more skilled labour and the level of productivity gains."New Growth Theory" Explain the role of knowledge, technology in economy .In this response knowledge, education, training and new managerial work are the lay to the success stars of the economy.

Knowledge based economy 2.1 fig

A. KNOWLEDGE BASED ECONOMY (CURRENT LAYOUT)

The main aspect of this economy is that it is not for everyone as it remove the benefits for the middle class worker. No formula is used creating knowledge. It means that it might be a boom or a drought. The knowledge input is basically input can be defined as expenditure on research and development, employment and can be measured by patents easily. It is attractive at both national as well as international level. The two main flow of knowledge is very necessary to be analyse first one is to distribute knowledge in universities, institution and industries and the second part is to distribute knowledge within supplies and users in a market. The main key is to collect data within the boundary area as well as outside the boundary one way is to simply uses survey. The very practical way of doing this is education by analysing the impact on education. we can know how the knowledge is flowing.



Current Scenario Fig 2.1

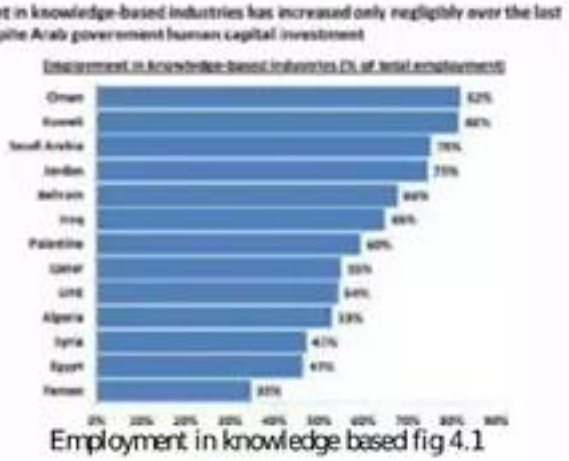
A. KNOWLEDGE DISTRIBUTION &INFORMATION SECURITY

Distribution of knowledge is done through formal and informal network and essential for economic performance. Knowledge is codified and transmitted through computers and communication networks and skill is required to codified knowledge which show the continuous learning by individual and firms in knowledge based innovation is driven by the interaction of producers and users.This model has replaced the traditional linear model of innovation. The configuration of national innovation system which consist of the flows and relationship among industry, government and academic in department of "science and technology".

Distribution of Knowledge fig 3.1

IV.EMPLOYMENT IN THE KNOWLEDGE BASED ECONOMY

Employment in the knowledge based economy is characterized by increase demand for more highly workers the knowledge intensive and high technology parts of economies tend to be the most dynamic in terms of output and employment growth changes in technology and particularly the advent of information technologies are making educated and skilled labour more valuable and unskilled labour less so government policies will need more stress on upgrading human capital through promoting access to a range of skills and especially the capacity to learn , enhancing the knowledge distribution power of the economy through collaborative networks and the diffusion of technology and providing the enabling condition for organizational change at the firm level; to maximize the benefits of technology for productivity India's rate of employment generation has gone up from an average of 1.07 percent between 1994 and 2000 to 2,04 percent between 2000-2019 and December 2002 the rise has been more in urban area as compared to rural ones Figures released by the national simple survey organization (NSS0) shows that an average 8.4 million jobs has been added over the 2.5 years periods. The tenth five year plan aims to generate 10 million employment opportunities each year The additional employment in the year 1999-2000 to December 2002 period has come from the small scale sector. In contrast, the corporate sector had shed around 1 million jobs in the previous year.



Employment in knowledge based fig 4.1

Employment in knowledge based fig 4.2

V.LATEST TOOLS AND TECHNOLOGIES AND THEIR IMPACT UPON KNOWLEDGE BASED ECONOMY

The emergence of latest AI tools and technologies like artificial neural network, fuzzy, logic , genetic algorithms etc. have contributed in a significant manner toward emergence of knowledge based economy and it has necessitated the need for worker to acquire a range of skills and to continuously adapt these skills . the importance of knowledge and technology diffusion requires better understanding of knowledge network and "national innovation system" Commentators suggest there are various interlocking driving forces, which are changing the rules of business and national competitiveness.

a. Globalization – markets and products are more global

b. Information technology, which is related to next three:-

Information knowledge intensity – efficient product relies information and know-how, over 70 percent of workers in developed economies are information workers, many factory workers use their heads more than their hands

New media– new media increases the production and the distribution of knowledge which in turn result in collective intelligence .existing knowledge become much easier to access as a result of networked data based which promote online interaction between user and producers , Computer networking and developments such as internet brings "global village " ever nearer.As a result, good and services can be developed , bought, sold and in many cases even delivered over electronic networks As regards the applications of any new technology , both manufacturing and service sectors , social and private of return to knowledge investments to better gauge the impact of technology on productivity and growth the functioning of knowledge networks and national innovation system and the development and skilling of human capital.

this depends on how it meets economic demand. it can remain dormant or make a commercial breakthrough.

Figure 1 - P21 Framework for 21st Century Learning

Tools and technology fig 5.1

CONCLUSIONS

In general , our understanding of what is happening in the knowledge-based economy is constrained by extend and quality of the available knowledge-related indicator traditional national accounts frameworks are not offering convincing explanation of trends in economic growth , productivity and employment , development of indicators of the knowledge based economy must start with improvements more traditional input indicator of R&D expenditures and research personal .better indicator are also needed of knowledge stocks and flows , particularly relating to the deffusion of ine information technologies , in

REFERENCES

[1] United Nations Conference on Trade and Development (20130). "World Investment Report 2013: Global Value Chains: Investment and Trade for Development," http://unctad.org/en/publicationslibrary/wir2013_en.pdf)

[2] Taylor, M. Scott (2004). "TRIPS, Trade and Growth," *International Economic Review*, Vol. 35, 2004.

[3] Wai-MunHar, Kai-Lin Teo and Yee, Kar-Mun (2008). "FDI and Economic Growth Relationship: An Empirical Study on Malaysia." *International Business Research*, Vol. 1, No. 2, pp. 11-18, April 2008.

[4] Gordon, J. and Poonam Gupta (2004) Understanding India's Services Revolution, IMF Working Paper No. WP/04/171, Washington, DC.

[5] Kumar, Nagesh (2003) 'Intellectual Property Rights, Technology and Economic Development: Experiences of Asian Countries', *Economic and Political Weekly*, 38(3), January 18, 2003: 209-226.

[6] Panagariya , A. (2008), *India: The Emerging Giant*, New York: Oxford University Press.

[7] UNCTAD (2005) *World Investment Report 2005*, New York: United Nations.

Internet of Things

Aditya Kumar &KhushiAgarawal (Students, CCSIT, TMU)
Dr. Arpit Jain (Assistant Professor, CCSIT)
CCSIT, TeerthankerMahaveer University, Moradabad.
medicoadi@gmail.com
khushiagarawal2k19@gmail.com

Abstract– The Internet of Things (IoT) is the internetworking of physical devices, vehicles and other objects which consists of an embedded system with sensors, actuators and network connectivity that enable to collect and exchange data. The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure, creating opportunities for more integration of the physical world into computer-based systems, and result in improved accuracy, efficiency and economic benefit. The IoT is a rapidly increasing and promising technology which becomes more and more present in our everyday lives.

Keywords- Sensors, Network connectivity, Computer-Based System.

Introduction

The term "The Internet of Things" (IoT) was coined by **Kevin Ashton** in a presentation to Proctor & Gamble in 1999. He is a co-founder of MIT's Auto-ID Lab. He pioneered RFID (used in bar code detector) for the supply-chain management domain. He also started Zensi, a company that makes energy sensing and monitoring technology. The 'Thing' in IoT can be any device with any kind of built-in-sensors with the ability to collect and transfer data over a network without manual intervention. The embedded technology in the object helps them to interact with internal states and the external environment, which in turn helps in decisions making process.

a) IoT Definitions: The term Internet of Things generally refers to scenarios where network connectivity and computing capability extends to objects, sensors and everyday items not normally considered computers, allowing these devices to generate, exchange and consume data with minimal human intervention. There is, however, no single, universal definition.

b) Enabling Technologies: The concept of combining computers, sensors, and networks to monitor and control devices has existed for decades. The recent confluence of several technology market trends, however, is bringing the Internet of Things closer to widespread reality. These include Ubiquitous Connectivity, Widespread Adoption of IP-based Networking, Computing Economics, Miniaturization, Advances in Data Analytics, and the Rise of Cloud Computing.

c) Connectivity Models: IoT implementations use different technical communications models, each with its own characteristics. Four common communications models described by the Internet Architecture Board include: *Device-to-Device, Device-to-Cloud, Device-to-Gateway*, and *Back-End Data-Sharing*. These models highlight the flexibility in the ways that IoT devices can connect and provide value to the user.

d) Transformational Potential:
If the projections and trends towards IoT become reality, it may force a shift in thinking about the implications and issues in a world where the most common interaction with the Internet comes from passive engagement with connected objects rather than active engagement with content. The potential realization of this outcome – a "hyper-connected world" — is testament to the general-purpose nature

of the Internet architecture itself, which does not place inherent limitations on the applications or services that can make use of the technology.

IoT Across Various Domains:

- **Energy Applications:** The energy rates have raised to a great instinct. Individuals and organisations, both are searching ways to reduce and control the consumption. IoT provides a way to not only monitor the energy usage at the appliance-level but also at the house-level, grid level or could be at the distribution level. Smart Meters & Smart Grid are used to monitor energy consumption. It also detects threats to the system performance and stability, which protect appliances from downtime and damages.

- **Healthcare Application**: Smart watches and fitness devices have changed the frequency of health monitoring. People can monitor their own health at regular intervals. Not only this, now if a patient is coming to the hospital by ambulance, by the time he or she reaches the hospital his health report is diagnosed by doctors and the hospital quickly starts the treatment. The data gathered from multiple healthcare applications are now collected and used to analyze different disease and find its cure.
- **Education**: IoT provides education aids which helps in fulfilling the gaps in the education industry. It not only improves the quality of education but also optimizes the cost and improves the management by taking into consideration students response and performance.

- **Government**: Governments are trying to build smart cities using IoT solutions. IoT enhances armed force systems and services. It provides better security across the borders through inexpensive & high-performance devices. IoT helps government agencies to monitor data in real-time and improve their services like healthcare, transportation, education etc.

- **Air and Water Pollution:** Through various sensors, we can detect the pollution in the air and water by frequent sampling. This helps in preventing substantial contamination and related disasters. IoT allows operations to minimize the human intervention in farming analysis and monitoring. Systems automatically detect changes in crops, soil, environment, and more.

- **Transportation**: IoT has changed the transportation sector. Now, we have self-driving cars with sensors, traffic lights that can sense the traffic and switch automatically, parking assistance, giving us the location of free parking space etc. Also, various sensors in your vehicle indicate you about the current status of your vehicle, so that you don't face any issues while travelling.

- **Marketing your product**: Using IoT, organizations can better analyze & respond to customer preferences by delivering relevant content and solutions. It helps in improving business strategies in the real-time. Now that we are aware of the powerful IoT solutions that have been astoundingly impacting various domains, let's take a deep dive and understand Raspberry Pi, which is commonly used to prepare IoT solutions. After understanding Raspberry Pi we will be creating an IoT application.

Acknowledgement

I would like to express my gratitude towards **Dr.Arpit Jain Sir (Assistant Professor, CCSIT)** for their kind co-operation and encouragement which help me in completion of this paper. I would like to

express my special gratitude and thanks to **National Conference on Industry 4.0** for giving me such attention and time.

References

[1]https://www.edureka.co/blog/iot-tutorial/

[2]https://www.internetsociety.org/

ROLE OF HUMANITIES IN MODERN TECHNOLOGICAL WORLD

Ms Indu Tripathi
Assistant Professor
Faculty of Engineering & Computing Science
Teerthanker Mahaveer University, Moradabad

***Abstract*—The significance of Humanities cannot be ignored in the advanced and modern era too. Although it gets importance gradually, yet no one can ignore it completely. From a historical point of view, until the mid-19th century, the humanities held the upper hand. However, in 1847 Yale College broke with this tradition and formed the School of Applied Chemistry. Science had begun its separation and was ascending visa-visa the liberal arts in universities the world over. Authorities both within and outside of science have expressed concern that scientists do not learn enough about the humanities to the detriment of society. There are some reasons why students pursuing science careers should augment their education with a strong foundation in the humanities. A successful society depends upon altruism, charity, civility, compassion, and generosity and the humanities evaluate and emphasize the importance of these characteristics. Humanities study helps you understand the impact that science, technology, and medicine has had on society and understand the future scientific needs of society. It is a general belief among scientists that science deals with facts and the humanities deals with values.**

Keywords-- Humanities, modern technological world, science

The humanities came into existence around the time of the Renaissance to distinguish the study of human matters from the things that were concerned with theology on the one hand & nature on the other. The things concerned with nature became the source of modern science, but that still left the study of humankind itself. It is common to hear undergraduates and recent college graduates preparing for a career in science complain: "I think I wasted a lot of time in college being forced to take humanities classes that had nothing to do with my area of study." This is one of many manifestations of the ongoing centuries-long battle over the relationship between the sciences and the humanities. From a historical point of view, until the mid-19th century, the humanities held the upper hand. However, in 1847 Yale College broke with this tradition and formed the School of Applied Chemistry. Science had begun its separation and was ascending visa-visa the liberal arts in universities the world over. The need for science majors to take courses in the humanities has been contentious ever since. Authorities both within and outside of science have expressed concern that scientists do not learn enough about the humanities to the detriment of society. There are some reasons why students pursuing science careers should augment their education with a strong foundation in the humanities. The humanities prepare you to fulfill your civic and cultural responsibilities. The humanities provide an insightful understanding into moral, ethical, political, and ideological forces. A successful society depends upon altruism, charity, civility, compassion, and generosity and the humanities evaluate and emphasize the importance of these characteristics. The liberal arts introduce aesthetic values to the student. While it may not be obvious how these characteristics are essential to finding a research position in academia or industry, they are keys to a full and meaningful life. Studying the humanities allows you to become familiar with and use the creative ideas from great minds outside of science. Biography, literature, and history offer a window into the understanding of human nature and society. They introduce us to thoughts and ideas from outside our specialist

areas and can have relevance to finding new directions and enhance creative thinking. For example, a classic case that demonstrates the influence of humanities on science can be seen in Charles Darwin's development of the theory of evolution by natural selection. In his On the Origin of Species, his autobiography, and other writings, Darwin revealed that the principal insight that led to his theory of evolution was his knowledge of Malthus' population theory. This states that populations increase geometrically while food supplies grow arithmetically. Robert Young, who carefully traced this link in his 1969 publication, Malthus and the Evolutionists: the Common Context of Biological and Social Theory, points out those assumptions in the humanities about human nature and society contribute fundamentally to approaches taken in the scientific study of nature. The state-of-the-art scientific knowledge and techniques you learn in college have a limited shelf life; mastering the humanities provides tools for extending it. The preparation for a scientific career one receives in graduate school leaves the individual competitive for a finite period only. The study of humanities, both in its pursuit and the perspective it provides, rewards the student with the skills needed for self-critical reflection, adaptability, and self-teaching. These are the functions needed to be an independent learner, thereby extending one's scientific knowledge and teaching abilities throughout his or her professional career. Humanities study strengthens your ability to communicate and work with others. Scientists chafe at the stereotype held by some that they belong to a class of socially awkward "geeks" that are unable to communicate their ideas clearly. The old "classical" liberal arts education was pursued in large measure because the materials studied and the methods of study enhanced one's ability to work well with others and communicate properly via the spoken and written word. These rewards still apply and remain useful in securing good jobs, gaining advancement and promotions, and obtaining grants. You will gain knowledge of foreign languages and foreign cultures. With globalization, this is increasingly seen as a requirement for a successful career in commerce and industry. It is also helpful in science and medicine. Although we assume English to be the universal language of science and medicine, this isn't the case in every country. Moreover, all non-English speaking countries retain their national pride. The walls that exist among disciplines have been lowered and students can move across disciplines more freely. The concept of a core curriculum has changed and students have increasing flexibility, largely as a result of information technology. Students can benefit from advice on which courses to take. Without the benefit of experience or advice, students choosing courses in an abstract manner can make poor decisions. Humanities study helps you understand the impact that science, technology, and medicine has had on society and understand the future scientific needs of society. The study of literature, history, and philosophy shed light on the influence science has had on the quality of people's lives and on the shaping of society, both positively and negatively. These studies also inform us of society's needs and are important considerations for the concerned scientist to appreciate and learn from, including the consideration in where he or she chooses to work and what projects they undertake. Interdisciplinary learning adds value to one's degree. In a significant measure, the diploma we receive at graduation defines and symbolizes who we are and what we are qualified to do. But its true value is derived from what we have put into our head and our heart. A broad knowledge that includes the essentials of the humanities is an important complement to our scientific training. Humanities study teaches you that the supposedly sharp dichotomies that separate science from

humanities do not really exist. It is a general belief among scientists that science deals with facts and the humanities deals with values. But as Robert Young astutely notes: "Science, technology and medicine -- far from being value-neutral are the embodiment of values in theories, things and therapies, in facts and artifacts, in procedures and programs. I am suggesting that science is part of culture and that research traditions cannot be reasonably claimed to be set above the prevailing world view of the epoch." It is believed that it is the most compelling reason why the knowledge of values gained through the study of the humanities is important to one.

References

[1] http://ah21cw.com/2014/06/tenimportan t-reasons-to-include-thehumanities-in-your-preparation-for-ascientific-career/

[2] http://blogs.sciencemag.org/sciencecareer

[3] s/2011/05/ten-important-r.html

[4] http://www.highered.org/resources/legacy.htm

[5] http://blogs.sciencemag.org/sciencecareers/201

[6] 1/05/ten-important-r.htm

Analysis of 4G and 5G Communication System

Saquib Saqulain,
Ashok Kumar
[1]Scholar FOECS TMU, MORADABAD
[2]Associate Professor FOECS TMU, MORADABAD
[1]saquibsaqulain12@gmail.com
[2]ashok.computers@tmu.ac.in

ABSTRACT–5G wireless technology is the modification and upgrade version of 4G technology. Currently 4G is lacking qualities in many areas which needed to be fixed . The comparative analysis between 4G and 5G is mainly in areas like speed, frequency, band switching design basis and forward error correction is studied. 5G mainly solves the problem of poor coverage, bad interconnectivity, poor quality of service. 5G technology will be proficient of providing an omnipresent Gpbs experience to customers who subscribe from anywhere in the country and provides data transmission speed up to tens of Gbps per base station. The importance of the comparative study is estimated for a speed and effective connection and communication of devices like wireless devices and other hardware. The importance of the comparative study is estimated for a speed and effective connection and communication of devices like wireless devices and other hardware.

KEYWORDS-- ITU.WiMAX, OFDMA, RAT, TDMA, PDC, LTE.

INTRODUCTION

Mobile network technology is moving very fast .The current 4G technology is modified to next level 5G technology. A cellular network or mobile network is a communication network. The first commercial cellular network, The 1G generation. This 1G was followed by the first commercial digital cellular network, the 2G generation. 2G introduced data services for mobile, starting with SMS plain text-based messages.3G technology provides an information transfer rate of at least 144 kbit/s. Each generation is characterized by new frequency bands, higher data rates and non–backward-compatible transmission technology. 4G provides, in addition to the usual voice and
other services of 3G, devices. LTE(Long Term Evolution) is commonly marketed as 4G LTE. 5G is a generation currently under development. It denotes the next major phase of mobile telecommunications standards beyond the current 4G/IMT Advanced standards mobile broadband Internet access, for example to laptops with wireless modems, to smart-phones and to other mobile

EVOLUTION OF MOBILE CELLULAR NETWORKS

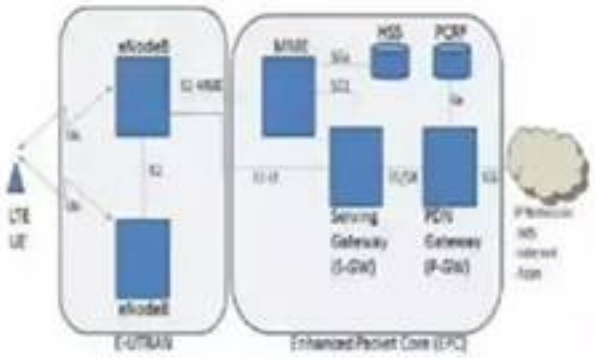
First Generation (1G) mobile networks were reliant upon analog radio systems which meant that users could only make phone calls, they couldn't send or receive text messages. The 1G network was first introduced in Japan in 1979 before it was rolled out in other countries such as the USA in 1980. The 1G network was not perfect, but it remained until remained until 1991 when it was replaced with 2G. Third generation mobile networks are still in use today, but normally when the superior 4G signal fails.

Figure-1 Evolution of generation

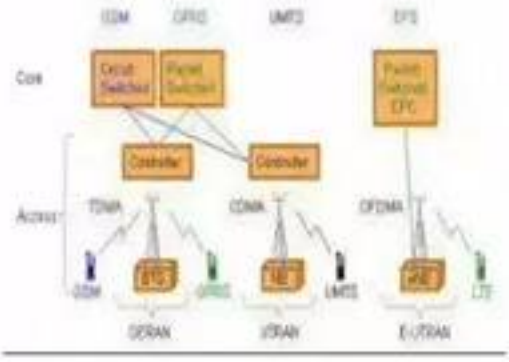
4G COMMUNICATION SYSTEM

4G is a collection of fourth generation cellular data technologies. It succeeds 3G and is also called "IMT-Advanced," or "International Mobile Telecommunications Advanced." 4G was made available as early as 2005 in South Korea under the name WiMAX and was rolled out in several European countries over the next few years. It became available in the United States in 2009, with Sprint being the first carrier to offer a 4G cellular network. All 4G standards must conform to a set of specifications created by the International Telecommunications Union. For example, all 4G technologies are required to provide peak data transfer rates of at least 100 Mbps. While actual download and upload speeds may vary based on signal strength and wireless interference, 4G data transfer rates can actually surpass those of cable modem and DSL connections.

ARCHITECTURE OF 4G



Technologies used in 4 G are smart antennas for multiple input and multiple output (MIMO), IPv6, VoIP, OFDM and Software defined radio (SDR) System. 4G is evaluation of 3G to meet the forecasted rising demand. It is an integration of various technologies including GSM, CDMA, GPRS, IMT-2000, Wireless LAN. 4 G network is an integration of all heterogeneous wireless access networks such as Ad-hoc, cellular, hotspot and satellite radio component. OFDM stands for Orthogonal Frequency Division Multiplexing which is currently used as WiM ax and WiFi.



FEATURES OF 4G

The following are some possible features of the 4G systems :

1. Support interactive multimedia, voice, video, wireless internet and other broadband services.

2. High speed, high capacity and low cost per bit.

3. Global mobility, service portability, scalable mobile networks.

4. Seamless switching, variety of services based on Quality of Service (QoS) requirements.

5. Better scheduling and call admission control techniques.

6. Ad hoc networks and multi-hop networks.

1) LTE-Long Term Evolution

LTE has been marketed both as "4G LTE" and as Advanced 4G but it does not meet the technical criteria of a 4G wireless service, as specified in the 3GPP Release 8 and 9 document series for LTE Advanced. LTE is also commonly known as **3.95G**. The requirements were originally set forth by the ITU-R organization in the IMT Advanced specification. However, due to marketing pressures and the significant advancements that WiMAX, Evolved High Speed Packet Access, and LTE bring to the original 3G technologies, ITU later decided that LTE together with the aforementioned technologies can be called 4G technologies.

2) WiMAX

WiMax stands for "Worldwide Interoperability for Microwave Access." It is an ITU-approved, fourth-generation mobile broadband technology that attempts to mimic the abilities of Wi-Fi wireless internet, but over a mobile phone network using an open protocol (802.16m). Think of it as a patchwork of Wi-Fi hotspots that, instead of reaching for a few hundred feet, can stretch for miles and overlap, eliminating coverage gaps. It provides fixed and mobile internet access for compatible devices with less interference than traditional Wi-Fi. Theoretically, a WiMax tower could provide broadband wireless internet over a 30-mile range, though most stations currently achieve much less. Current WiMax users can realistically expect about 3Mbps to 6Mbps download speeds.

3) CDMA

Stands for Code Division Multiple Access. CDMA uses a multiple access mode of communication. This is where several transmissions are made over the same channel simultaneously. Using a speed spectrum, each transmission is assigned a unique code that corresponds to the source and destination of the signal.

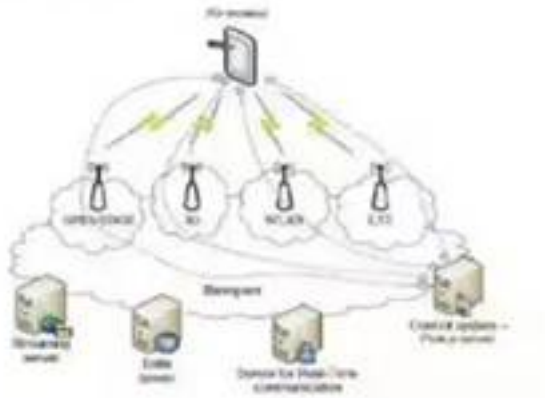
5G COMMUNICATION SYSTEM

5G Technology stands for 5th Generation Mobile technology. 5G technology has changed the means to use cell phones within very high bandwidth. The 5G network is yet to be released but is widely anticipated by the mobile industry. Many experts claim that the network will change not just how we use our mobiles, but how we connect our devices to the internet. The improved speed and capacity of the network will signal new IoT trends, such as connected cars, smart cities and IoT in the home and office. Mobile network operators claim that 5G will be available by 2020 but nothing is certain just yet. For more information on 5G and the IoT, check out our video interview of Dr Hamid Falaki, Technical Architect at Digital Catapult on how 5G will enhance the IoT. 5G is a packet switched wireless system with wide area coverage and high

throughput. 5G wireless uses OFDM. The primary technologies behind 5G include 26, 28, 38 & 60GHz millimeter wave bands. These 5G frequency bands offer speeds as high as 20Gbps Massive Multiple-Input-Multiple-Output (MIMO) 64-256 antennas offer performance speeds that are ten times better than the current 4G networks. Low-band and mid-band 5G use frequencies ranging from 600MHz – 6GHz (especially 3.5 – 4.2 GHz). 5G wireless frequency bands in the USA that are available and ready for use include; 3100 – 3550 MHz and 3700 – 4200 MHz. In Asia, they include; 3300 – 3600 MHz, 4400 – 4500 MHz and 4800 – 4990 MHz in China, 3600 – 4200 MHz and 4400– 4900 MHz in Japan and 3400 – 3700 MHz in Korea. 3400 – 3800 MHz is available in Europe. America has already begun pre-commercial deployment for very high 5G MMW frequency bands 27.5 – 28.35GHz & 37 – 40GHz. .

ARCHITECTURE OF 5G

As shown in the following image, the system model of 5G is entirely **IP** based model designed for the wireless and mobile networks.



The system comprising of a main user terminal and then a number of independent and autonomous radio access technologies. Each of the radio technologies is considered as the IP link for the outside internet world. The IP technology is designed exclusively to ensure sufficient control data for appropriate routing of IP packets related to a certain application connections i.e. sessions between client applications and servers somewhere on the Internet. The 3rd Generation Partnership Project (3GPP) covers telecommunication technologies including radio access, core transport networks and service capabilities. 3GPP has provided complete system specifications for 5G network architecture which is much more service oriented than previous generations.Multiple frequency ranges are now being dedicated to 5G new radio (NR). The portion of the radio spectrum with frequencies between 30 GHz and 300 GHz is known as the millimeter wave, since wavelengths range from 1-10 mm. Frequencies between 24 GHz and 100 GHz are now being allocated to 5G in multiple regions worldwide.

FEATURES OF 5G

A new revolution of 5G technology is about to begin because 5G technology going to give tough completion to normal computer and laptops whose marketplace value will be effected. There are lots of improvements from 1G, 2G, 3G, and 4G to 5G in the world of telecommunications. The new coming 5G technology is available in the market in affordable rates, high peak future and much reliability than its preceding technologies. Features that are getting embedded in such a small piece of electronics are huge. Today you will hardly witness a cell phone without an mp3 player with huge storage memory and a camera. We can use the cell phone as a Walkman. Some of the features of 5G are as follows-

- The advanced billing interfaces of 5G technology makes it more speed.
- The 5G technology also support virtual private network.

- The new 5G technology will take all delivery service out of business prospect attractive and effective.
- 5G technology also providing subscriber supervision tools for fast action.
- The uploading and downloading speed of 5G technology touching the peak.
- The 5G technology network offering enhanced and available quality services of 5G technology based on Policy to avoid error.
- 5G technology is providing large broadcasting of data in Gigabit which supporting almost 65,000 connections.
- 5G technology offer transporter class gateway with unparalleled consistency.
- The traffic statistics by 5G technology makes it more accurate.

CONCLUSION

While the future is becoming more difficult to predict with each passing year, we should expect an accelerating pace of technological change. 5G is not a term officially used for any particular specification or in any official document yet made public by telecommunication companies. To address 5G applications, there are many developments to be considered above the introductory model. In order to handle higher data rates, the operating frequency has to be increased to a millimeter range from which we can achieve a wider bandwidth. This will result in higher path loss between transmitters and receivers, so antennas need to provide higher gain to reach a longer distance. However, this will significantly reduce the covering range in terms of angle because the radiation pattern will be very sharp. Consequently, phased array antennas are required to get over the limit of angular dependency of high-gain antennas using the ability to steer a radiation beam toward wanted directions. By optimizing the design and performance of mobile device antennas, including those just mentioned, the ideal Internet of Things will be here before we know it, and we will be ready to embrace the new technology4G and 5G techniques provide efficient user services with lower battery consumption, lower outage probability (better coverage), high bit rates in larger portions of the coverage area, cheaper or no traffic fees due to low infrastructure deployment costs, or higher aggregate capacity for many simultaneous users.

REFERENCES

[1] K. Kumaravel , Comparative Study of 3G and 4G in Mobile Technology, IJCSI International Journal of Computer Science Issues, Vol. 8, Issue 5, No 3, September 2011

[2]Pankaj Sharma, Evolution of Mobile Wireless Communication Networks-1G to 5G as well as Future Prospective of Next Generation Communication Network, IJCSMC, Vol. 2, Issue. 8, August 2013.

[3] Sapna Shukla, Varsha Khare, Shubhanshi Garg, Paramanand Sharma, Comparative Study of 1G, 2G, 3G and 4G, Journal of Engineering, Computers & Applied Sciences (JEC&AS)Volume 2, No.4, April 2013

[4] Ms. Sachi Pandey Manoj Kumar, Atendra Panwar Ishita Singh, A Survey: Wireless Mobile Technology Generations With 5G, International Journal of

Engineering Research & Technology (IJERT)Vol. 2 Issue 4, April - 2013

[5] Hassan Gobjuka Verizon 4G Wireless Networks:Opportunities and Challenges.

[6] Mr. Arunabha Debnath, Mr. Abhinandan, Review on NEXT Generation Technologies of Wireless Communication, International Journal on Recent and Innovation Trends in Computing and Communication, Volume: 1 Issue: 4

[7] Toshio Miki, Tomoyuki Ohya, Hitoshi Yoshino and Narumi Umeda, The Overviewof the 4th Generation Mobile Communication System.

[8] Muhammed Mustaqim, 2 Khalid Khan , 3 Muhammed Usman, LTE-Advanced:Requirements and Technical Challenges for 4G Cellular Network, Journal of Emerging Trends in Computing and Information Sciences [9]Nitika Rawat, Future and Challenges of 4G Wireless Technology, International Journal of Scientific & Engineering Research Volume 3, Issue 12, December-2012 ISSN 2229-5518

[10] Prof. Panagiotis Demestichas, Next Generation Communication Architectures and Technologies

[11] Aleksandar Tudzarov and Toni Janevski Functional Architecture for 5g Mobile Network International Journal of Advanced Science and Technology Vol. 32,July, 2011

A Review Paper on Rectangular Microstrip Patch Antenna

Sakshi Singh[1], Jitesh Kumar[2]
[1]Department of Electronics & Communication Engineering, FOE&CS, TMU, Moradabad
[2]Department of Electronics Engineering, University Polytechnic, Moradabad
[1]sakshi.singh.tmu@gmail.com
[2]jitesh.verma.28aug@gmail.com

***Abstract*- In this rapid changing world in wireless communication, dual or multiband antenna has been playing a key role for wireless service requirements Antenna is basically a guiding transitional that is used for radiating or receiving radio waves.. Microstrip patch antenna has many advantages like low cost, compact size, simple structure and compatibility with integrated circuitry. It has tremendous applications in military, radar systems, mobile communications, global positioning system (GPS), remote sensing etc. Wireless local area network (WLAN) and Worldwide Interoperability for Microwave Access (WiMAX) have been widely applied in mobile devices such as handheld computers and smart phones. These two techniques have been widely considered as a cost-effective, flexible, reliable and high- speed data connectivity solution, enabling user mobility. This paper presents a literature survey of dual band rectangular patch antenna for WLAN and WiMAX application**

I. INTRODUCTION

Wireless communication is the fastest growing field of technology which has captured the attention of social life in the present century. Modern wireless local area networks are implemented in many homes, business centers and campuses. The first well-known antenna experiment was conducted by the Heinrich Rudolf Hertz in 1886, which consisted of the dipole antenna is also called the Hertz (dipole) antenna. Then Guglielmo Marconi developed and commercialized wireless technology by introducing a radiotelegraph system, where he used Monopole antennas (near quarter-wavelength).manuscripts [1]. The concept of microstrip antenna was first proposed by Deschamps in 1953 [2]. However, practical implementation of this concept of microstrip antennas was not achieved until late 1970s, by Munson and Howell [3]. A conventional microstrip antenna in general consists of a conducting patch printed grounded microwave substrate with ground plane below, as shown in figure 1. Microstrip antennas have attractive attractive features of low profile, light weight, easy fabrication, and conformability to mounting hosts. A Microstrip device literally means a sandwich of two parallel conducting layers separated by single thin dielectric substrate. The lower conductor is called Ground Plane & the upper conductor is a simple resonant circular/rectangular Patch. The metallic patch (usually Cu or Au) may take many geometrics viz. rectangular, circular, triangular, elliptical, helical, ring etc.

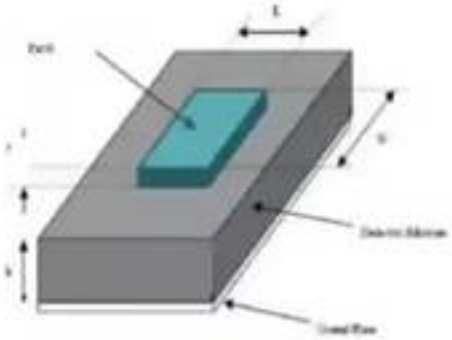


Figure 1. Structure of Microstrip Patch Antenna

The Microstrip patch antenna is commonly excited using a microstrip edge feed or a coaxial probe. The canonical forms of the Microstrip antenna are the rectangular and circular patch MSAs. The rectangular patch antenna in is fed using a microstrip edge feed and the circular patch antenna is fed using a coaxial probe. The dielectric substrates used are RT Duroid Bakelite, FR4 Glass Epoxy and Taconic TLC. The height of the substrates is constant i.e., 1.6 mm.

Table I
Properties of different substrates for microstrip patch antenna design

Parameter	RT Duriod	Bakelite	FR 4	Taconic
Dielectric constant	2.2	4.78	4.36	3.2
Density	2200kg/m3	1810kg/m3	1850kg/m3	-
Surface resistivity	3×107 Mohm	5×1010 Mohm	2×105 Mohm	-

II. LITERATURE SURVEY

Antenna is one of the important elements in the RF[1] system for receiving transmitting signals from and into the air as medium. Without proper design of the antenna, the signal generated by the RF system will not be transmitted and no information or signal can be received at the receiver. Antenna design is an active field in communication for future development. Many types of antenna have been designed to suit with most devices. One of the types of antenna is the micro strip patch antenna (MPA). The microstrip antenna has been said to be the most innovative area in the antenna engineering with its low material cost and easy to fabricate which the process can be made inside universities or research institute. The concept of microstrip antenna with conducting patch on a ground plane separated by dielectric substrate was undeveloped until the revolution in electronic circuit miniaturization and large-scale integration in 1970. In this section, the microstrip antenna literature survey is discussed. Design of stacked miniaturized slotted antenna with[7] enhanced bandwidth for WiMax application has been proposed. In this paper asymmetric U- slot on lower patch and a rectangular slot on upper patch is presented. The aim of this paper is to design smaller size microstrip patch antenna by increasing the path length of the surface current which is obtained by cutting the slot in the radiating patch .It can be observe d that antenna well suited for WiMax application in 3.40-3.69 GHz and 5.25-5.85 GHz band. A microstrip E shaped patch antenna has been [8] proposed for wireless application. The antenna is capable of switching its polarization from right hand circular polarization (RHCP) to left hand circular polarization (LHCP) and vice versa. The antenna design exhibits a 7% effective bandwidth with maximum realized gain of 8.7 dBic at 2.45 GHz. A microstrip patch antenna with parasitic ring slot [10] proposed for L band satellite system application. The key feature of the design is employing capacitive- coupled four-probe feeds to increase impedance bandwidth and adopting coplanar parasitic ring slot patch to enhance CP bandwidth. L slotted rectangular microstrip patch antenna has been proposed for wireless system and RF application.[4] Dual frequency operation is achieved by loading two pair of narrow L slots in rectangular patch, parallel to the non radiating edge and better impedance bandwidth is achieved. The impedance bandwidth of 130MHz and 1.45GHz band is obtained in this design. In this paper[13], the different types of broad-banding techniques

have been used to alleviate the narrowband limitation of antenna. Four types of patch antennas have selected and compared with proposed H-shaped patch antenna. The results obtained clearly indicate the main factors that affect the bandwidth of a particular micro strip antenna are thickness of the dielectric substrate, the size of the metallic patch, the dielectric constant of the dielectric substrate, the feed type to be used and the coupling level to some extent. In this paper[14], many techniques are suggested and analyses for rectangular micro strip antenna (RMSA) operating in X-band for 10 GHz center frequency. These approaches are: lowering quality factor, shifting feeding point, using reactive loading and modification of the patch shape. The design of a RMSA is made to several dielectric materials, and the selection is based upon which material gives a better antenna performance with reduced surface wave loss. Duroid 5880 and Quartz are the best materials for proposed design to achieve **a broader Bandwidth (BW)** and better mechanical characteristics than using air. The overall antenna BW for RMSA is increased by 11.6 % with Duroid 5880 with shifted feeding point and with central shorting pin while that for Quartz is 17.4 %.

In this paper[15], different thickness of dielectric substrate (h = 4, 6 and 8 mm) are used to increase bandwidth. A rectangular micro strip patch antenna that meets the requirement of operation at (2.4 GHz), the proposed configurations are simulated and analyzed using microwave office 2000 software package. The VSWR, input impedance, radiation patterns and S11 performance are used for the analysis of the different configurations. Feed point on the patch that gives a good match of 50 ohm, input impedance was found by a method of trial and error. For substrate thickness (4mm) the first design antenna had a (155.1) MHz bandwidth (6.46 % of central frequency). Whereas when the thickness as used (6mm), the bandwidth increased to be (200) MHz. In this paper[16], a new design technique for enhancing bandwidth that improves the performance of a conventional micro strip patch antenna is proposed. This paper presents a novel wideband probe fed inverted slotted micro strip patch antenna. The design adopts contemporary techniques; coaxial probe feeding, inverted patch structure and slotted patch. The composite effect of integrating these techniques and by introducing the proposed patch, offer a low profile, broadband, high gain, and low cross-polarization level.In this paper[17], the performance of a micro strip elliptical patch antenna is investigated using different substrate materials. The Micro strip antenna is studied with different substrates for a radiating elliptical patch of fixed dimensions. The effects of the dielectric constant of the perfect and lossy substrates on the resonant frequency, bandwidth and gain are investigated. A gain drop of 1.3 dB per decade is observed. Return loss, input impedance, radiation patterns and current distributions are investigated and presented with the help of Ansoft-HFSS. Performance evaluation of the micro strip elliptical patch antenna on different substrate materials with permittivity varying from 1.006 to 4.4 is simulated. Bandwidth of 88% achievement obtained in the case of RT-duroid, whereas by using FR4 only 63% is achieved.

In this paper[18], to enhance the impedance bandwidth, a new wideband and small size star shaped patch antenna fed by a small diamond shape patch is proposed. HFSS high frequency simulator is employed to analyze the proposed antenna and simulated results on the return loss, the E- and H-plane radiation patterns and Gain of the proposed antenna are presented at various frequencies. The antenna is able to achieve in the range of 4-8.8 GHz an impedance bandwidth of 81% for return loss of less than -10 dB.

In this paper[19], a dual band rectangular micro strip antenna with parasitic element fed by L-probe is used for band width improvement. The aim of the proposed research is to achieve dual band by electromagnetically coupling the two patches where one is driven and the other is parasitic. An L-shaped probe feeds the driven patch. The impedance bandwidth achieved is

63.35%, centered at 9.981 GHz and 33.48% centered at 13.99 GHz with a return loss >-10 dB. The antenna gain for the operating frequencies within the impedance bandwidth is 6 dBi.

III. FEEDING TECHNIQUES

There are variety of feed technique to microstrip patch antennas. These methods can be classified into two categories- contacting and non-contacting. In the contacting method, the RF power is fed directly to the radiating patch using a microstrip line as a connecting element. In the non-contacting scheme, electromagnetic field coupling is done to transfer power between the micro trip line and the radiating patch. The feed of microstrip antenna can have many configurations like microstrip line, coaxial, aperture coupling and proximity coupling. But microstrip line and the coaxial feeds are relatively easier to fabricate. Coaxial probe feed is used because it is easy to use and the input impedance of the coaxial cable in general is 50 ohm. There are several points on the patch which have 50 ohm impedance. We have to find out those points and match them with the input impedance.

Table II
Comparison of the different feeding techniques

Characteristics	Microstrip Line Feed	Coaxial Feed	Aperture coupled Feed	Proximity coupled Feed
Spurious feed radiation	More	More	Less	Minimum
Reliability	Better	Poor due to soldering	Good	Good
Ease of fabrication	Easy	Soldering and drilling needed	Alignment required	Alignment required
Impedance Matching	Easy	Easy	Easy	Easy
Bandwidth (achieved with impedance matching)	2-5%	2-5%	2-5%	13%

IV. PARAMETERS

Different parameter such as VSWR, Return Loss, Antenna Gain, Directivity, Antenna Efficiency and Bandwidth are analyzed

A. Gain

Gain is the parameter which measures the degree of the directivity of the antenna's radiation pattern. It is defined as the ratio of the radiated power Pr to the input power Pi. The input power is transformed into radiated power and surface wave power while a small portion is dissipated due to conductor and dielectric losses of the materials used. Antenna gain can also be specified using the total efficiency instead of the radiation efficiency only. This total efficiency is a combination of the radiation efficiency and efficiency linked to the impedance matching of the antenna. High gain antenna have the advantage of longer range and better signal quality but must be aimed carefully in particular

direction.

B. Radiation Pattern

The radiation pattern is defined as a mathematical function or a graphical representation of the radiation properties of the antenna as a function of space coordinates.

C. Antenna Efficiency

It is a ratio of total power radiated by an antenna to the input power of an antenna.

D.VSWR

Voltage standing wave ratio is defined as VSWR=Vmax/Vmin.It should lie between 1 and 2. VSWR is defined as the ratio of the maximum voltage to the minimum voltage in a stading wave pattern. A standing wave developed when power is reflected from a load. This happens because of improper impedance matching. According to the maximum power transfer theorem, maximum power can be transferred only if the impedance of the transmitter Zs is match with impedance Zin.
Voltage Standing Wave Ratio (VSWR) can be defined as:

VSWR=V_max/V_min

E. Return Loss

Return loss is the reflection of signal power from the insertion of a device in a transmission line. Hence the RL is a parameter similar to the VSWR to indicate how well the matching between the transmitter and antenna has taken place. The RL is given as by as:

$$RL = -20 \log 10 (\Gamma) \text{ dB}$$

For perfect matching between the transmitter and the antenna, $\Gamma = 0$ and $RL = \infty$ which means no power would be reflected back, whereas a $\Gamma = 1$ has a RL = 0 dB, which implies that all incident power is reflected. For practical applications, a VSWR of 2 is acceptable, since this corresponds to a RL of -9.54 dB.

V. ANTENNA DESIGN

To design a rectangular microstrip patch antenna following parameters such as dielectric constant (Єr), resonant frequency (fo), and height (h) are considered for calculating the length and the width of the patch.

Width of Patch(W) :

$$W = \frac{C}{2f_0\sqrt{\frac{(\varepsilon_r + 1)}{2}}}$$

Effective dielectric constant of antenna (Єreff):

$$\varepsilon_{reff} = \frac{\varepsilon_r + 1}{2} + \frac{\varepsilon_r - 1}{2}\left|\frac{1}{\sqrt{1 + 12(\frac{h}{W})}}\right|$$

Effective Length of antenna:

$$L_{eff} = \frac{C}{2f_0\sqrt{\varepsilon_{reff}}}$$

The extended length of antenna (ΔL):

$$\Delta L = 0.412h\,\frac{(\varepsilon_r + 0.3)\left(\frac{W}{h} + 0.264\right)}{(\varepsilon_{eff} - 0.258)\left(\frac{W}{h} + 8\right)}$$

The length of the patch

$$L = L_{eff} - 2\Delta L$$

VI. ADVANTAGES AND DISADVANTAGES

Microstrip patch antenna has several advantages over conventional microwave antenna. Also microstrip patch antenna has some disadvantages.

Sr No.	Advantages	Disadvantages
1	Low weight	Low efficiency
2	Low profile	Low gain
3	Thin Profile	Large Ohmic loss in the feed structure of array
4	Required no cavity backing	Low power handling capacity
5	Linear and circular polarization	Excitation of surface waves
6	Capable of dual and triple frequency operation	Polarization purity is difficult to achieved

CONCLUSION

From this review, it is understood that many efforts are going on to overcome some of the limitations of conventional microstrip antenna characteristics. A theoretical survey on microstrip patch antenna is presented in this paper. After study of various research papers it concluded that Lower gain and low power handling capacity can be overcome through an array configuration and slotted patch. Some characteristics of feeding technique and various antenna parameters are discussed. Particular microstrip patch antenna can be designed for each application and different merits are compared with conventional microwave antenna.

REFERENCES

[1] Constantine A. Balanis, "Antenna Theory Analysis and Design", Wiley & Sons, INC., Publications.

[2] Munson, R. E., "Conformal Microstrip Antennas and Microstrip Phased Arrays",IEEE Trans. Antennas Propagation, Vol. AP-22, 1974, pp. 74–78.

[3] Vivekananda Lanka Subrahmanya, "Pattern Analysis of The Rectangular Microstrip Patch Antenna" , 30 ECTS, Thesis No.: 4/2009 MSc. Electrical Engineering – Communication & Signal Processing.

[4] Dinesh Yadav, "**L** – slotted rectangular microstrip patch antenna", 2011 International Conference on Communication Systems and Network Technologies.

[5] S. Bhunia, "Effects of Slot Loading on Microstrip Patch Antennas" ,International Journal of Wired and Wireless Communications Vol.1, Issue 1, October, 2012

[6] Punit Shantilal Nakar, "Compact and Broadband Microstrip Antennas",. Kin-Lu Wong Copyrightc 2002 John Wiley & Sons, Inc. ISBNs: 0-471-41717-3 (Hardback); 0-471-22111-2 (Electronic).

[7] Jimmy Gautam, "Design of Stacked Miniaturized Slotted Antenna with Enhanced Bandwidth for WiMAX Application" 2014 International Conference on Signal Processing and Integrated Networks (SPIN).

[8] Ahmed Khidre, "Circular Polarization Reconfigurable Wideband E-ShapedPatch Antenna for Wireless applications", IEEE transactions on antennas and propagation, vol. 61, no. 2, February 2013

[9] Constantine A Balanis, "The Antenna serves to a communication system the same purpose that eyes and eyeglasses serve to a Human".

[10] Shiqiang Fu, "Broadband Circularly Polarized for L-Band Satellite System Application", IEEE antennas and wireless propagation letters, vol. 13, 2014

[11] Atser A. Roy, "Enhancing the Bandwidth of a Microstrip Patch Antenna using Slots Shaped Patch", e-ISSN : 2320- 0847 p-ISSN : 2320-0936 Volume-02

[12] A.-A Kalteh, "A Novel Microstrip-Fed UWB Circular SlotAntenna with 5-GHz Band-NotchCharacteristics", 978-1-4244-1827-5/08/$25.00 ©2008IEEE.

[13] Kazi Tofayel Ahmed, Md. Bellal Hossain, Md. Javed Hossain," Designing a high bandwidth Patch Antenna and comparison with the former Patch Antennas", Canadian Journal on Multimedia and Wireless Networks Vol. 2, No. 2, April 2011.

[14] Adil Hameed Ahmad and Basim Khalaf Jar'alla, "Design and Simulation of Broadband Rectangular Micro strip Antenna", Eng.Tech.Vol.26,No1,2008.

[15] Ali A. Dheyab Al-Sajee and Karim A. Hamad, "Improving Bandwidth of Rectangular Patch Antenna using different Thickness of Dielectric Substrate", ARPN Journal of Engineering and Applied Sciences, VOL. 6, NO. 4, APRIL 2011.

[16] Norbahiah Misran, Mohammed N. Shakib, Mohammad T. Islam, and Baharudin Yatim, "Design Analysis of a Slotted Micro strip Antenna for Wireless Communication", World Academy of Science, Engineering and Technology 49 2009.

[17] B.T.P.Madhav, Prof.VGKM Pisipati, Dr.K.Sarat Kumar, P.Rakesh Kumar, K.Praveen Kumar, N.V.K.Ramesh, M.Ravi Kumar, "Substrate Permittivity Effects on the Performance of the Micro strip Elliptical Patch Antenna", Journal of Emerging Trends in Computing and Information Sciences, Volume 2 No3.

[18] M. Ramkumar Prabhu and S. Shanmugapriya, "Modified Star Patch Antenna with Enhanced Bandwidth" Research Journal of Applied Sciences, Engineering and Technology 3(3): 145-148, 2011.

[19] M. Selvarani and N. Gunasekaran, "Dual band L-Probe Fed Rectangular Micro strip Antenna with Parasitic Element", Journal of Mobile Communication, Year: 2010 | Volume: 4 | Issue: 3 | Page No.: 60-63

SMART ROAD SAFETY AND VEHICLE ACCIDENT PREVENTION SYSTEM FOR MOUNTAIN ROAD

Shubham Verma[1] Umesh Kumar Singh[2] Vivek Kumar[3] Aakansha Singh[4]
Electrical Engineering department

Teerthanker Mahaveer University, Moradabad
vshubham1012@gmail.com[1]umeshsingh11feb@gmail.com[2].
Er.vivekchauhan.vc560@gmail.com[3]akankshasingh8006@gmail.com[4]

***Abstract*-On road, accident is a major issue of concern. Even with all modern developments in the field of vehicle design, road lane design and management, accidents do occur. Timely accident detection and taking immediate action with respect to emergency health care of victims by informing an emergency center such as a hospital or a police station about the accident on time plays a vital role in human safety and road traffic management. Accident detection can be done under various domains. Most of the papers surveyed use application of sensor technology, besides trying to detect accidents automatically using machine learning and computer vision from surveillance systems. Any kind of accident detected is automatically sent as an alert to the required destination. Each of these methods has different percentages of accuracy and their own limitations.**

***Keywords*—Micro Electro Mechanical System (MEMS),Infra Red (IR).**

I. INTRODUCTION

Today, road traffic injuries are one of the leading causes of death, disabilities and hospitalization in the country. Road network in India, of about 56 lakh km in March 2016, is one of the largest in the world. A total of 4,64,910 road accidents have been reported by States and Union Territories (UTs) in the calendar year 2017 claiming 1,47,913 lives and causing injuries to 4,70,975 persons. These figures translate, on an average, into 1274 accidents and 405 deaths every day or 53 accidents and 17 deaths every hour in the country. Every minute, on average, at least one person dies in a vehicle crash. Auto accidents also injure at least 10 million people each year, and two or three million of them seriously. The hospital bill, damaged property, and other costs are expected to add up to 1%-3% of the world's gross domestic product. With the aim of reducing injury and accident severity, pre-crash sensing is becoming an area of active research among automotive manufacturers, suppliers and universities. Vehicle accident statistics disclose that the main threats a driver is facing are from other vehicles. The proposed system deals with an automatic accident detection system involving vehicles which sends information about the accident including the location, the time and angle of the accident to a rescue team like a first aid center and the police station. This information is sent in the form of an alert message. But in the cases where there are no casualties a switch is provided which can be turned off by the driver to terminate sending the alert message. A GSM module is used to send the alert message and a GPS module is used to detect the location of the accident. The GPS and GSM module are interfaced to the control unit using serial communication[1]. The accident itself is detected using two sensors- Micro Electro Mechanical System (MEMS) sensor and vibration sensor. MEMS sensor also helps in measuring the angle of roll over of the car. A 32-bit ARM controller is used as the main high speed data-processing unit. The vibrations are sent from the vibrating sensor to the controller after passing through an amplifying circuit [2]. The use of GPS adds to the advantage of the system being cost-effective, portable and detecting the accurate location [3]. They proposed that measures of the driver's eyes are capable to detect drowsiness under simulator or experiment conditions. The performance of the latest eye tracking based in-vehicle fatigue prediction measures are evaluated.

These measures are assessed statistically and by a classification method based on a large dataset of 90 hours of real road drives. The results show that eye-tracking drowsiness detection works well for some drivers as long as the blinks detection works properly. Even with some proposed improvements, however, there are still problems with bad light conditions and for persons wearing glasses. As a summary, the camera-based sleepiness measures provide a valuable contribution for a drowsiness reference, but are not reliable enough to be the only reference [4].

They proposed that to reduce the amount of such fatalities, a module for an advanced driver assistance system, which caters for automatic driver drowsiness detection and also driver distraction, is presented. Artificial intelligence algorithms are used to process the visual information in order to locate, track and analyze both the driver's face and eyes to compute the drowsiness and distraction indexes. This real-time system works during nocturnal conditions as a result of a near-infrared lighting system. Finally, examples of different driver images taken in a real vehicle at night time are shown to validate the proposed algorithms [5].Accident prevention in U-turn, S-turn, hilly Ghats and mountain roads using modern sensor technology, Which uses Arduino UNO, Ultrasonic sensor, RF module LED etc.It is the one having possibilities to reduce the accidents in U-turn, S-turn, hilly Ghats and mountain roads as the system is outside the vehicle. Moreover this technology covers all kind of vehicles New version and Old version cars [6].The proposed system in [7] aims at reducing the loss of lives due to traffic accidents and performs three main tasks – (1) detecting an accident and sending the location to the nearest hospital, (2) controlling traffic light signals in the route taken by the ambulance[8][9] and (3) monitoring vital parameters of the patient inside the ambulance itself and sending this information to the hospital.

II. SYSTEM INVESTIGATED

To overcome this existing system problem we developed the new system in which accidents can be avoided using ultrasonic sensor. These sensors are placed at both the sides of the road. Total four sensors are used. Two sensors are placed at left sides of the road and two sensors are placed at right sides of the road. Two lamps or buzzers are used. Lamps will be glow and buzzer will ring loudly. ultrasonic sensors are used to detect the vehicles and indication is given by a lamp so accident can be avoided at a turning point. Because of this technique people identify that what is the position of the vehicle at the turning point. This technique is easy to implement. Avoid accident, and save lives [15].The design focuses on the measurement and control of the eye blink using IR sensor to prevent vehicular accident whenever the driver becomes drowsy in the process of driving. The eye blink sensor serves as the detection unit which determines whether the driver is either drowsy or not during driving period and also the input to the control unit. The Arduino Uno microcontroller is the principal component of the design, a power supply maintains the output voltage at a constant value of 5 V required by the microcontroller, a relay which uses a low voltage circuit for switching in order to control the state of the vehicle motor, braking motor and the buzzer. A buzzer which issues a warning signal to prompt the driver when drowsiness is detected, traffic indicators to alert nearby vehicle drivers, automatic braking system which gradually brings the vehicle to a halt[16].

Fig.1: View of Vehicle accident prevention system

A. Implementation Methodology

This system mainly consists of two parts: Hardware and software. Hardware design consists of sensors like infrared sensor, Arduino UNO and LED. infrared sensor uses +5V DC supply. Arduino UNO need a power supply of 6-12V Arduino UNO Software design is done for sensing the vehicle or obstacle and to operate the LED by using Arduino 1.0.5 IDE tool which is open source software.

Working

It uses two IR sensors, which are placed on either side of the turn. One sensor ir1 is installed by the side of the uphill section of the road, similarly one sensor ir2 is installed by the side of the downhill section of the road. The sensors are connected to ATmega328P microcontroller through wires. Based on the output of sensors, position of vehicles on either side of the bend is detected which is provided as an input to the microcontroller.IR sensor has pins +5V VCC, GND, IR emitter led and IR receiver led. IR sensor sends the signal in the form of pulses from emitter led.When this signal hit the object it will get reflected back and is received by the echo receiver led. From echo the signal is sent to microcontroller Arduino UNO. Microcontroller Arduino UNO processes this data and operates the LED which is connected to output pin of the microcontroller ArduinoUNO. LED is operated according to the command i.e. LED will glow if the signal is reflected back. In the absence of the object the signal will not reflect back. Hence the LED will not glow.

Block diagram

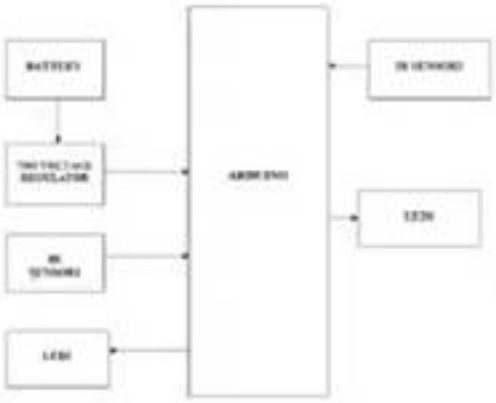


Fig2: Block diagram of accident prevention system

Flow diagram

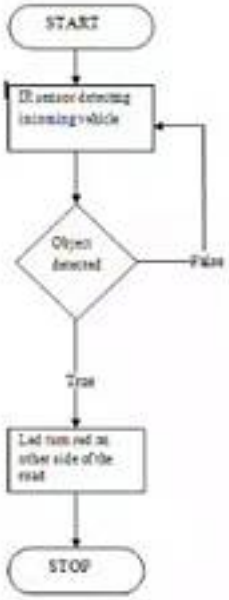


Fig.3: Flow chart of proposed system

B. Hardware Description

Hardware design consists of IR sensor, Voltage Regulator,Supply,Arduino,LED Buzzer.

ARDUINO

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button

Fig.4: Arduino ATmega328P

IR Sensors

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.

Fig.5: IR sensor

III. CONTROL TECHNIQUES

Control strategy includes the interference of Hardware and Software. The different colors of Led are being used on the both side of road as shown in fig. When the Vehicle is coming from A to B and No vehicle in coming from B to A then

the signal for the driver coming from side A is Green. The same rule is used for vice versa.

Considering the case when cars are coming from both the sides and Car coming from side A has already entered/ crossed the line then the signal for the car coming from other side will become Red. In this fashion this project provides a better way to reduce the chances of accident. In addition, we can also include a buzzer in synchronism with the Led for improving the quality of output.

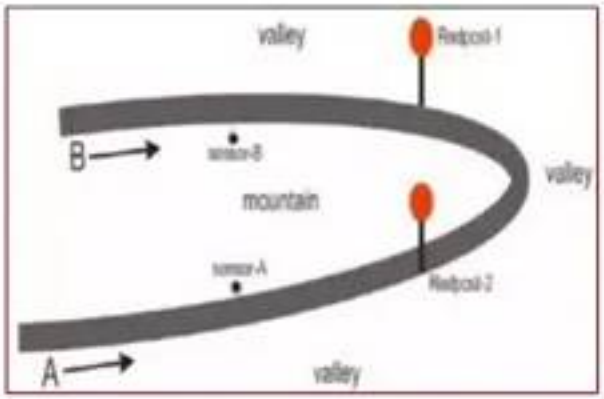


Fig.6: Schematic diagram of Accident prevention system

Condition	S_A	S_B	Output
1#	Red	Red	Stop
2#	Red	Green	Vehicle on side A will stop
3#	Green	Red	Vehicle onside B will stop
4#	Green	Green	Empty Road

IV. RESULTS

It involves the physical setup of the model. There are two infrared sensors kept at a particular distance. The two sensors are used because the intention to show that vehicle is at safe distance means far from the curve but which ensures the vehicle is coming. This can be done by glowing the green LED light and when the vehicle approaches very near the curve then it will glow red LED light, by this one can alert at the other side .Which helps to avoid the accident.

Conclusion

The purpose of this project is to decrease the number of accidents occurring on hilly and curved roads. This is done by keeping an ir sensor in one side of the road before the curve and keeping a LED light after the curve, so that if vehicle comes from one end of the curve sensor senses and LED light glows at the opposite side. By this we can save thousands of lives including animals.

References

[1] V. Goud, "Vehicle Accident Automatic Detection and Remote Alarm Device", International Journal of Reconfigurable and Embedded Systems (IJRES), Vol. 1, no. 2, 2012.
[2] GSM User Manual, SIMCOM Ltd, August 2006.
[3] GPS Beginner`s Guide, Garmin Ltd, 2008.
[4] Fabian Friedrichs and Bin Yang, "Camera-based Drowsiness Reference for Driver State Classification under Real Driving Conditions" 2010 IEEE Intelligent Vehicles Symposium University of California, San Diego, CA, USA June 21-24, 2010.
[5] M.J. Flores J. Ma Armingol A. de la Escalera, "Driver drowsiness detection system under infrared illumination for an intelligent vehicle" Published in IET Intelligent Transport Systems Received on 13th October 2009 Revised on 1st April 2011.

[6] Aravinda B, Chaithralakshmi C, Deeksha, Ashutha K "Sensor Based Accident Prevention System" International Journal of Innovative Research in Electrical, Electronics, Instrumentation And Control Engineering Vol. 4, Issue 6, June2016.

[7] B. Prachi, D. Kasturi and C. Priyanka, "Intelligent Accident-Detection And Ambulance-Rescue System", International Journal Of Scientific & Technology Research, Vol. 3, No. 6, 2016. IJSER

[8] Mr.S.Iyyappan and Mr.V.Nandagopal , "Accident Detection and Ambulance Rescue with Intelligent Traffic Light System?", International Journal of Advanced Technology and Engineering Research, 2013.

[9] Amnesh Goel, Sukanya Ray, Nidhi Chandra, "Intelligent Traffic Light System to Prioritized Emergency Purpose Vehicles based on Wireless Sensor Network" International Journal of Computer Applications, Volume 40– No.12, February 2012

[10] Kartik Venkata Mutya, Sandeep Rudra "Road Safety Mechanism to Prevent Overtaking Accidents" International Journal of Engineering Trends and Technology (IJETT) – Volume 28 Number 5 - October 2015.

[11] M. Amin, M. SobhanBhuiyan, M. IbneReaz and S. Nasir, "GPS and Map Matching Based Vehicle Accident Detection System", in 2013 IEEE Student Conference on Research and Development (SCOReD), Putrajaya,Malaysia, 2013.

[12] Prof. Lakshmipraba Balaji, Ranjit V Gujar, Prathamesh V Jadhav, Akshay A Ratnaparkhe "Smart Highway Systems for Accident Prevention Using IOT" ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887 Volume 5 Issue X, October 2017

[13] B. Fernandes, M. Alam, V. Gomes, J. Ferreira and A. Oliveira, "Automatic accident detection with multi-modal alert system implementation for ITS", Vehicular Communications, Vol. 3, pp. 1-11, 2016.

[14] Pranav Dhole, Saba Shaikh, NishadGite, Vijay Sonawane "Automatic Accident Detection: Assistance Through Communication Technologies and Vehicles", IJETST- Vol. 02, Issue 04 Pages 2285-2288 April 2015

[16] Stephen Eduku, Mohammed Okoe Alhassan, Joseph Sekyi – Ansah "Design of Vehicle Accident Prevention System Using Wireless Technology" International Journal of Scientific and Research Publications, Volume 7, Issue 10, October 2017 397 ISSN 2250-3153

[17] R.Saranya, R.Arun Kumar "Vehicle Accident Prevention Using Sensors" International Research Journal of Engineering and Technology (IRJET) Volume: 04 Issue: 10 |Oct -2017

[18]Chitransh Srivastava, Nikhil Acharya, Fervez Jaffer B.M. , Sachin Bhat "Implementation of Collision Avoidance System for Hairpin Bends in Ghats Using Proximity Sensors" International Journal of Current Engineering and Scientific Research(IJCESR) Vol-3, Issue-11, 2016

[19]Anand M G, A Dhanyakumar, Bhaskar N , Mahaling S B "Sensor Based Accident Prevention System in Curving" IJARIIE-ISSN(O)-2395-4396 Vol-5 Issue-2 2019

[20]Kartik Venkata Mutya, Sandeep Rudra "Road Safety Mechanism to Prevent Overtaking Accidents" International Journal of Engineering Trends and Technology (IJETT) – Volume 28 Number 5 - October 2015.

[21] R. Meena, R.Lavanya and K.Suresh Kumar "Pre-Crash Sensing and Warning System in Hilly Region" Asian Journal of Applied Science and Technology (AJAST) Volume 1, Issue 3, Pages 08-10, April 2017.

[22] M. Amin, M. SobhanBhuiyan, M. IbneReaz and S. Nasir, "GPS and Map Matching Based Vehicle Accident Detection System", in 2013 IEEE Student Conference on Research and Development (SCOReD), Putrajaya,Malaysia, 2013.

[23]Lorate Shiny, A.Rajakumaran, S.Vijay "Vehicle Control System with Accident Prevention by Using IR Transceiver" International Journal of Innovative Research in Science, Engineering and Technology(An ISO 3297: 2007 Certified Organization)Vol. 4, Special Issue 6, May 2015

[24]kalpana.S, Jerald Roiston.J , Krishna Kumar.S, Rajkumar.S ,Sinto P Davis "Intelligent Collision Preventive System Using Arduino Microcontroller" International Journal of Recent Trends in Engineering & Research (IJRTER)Volume 02, Issue 04; April - 2016

IOT BASED INFORMATION SYSTEM FOR SHIPS & CARGO

Shiv Om Wadhwa, Dr. Arpit Jain
[1]*MCA, FOE&Cs, TMU, Moradabad*
swadhwakhatri@gmail.com

***Abstract*— The main aim of this paper is to avoid or be aware in having the unconditional surcamstances of accidents of ship using information system implementionted through internet of things IOT. Raspberry Pi 3 is use as main controller and embedded web server for information access system. Arduino UNO R3 is use to interface the Raspberry Pi with GPS. We suppose to develop a web page using PHP show in all sensor parameters/safety alerts/GPS coordinate of a ship. Sensor like waterproof temperature sensor DS18B20, MQ135, ADXL345 are used for safety measures. GPS is use to track ship at any time/anywhere using information access system. This will ensure not only safety of ship but also the people travelling through ship. This integrated system will be a real time operating system.**

***Keywords*— IoT, Webserver, Raspberry Pi 3, Webpage (php based)**

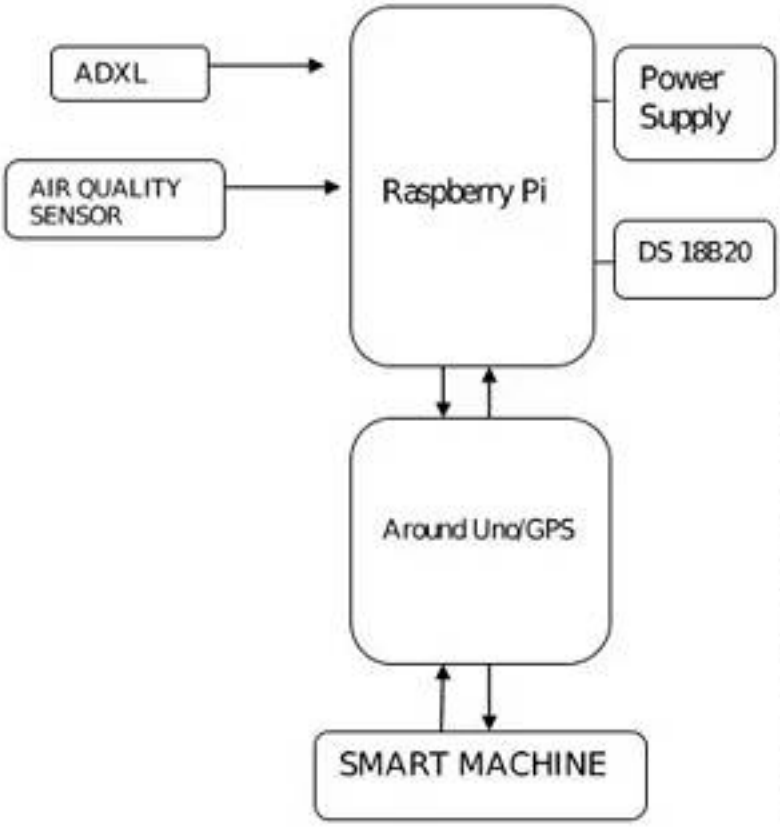
INTRODUCTION

IOT devices are embedded devices, and as such, the circuit design of each device must take into consideration operating constraints, such as: Environmental conditions. The type and number of sensors and actuators attached to the device. That the volume of data to be collected and transmitted. The Internet of Things (IOT) is a global system of interconnected physical devices that deliver data via the Internet, and the IOT is transforming in the way we live and work. IOT devices have been widely adopted across a range of industries, including healthcare, manufacturing, automotive, retail, and building automation, just to name a few. Businesses are leveraging data from which connected devices to increase operational efficiency and to provide improved value and the experiences to their clients. With in the pace of IOT adoption rapidly increasing and with in the number of connected devices are in the billions already, consider demand for skilled developers which are able to deliver I OT solutions continues to rise.

Developers which want to make the most of the opportunities of IOT should foster skills across a range of key topic areas including:

- Hardware
- Networking
- Application design
- Application development
- Security
- Business intelligence and data analytics
- Machine learning and artificial intelligence (AI)

SYSTEM DEVELOPMENT DIAGRAM

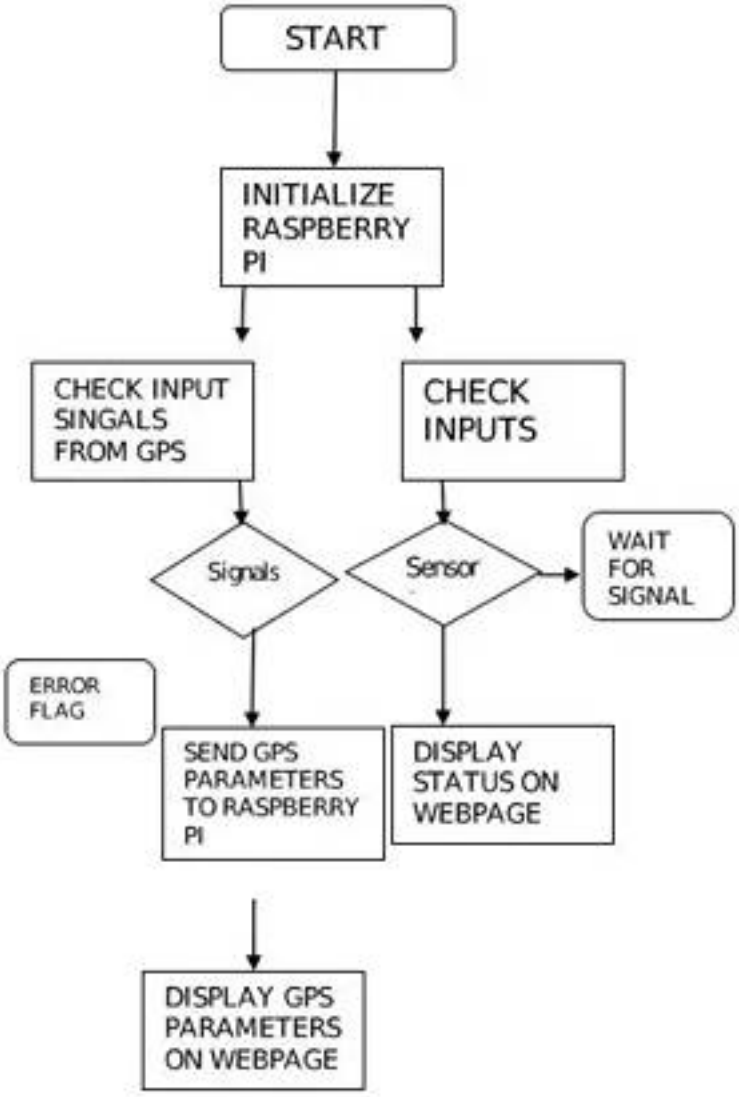


In proposed system the following parameters are used

- Raspberry pi 3
- Arduino UNO R3
- ADXL345 Accelerometer
- MQ-135 fuel leakage sensor
- DS18B20 Waterproof temperature sensor
- GPS
- Alarm system

The system which uses different sensors like fuel leakage sensor, 3 axis accelerometer sensor, waterproof temperature sensor & GPS for the tracking purpose. Raspberry Pi 3 is in use as main controller and embedded web server for information access the system. Arduino is used to interface GPS with Raspberry- pi. We suppose to develop a web page which is using PHP show in all sensor parameters/safety alerts/GPS coordinate of a ship. Firstly raspberry-pi check signal from the various sensors and depending on situation it will take action. If gases are present there then the coil of MQ-135 heats the output voltage varies then RPI turn on alarm which is on ship and also it shows status of presence of the gas on monitoring web page. And also with the sea water temperature is to be measured using waterproof one wire temperature sensor which shows water status as high and low depending on threshold point 32oC. Also accelerometer gives the minimum maximum value of tilting of ship which will help to control collapse of ship. GPS is used for giving location of ship which is under control by giving latitude & longitude type values on the web page. GPS is to be used to track ship at any time/anywhere using information access system. This will ensure not only safety of ship and cargo but also that the people which are travelling through ship can be traced as well. This integrated system will be a real time operating system and low cost but qualitatively very efficient.

WORKING FLOW DIAGRAM



CONCLUSIONS

The IOT based system is towards the efficient technology which is used by most of the transport system so that to avoid accident of ship and cargo. That the proposed system is to be used to access to data sensed through sensor on ship which is to be stored on cloud using IOT based technology devices in the control room or on smart phone. We concluded from this review paper that it to be essential to integrate the IOT based information access system and the sensor with embedded system. For prototype model we used safety sensors. For information access system we used PHP language for IOT purpose. We can implemented web server using Raspberry pi. Sensors are configured with embedded system using the python language. The proposed system would be one step towards efficient & effective application for the purpose of ship safety and monitoring.

REFERENCES

[1] Getting Started with the Internet of Things" by Cuno Pfister R. M.
[2] www.newark.com/buy-raspberry-pi

Effectiveness of Digital Marketing: An Organizational Perspective

[1] Manas Ranjan Tripathy, [2] Dr. Pradip Kumar Das,
[1] Sr. Office Executive, Faculty of Engineering & Computing Sciences,
Teerthanker Mahaveer University, Moradabad(U.P.),
[2] Assistant Professor, Dept. of Management, Sikkim Central University(Sikkim),
[1] manas2580@rediffmail.com,
[2] pkdas@cus.ac.in

Abstract:
Marketers are faced with new challenges and opportunities within this digital age. Digital marketing is the utilization of electronic media by the marketers to promote the products or services into the market. The main objective of digital marketing is attracting customers and allowing them to interact with the brand through digital media. This article focuses on the importance of digital marketing for both marketers and consumers. We examine the effect of digital marketing on the firms' sales. Additionally the differences between traditional marketing and digital marketing in this paper are presented. This study has described various forms of digital marketing, effectiveness of it and the impact it has on firm's sales. The examined sample consists of one hundred fifty firms and fifty executives which have been randomly selected to prove the effectiveness of digital marketing. Collected data has been analyzed with the help of various statistical tools and techniques.

Keywords: Digital Marketing, Promotion, Effectiveness, Customer Reach

Introduction

Digital marketing is one type of marketing being widely used to promote products or services and to reach consumers using digital channels. Digital marketing extends beyond internet marketing including channels that do not require the use of Internet. It includes mobile phones (both SMS and MMS), social media marketing, display advertising, search engine marketing and many other forms of digital media.

Through digital media, consumers can access information any time and any place where they want. With the presence of digital media, consumers do not just rely on what the company says about their brand but also they can follow what the media, friends, associations, peers, etc., are saying as well. Digital marketing is a broad term that refers to various promotional techniques deployed to reach customers via digital technologies. Digital marketing embodies an extensive selection of service, product and brand marketing tactics which mainly use Internet as a core promotional medium in addition to mobile and traditional TV and radio. Canon iMage Gateway helps consumers share their digital photos with friends online. L'Oréal's brand Lancôme uses email newsletters to keep in touch with customers and hence tries to strengthen customer brand loyalty (Merisavo et al., 2004). Magazine publishers can activate and drive their customers into Internet with e-mails and SMS messages to improve re-subscription rate (Merisavo et al., 2004).

Marketers increasingly bring brands closer to consumers' everyday life. The changing role of customers as co- producers of value is becoming increasingly important (Prahalad and Ramaswamy, 2004). Khan and

Mahapatra (2009) remarked that technology plays a vital role in improving the quality of services provided by the business units. According to Hoge (1993), electronic marketing (EM) is a transfer of goods or services from seller to buyer involving one or more electronic methods or media. E-Marketing began with the use of telegraphs in the nineteenth century. With the invention and mass acceptance of the telephone, radio, television, and then cable television, electronic media has become the dominant marketing force. McDonald's uses online channel to reinforce brand messages and relationships. They have built online communities for children, such as the Happy Meal website with educative and entertaining games to keep customers always close to themselves (Rowley 2004). Reinartz and Kumar (2003) found that the number of mailing efforts by the company is positively linked with company profitability over time. The primary advantages of social media marketing is reducing costs and enhancing the reach. The cost of a social media platform is typically lower than other marketing platforms such as face-to-face sales or sales with a help of middlemen or distributors. In addition, social media marketing allows firms to reach customers that may not be accessible due to temporal and locational limitations of existing distribution channels. Generally, main advantage of social media is that it can enable companies to increase reach and reduce costs (Watson et al. 2002; Sheth & Sharma 2005).

According to Chaffey (2011), social media marketing involves "encouraging customer communications on company's own website or through its social presence". Social media marketing is one important technique in digital marketing as companies can use social media form to distribute their messages to their target audience without paying for the publishers or distributor that is characteristic for traditional marketing. Digital marketing, electronic marketing, e-marketing and Internet marketing are all similar terms which, simply put, refer to "marketing online whether via websites, online ads, opt-in emails, interactive kiosks, interactive TV or mobiles" (Chaffey & Smith, 2008). Giese and Gote (2000) finds that customer information satisfaction (CIS) for digital marketing can be conceptualized as a sum of affective response of varying intensity that follows consumption and is stimulated by focal aspects of sales activities, information systems (websites), digital products/services, customer support, after-sales service and company culture.

Waghmare (2012) pointed out that many countries in Asia are taking advantage of e-commerce through opening up, which is essential for promoting competition and diffusion of Internet technologies. Zia and Manish (2012) found that currently, shoppers in metropolitan India are being driven by e-commerce: these consumers are booking travels, buying consumer electronics and books online. Although spending per online buyer remains low, some 59% of online consumers in metropolitan India already make purchases online at least once in a month. Dave Chaffey (2002) defines e-marketing as "application of digital technologies - online channels (web, e-mail, databases, plus mobile/wireless & digital TV) to contribute to marketing activities aimed at achieving profit acquisition and customers retention (within a multi-channel buying process and customer lifecycle) by improving customer knowledge (of their profiles, behavior, value and loyalty drivers) and further delivering integrated communications and online services that match customers' individual needs. Chaffey's definition reflects the relationship marketing concept; it emphasizes that it should not be technology that drives e-marketing, but the business model. All types of social media provide an opportunity to present company itself or its products to dynamic communities and individuals that may show interest (Roberts &

Kraynak, 2008). According to Gurau (2008), online marketing environment raises a series of opportunities and also challenges for social media marketing practitioners.

The main objective of this paper is to identify the effectiveness of digital marketing in the competitive market.

The supportive objectives are following:

- ✓ To show the various elements of digital marketing;
- ✓ To focus on the basic comparison between traditional and digital marketing;
- ✓ To discuss the effects of various forms of digital marketing on the firm's sales and other activities;
- ✓ To show the various advantages of digital marketing to the customers.

2. Theoretical and conceptual framework

There are various elements by which digital marketing is formed. All forms operate through electronic devices. The most important elements of digital marketing are given below:

(i) Online advertising:

Online advertising is a very important part of digital marketing. It is also called internet advertising through which company can deliver the message about the products or services. Internet-based advertising provides the content and ads that best matches to consumer interests. Publishers put about their products or services on their websites so that consumers or users get free information. Advertisers should place more effective and relevant ads online. Through online advertising, company well controls its budget and it has full control on time.

(ii) E-mail Marketing:

When message about the products or services is sent through email to the existing or potential consumer, it is defined as email marketing. Direct digital marketing is used to send ads, to build brand and customer loyalty, to build customer trust and to make brand awareness. Company can promote its products and services by using this element of digital marketing easily. It is relatively low cost comparing to advertising or other forms of media exposure. Company can bring complete attention of the customer by creating attractive mix of graphics, text and links on the products and services.

(iii) Social Media:

Today, social media marketing is one of the most important digital marketing channels. It is a computer-based tool that allows people to create, exchange ideas, information and pictures about the company's product or services. According to Nielsen, internet users continue to spend more time with social media sites than any other type. Social media marketing networks include Face book, Twitter, LinkedIn and Google+. Through Facebook, company can promote events concerning product and services, run promotions that comply with the Face book guidelines and explore new opportunities. Through Twitter, company can increase the awareness and visibility of their brand. It is the best tool for the promotion of company's products and services. In LinkedIn, professionals write their profile and share information with others. Company can develop their profile in LinkedIn so that the professionals can view and can get more information about the company's product and services. Google+ is also social media network that is more effective than other social media like Face book, Twitter. It is not only simple social media network but also it is an authorship tool that links web-content directly with its owner.

(iv)Text Messaging:

It is a way to send information about the products and services from cellular and smart phone devices. By using phone devices, company can send information in the form of text (SMS), pictures, video or audio (MMS). Marketing through cell phone SMS (Short

Message Service) became increasingly popular in the early 2000s in Europe and some parts of Asia. One can send order confirmations, shipping alerts using text message. Using SMS for campaigns get faster and more substantial results. Under this technique, companies can send marketing messages to their customers in real-time, any time and can be confident that the message will be seen. Company can create a questionnaire and obtain valuable customer feedback essential to develop their products or services in future.

(v) Affiliate Marketing:

Affiliate marketing is a type of performance-based marketing. In this type of marketing, a company rewards affiliates for each visitor or customer they bring by marketing efforts they create on behalf of company. Industry has four core players: the merchant (also known as "retailer" or "brand"), the network, the publisher (also known as "the affiliate") and the customer. The market has grown in such complexity resulting in the emergence of a secondary tier of players including affiliate management agencies, super-affiliates and specialized third party vendors. There are two ways to approach affiliate marketing: Company can offer an affiliate program to others or it can sign up to be another business's affiliate. If company wants to drive an affiliate program, then, the company owner has to pay affiliates a commission fee for every lead or sale they drive to company's website. Company's main goal here is to find affiliates who can reach untapped markets. For example, a company with an e-zine may become a good affiliate because its subscribers are hungry for resources. So, introducing one's offer through "trusted" company can grab the attention of prospects which might not have otherwise reached.

(vi) Search Engine Optimization (SEO)

Search engine optimization (SEO) is the process of affecting the visibility of a website or a web page in a search engine's "natural" or un-paid ("organic") search results. In general, the earlier (or higher ranked on the search results page), and more frequently a website appears in the search result list, the more visitors it will receive from the search engine users. SEO may target different kinds of search including image search, local search, video search, academic search, news search and industry-specific vertical search engines.

(vii) Pay Per Click (PPC)

Pay-per-click marketing is a way of using search engine advertising to generate clicks to your website rather than "earning" those clicks organically. Pay per click is good for searchers and advertisers. It is the best way for company's ads since it brings low cost and greater engagement with the products and services.

2.1 Advantages digital marketing brings to customers

With rapid technological developments, digital marketing has changed customers buying behavior. It has brought various advantages to the consumers as given below:-

(i) Stay updated with products or services:

Digital marketing technologies allow the consumers to stay with the company information updated. Nowadays a lot of consumer can access internet any place anytime and companies are continuously updating information about their products or services.

(ii) Greater engagement:

With digital marketing, consumers can engage with the company's various activities. Consumers can visit company's website, read information about the products or services and make purchases online and provide feedback.

(iii) Clear information about the products or services:

Through digital marketing, consumers get clear information about the products or services. There is a little chance of misinterpretation of the information taken from sales person in a retail store. However, Internet provides comprehensive product information which

customers can rely on and make purchase decision.

(iv) Easy comparison with others:

Since many companies are trying to promote their products or services using digital marketing, it is becoming the greatest advantage for the customer in terms that customers can make comparison among products or services by different suppliers in cost and time friendly way. Customers don't need to visit a number of different retail outlets in order to gain knowledge about the products or services.

(v) 24/7 Shopping:

Since internet is available all day long, there is no time restriction for when customer wants to buy a product online.

(vi) Share content of the products or services:

Digital marketing gives viewers a chance to share the content of the product or services to others. Using digital media, one can easily transfer and get information about the characteristics of the product or services to others.

(vii) Apparent Pricing:

Company shows the prices of products or services through digital marketing channel and this makes prices very clear and transparent for the customers. Company may regularly changes the prices or gives special offers on their products or services and customers are always in advantages by getting informed instantly by just looking at any one mean of digital marketing.

(viii) Enables instant purchase:

With traditional marketing, customers first watch the advertisement and then find relevant physical store to purchase the products or services. However, with digital marketing, customers can purchase the products or services instantly.

3. Methodology of the study

Methodology comes from systematic and theoretical analysis of the methods to evaluate suitability of one specific method to apply to a field of study. It typically encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. This study is conducted based on both primary and secondary data sources.

Primary sources:

Primary source is a source from where we collect first-hand information or original data on a topic. Interview technique was used with structured questionnaire for the collection of primary data.

Secondary sources:

Secondary source is a source from where we collect data that has already been collected by someone. We have collected secondary data from the published financial statements of the firms, newspaper and articles. For the purpose of this study, we have selected one hundred fifty firms randomly which are using digital marketing system to sell their products to customers. Additionally, we also collected data from 50 executives from sample and other different firms to know their opinion on the effectiveness of digital marketing. Collected data and information has been organized, explained and analyzed by using different statistical tools and techniques. This study shows results both in descriptive and analytical way.

4.1 Analysis and Discussion: Correlation analysis

To show the correlation between the various elements of digital marketing and increased sales, we have collected data from one hundred fifty firms who are taking the various techniques or elements of digital marketing. Results are given below:

		Increased Sales	Online Advertising	Email Marketing	Social Media	Text Messaging	Affiliate Marketing	Search Engine Optimization (SEO)	Pay Per Click (PPC)
Increased Sales	Pearson Correla-tion(r)	1	.869	.873	.840	.667	.560	.840	.560
	Sig. (2-tailed)		.056	.053	.075	.219	.326	.075	.326
	N	150	150	150	150	150	150	150	150

Table 4-1 Correlations

From the above table, we can conclude that the every element of digital marketing is positively related to sales increase. It indicates that all elements of digital marketing show positive effect on firm's sales. Online advertising, email marketing, social media and search engine optimization (SEO) are highly positively correlated with sales increase since showing value of r to be .869, .873, .840 and .840 respectively. The value of r of text messaging, affiliate marketing and pay per click (PPC) are .667, .560 and .560 which also shows low positive correlation with sales increase.

4.2 Analysis of digital marketing

Digital media is so pervasive that consumers have access to information any time and any place they want. It was long ago when the messages people got about specific products or services consisted of only what a company wanted them to know.

Model	R square	F
Stay updated with products or services	.718	122.117
Greater engagement	.516	51.276
Clear information about the products or services	.629	81.254
Easy comparison with others	.639	85.141
24/7 Shopping	.749	142.868
Share content of the products or services	.656	91.498
Apparent Pricing	.636	83.962
Enables instant purchase	.667	96.028

Table 4-2 Model Summary

From the above table, we can conclude that almost all the variables having weight explaining with great extent its relationship with digital marketing. For example, stay updated with products or services is explained by 71.80% of digital marketing and the remaining 28.20% is explained by other factor. Greater engagement is explained by 51.60% of digital marketing and the remaining 48.40% is explained by other factor. Clear Information about the products or services is explained by 62.90% of digital marketing and the remaining 37.10% is explained by

other factor. We can also see from the above table that F value is bigger more than 80 indicating the strength of the model.

5. Concluding remarks and proposal

Digital channel in marketing has become essential part of strategy of many companies. Nowadays, even for small business owner there is a very cheap and efficient way to market his/her products or services. Digital marketing has no boundaries. Company can use any devices such as smart phones, tablets, laptops, televisions, game consoles, digital billboards, and media such as social media, SEO (search engine optimization), videos, content, e-mail and lot more to promote company itself and its products and services. Digital marketing may succeed more if it considers user needs as a top priority. Just like "Rome was not built in a day," so, digital marketing results won't also come without attempt, without trial (and error). The watchwords "test, learn and evolve" should be at the heart of all digital marketing initiatives. Companies should create innovative customer experiences and specific strategies for media to identify the best path for driving up digital marketing performance.

References:

[1] Chaffey, D. (2002). "Achieving marketing objectives through use of electronic communications technology."

[2] Chaffey, D. (2011). E-business & e-commerce management. Pearson Education.

[3] Chaffey, D., & Smith, P. (2008). E-marketing Excellence: planning and optimizing your digital marketing. Routledge.

[4] Fournier, Susan. (1998). Consumers and Their Brands: Developing Relationship Theory in Consumer Research. Journal of Consumer Research 24 (4): 343-73.

[5] G. T. Waghmare, 2012). E-commerce; A Business Review and Future Prospects in Indian Business. Internet Marketing in India. Indian Streams Research Journal, vol. 2, no. IV, (pp. 1-4).

[6] Gangeshwer, D. K. (2013). E-Commerce or Internet Marketing: A Business Review from Indian Context", International Journal of u- and e- Service, Science and Technology Vol.6, No.6, pp.187-194.

[7] Giese, J. L. and J. A. Gote,(2000). Defining Consumer Satisfaction,. Academy of Marketing Science Review [Online]00 (01).

[8] Gurau, C. (2008). Integrated online marketing communication: implementation and management, Journal of Communication Management, vol. 12 no. 2, pp. 169-184.

[9] Hoge, S, Cecil C. (1993). The Electronic Marketing Manual ABA Journal, 22, 175-185.

[10] Krishnamurthy, S. (2006). Introducing E-MARKPLAN: A practical methodology to plan e-marketing activities. Business Horizons. 49(1), 49, 51, 60.

[11] M. S. Khan and S. S. Mahapatra,(2009). Service quality evaluation in internet banking: an empirical study in India. Int. J. Indian Culture and Business Management, vol. 2, no. 1, (2009), pp. 30-46.

[12] Mangles, C. a. (2003). Relationship marketing in online business-to-business Markets: a pilot investigation of small UK manufacturing firms. European Journal of Marketing, Vol. 37 No. 5/6, pp. 753-773.

[13] Merisavo, M. and R. Mika . (2004). The Impact of E-mail Marketing on Brand Loyalty. Journal of Product and Brand Management13 (6): 498-505.

[14] Prahalad, C.K. and Ramaswamy V. (2005). The Future of Competition: Co-Creating Unique Value with Customers. Boston, Massachusetts: Harvard Business School Press.

[15] Reinartz, Werner J. and V. Kumar. (2003). The Impact of Customer Relationship Characteristics on Profitable Lifetime Duration. Journal of Marketing 67 (1): 77-79.

[16] Roberts, R. R., and J. Kraynak. (2008). Walk like a giant, sell like a madman. Hoboken,NJ: Wiley.

[17] Rowley, Jennifer. (2004). Online branding: the case of McDonald's. British Food Journal 106 (3): 228-237.

[18] Salehi M., Mirzaei H., Aghaei M., and Milad A. (2012). Dissimilarity of E-marketing VS traditional marketing. International Journal of Academic Research in Business and Social Sciences Vol. 2, No. 1 PP 511-515.

[19] Sheth, J.N., Sharma, A. (2005). International e-marketing: opportunities and issues. International Marketing Review vol. 22 no. 6, 2005 pp. 611-622.

[20] Watson, R.P., Leyland, F.P., Berthon, P. and Zinkham, G. (2002). U-commerce: expanding the universe of marketing. Journal of the Academy of Marketing Science, vol. 30 no. 4, pp. 333-47.

Cyber Crime

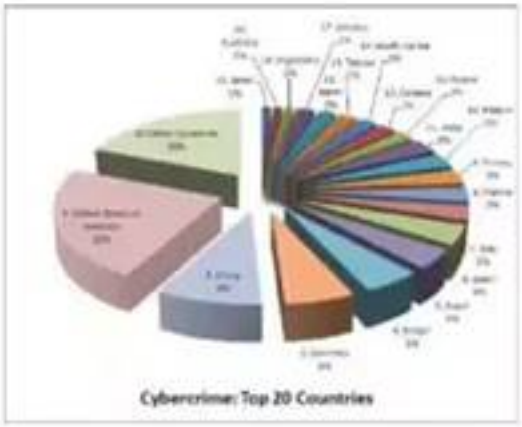
Anant Jain, Namit Gupta
CCSIT, TMU, MORADABAD
jain1999anant@gamil.com
namit.k.gupta@gmail.com

***Abstract*—As we all know that cyber crime has been one of the most common activity made by the computers experts. In this paper I have mentioned some of the impact of cyber crime .Cyber crime are that activities made by the people for destroying organizations for network stealing and other valuable data , documents ,hacking banking details. My paper includes detailed information regarding cyber crime and modes of cyber crime. Finally i will go for the research on the crimes made by the misuse of internet in some of the areas like Financial crimes ,Cyber pornography, E-mail spoofing, E-mail bombing, virus attacks .Finally I will get the main objectives of my paper. Like this my paper will be complete.**

Introduction

Cybercrime, also called computer crime, the use of a computer as an instrument to further illegal ends, such as committing fraud, trafficking in child pornography and intellectual property, stealing identities, or violating privacy. Cybercrime, especially through the Internet, has grown in importance as the computer has become central to commerce, entertainment, and government. Computer crime has been an issue in criminal justice and criminology since the 1970s, criminals use computers to commit crimes. Cybercrime is a criminal act using a computer that occurs over the Internet. The Internet has become the source for multiple types of crime and different ways to perform these crimes. The types of cybercrime may be loosely grouped into three categories of cybercrimes. First, the Internet allows for the creation and maintenance of cybercrime markets. Second, the Internet provides a venue for fraudulent behavior (i.e., cyberfraud). Third, the Internet has become a place for the development of cybercriminal communities.

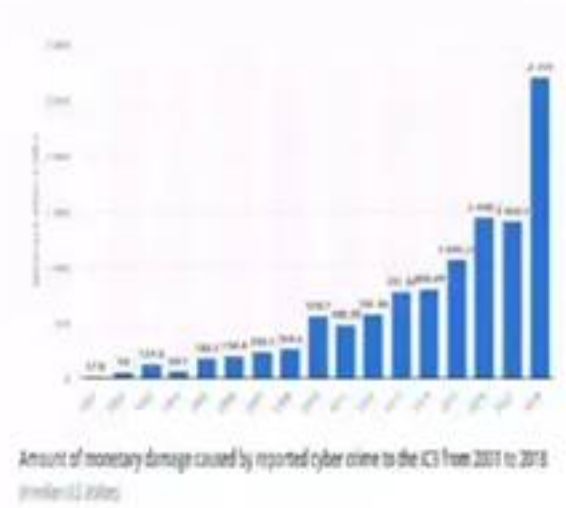
Facts about the Cybercrime market:
The World Economic Forum (WEF) has listed cyber attacks as the third most likely global risk in 2018 and given the lucrative market for cyber criminals this is not going to scale down in the coming years. According to Forbes, the global information security spending is poised to hit $124 billion by 2019, mainly driven by privacy concerns and regulations. The scenario of a considerable rise in the cybercrime activities has put huge pressure on industry players. If the cyberattacks have increased, then it must be noted that the attack vectors have also proliferated – from emails, websites to IoT devices and weaponization of AI-enabled devices, its all-pervasive leaving them vulnerable. New age threats like ransomware, cryptojacking for cryptomining, attacks on cyber-physical systems involving critical infrastructure such as power grids, transportation systems and other areas are lethal. Similarly, the old methods like phishing attacks and malware infection are equally damaging for any business.



Top 20 Countries Found to Have the Most Cybercrime

The costs of cybercrimes are mind boggling – loss, theft, manipulation of data, data processing infrastructure, theft of money, identity, intellectual property, personally identifiable data, digital forensic investigations, loss of productivity, reputation loss for organizations, fines, penalties, damages and law suits for organizations, loss of customers leading to dip in revenues, cost of restoration activities to bring business operations to normalcy are some of the ways in which these cybercrimes prove that they are dangerous. There have been times when business could not identify a malicious code written in a complex manner and hence, they incurred heavy losses or had to temporarily suspend business services. Some of the other impacts are that the key executives were removed from their positions and even had to face prison time which further damaged their reputation in the eyes of the public.

Damages done by Crime Globally:



Amount of monetary damage caused by reported cyber crime to the IC3 from 2001 to 2018

It is already been touted that the cybercriminal activity is going to be the biggest challenge that mankind will face in the next few decades. It is estimated that cybercrimes will cost $6 trillion annually (up from $2 trillion in 2015) in 2021. It is interesting to note that as per the Cost of Data Breach Report, 2018 of Ponemon Institute, the average total cost rose from $3.62 to $3.86 million, an increase of 6.4 percent from 2017 and the average cost for each lost record rose from $141 to $148 in 2018. The prediction is that these numbers would only grow in the years to come.

Most common types of cybercrime:

1. Malware

Over half (55%) of all types of cybercrime involve malware, according to the report. These attacks include spyware and remote administration malware. From there, they can gain login credentials, sensitive business data, or information to help them conduct social engineering attacks. The third most popular kind of malware attack is the dreaded ransom ware, which typically locks your device or takes your data hostage until you pay the hacker to release it.

2. Social engineering

Social engineering attacks (31%) don't rely on technical sophistication so much as trust. Because they prey on human vulnerabilities instead of technological ones, this type of cybercrime is especially difficult to guard against. Types of social engineering attacks include phishing and more elaborate physical schemes.

3. Hacking

Typically the term hacking encompasses a wide variety of attacks. Positive Technologies defines it more narrowly in its report: "attacks that take advantage of vulnerabilities in software and services, weaknesses in protection mechanisms, and other shortcomings of targeted systems that do not involve social engineering or malware."

4. Web attacks

Web attacks represent fifth of cybercrimes against businesses. These attacks exploit vulnerabilities in websites to access the data of other users of the sites. For example, hackers might inject malicious code into an e-commerce website that allows them to steal customers' credit card information.

5. Credential compromise

Seventeen percent of attacks involved credential compromise, meaning a hacker uses your login information to gain unauthorized access to your accounts. An attacker can learn your credentials in a number of ways: phishing, social engineering, malware (such as key loggers), or hacking (gaining access to a database of credentials and cracking the passwords).

6. Distributed denial of service (DDoS)

Although few businesses will ever find themselves the target of a DDoS attack (2%), these can be extremely costly and disruptive. DDoS attacks flood a network with traffic, overwhelming it and preventing legitimate users or employees from accessing the service. Once the network is effectively shut down, the hackers typically demand a ransom to restore service.

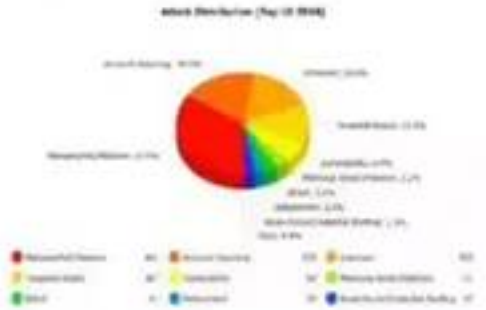
7. Malicious Code – Viruses, Worms and Trojans

Virus: - A virus is a program that modifies other computer programs. These modifications ensure that the infected program replicates the virus. Not all viruses cause damage to its host. A virus is typically spread form one computer to another by e-mail, or infected disk. However a virus cannot infect another computer until the program is executed. A common method of virus execution is when a computer user is tricked into opening a file attacked to an e-mail, thinking the file is a harmless program coming from a friendly source. The most popular example of virus is the Melissa virus which was launched in March 1999. The Melissa virus was hidden in a Microsoft word attachment that appeared to come from

a person knows to the recipient. The program activated a macro that tread the first fifty e-mail addresses located in the Microsoft Outlook e-mail program and e-mailed itself to the fifty addresses. The virus was estimated to have caused $80 million in damages.

Worms:-A worm is standalone program that replicates itself. A worm can wind its way throughout a network system without the need to be attached to a file, unlike viruses. For example: I love you worm in 2001 was estimated the loss caused to be $US 10.7 billion.

Trojans: - A Trojan Horses is an innocent looking computer program that contains hidden functions. They loaded onto the computer's hard drive an executed along with the regular program. However, hidden in the innocent program is a sub-program that will perform an unauthorized function. A Trojan horse is the most common way in which viruses are introduced into computer systems. For example: Back Orifice 2000 is a program designed for misuse and attack on another computer.



"The modern thief can steel more with a computer then with a gun. Tomorrow's terrorist may be able to do more damage with a keyboard than a bomb."

How to protect yourself from web attacks globally?

Some of the security measures are given below:-

Use an Internet Security Suite: If you know anything at all about a computer and the internet, the chances are very high that you might be using an antivirus already (And if not then do not take the risk unless you are seasoned cyber security professional with data backups in place). An antivirus program combined with an internet security program set helps you in:

1. Use an Internet Security Suite:

If you know anything at all about a computer and the internet, the chances are very high that you might be using an antivirus already (And if not then do not take the risk unless you are seasoned cyber security professional with data backups in place). An antivirus program combined with an internet security program set helps you in:

- Avoiding malicious downloads done by mistake.
- Avoiding malicious installs done by mistake.
- Preventing from being a victim to Man in the Middle Attack (MITM)
- Protection from phishing.

2. Use Strong Passwords:

This can't be emphasized enough. If you have "qwerty123" as your bank's password and a lot of money in the account, you must be ready for a surprise transaction. You should not fully rely on the rate-limiting measures used by websites that you visit. Your password should be strong enough to be practically unbreakable. A strong password is one that is 12+ characters long and contains a diverse use of alphabets(both cases), numbers and symbols (and spaces). Setting a really unbreakable password should not be difficult specially when there are help available as random password generators.

3. Keep Your Software Up-to-Date:

Despite the developer's best intention to create secure software and thorough reviews from the security teams, there are unfortunately many zero-days that are revealed once the software is being used by a large user base. Companies are well aware of this fact and that is why they release frequent updates to patch these vulnerabilities. This is the reason why those updates, however annoying they may be, are important. They help in preventing attacks that can easily skip the radar of the antivirus programs on your computer.

4. Avoid Identity Theft:

Identity theft is when someone else uses your personal information to impersonate you on any platform to gain benefits in your name while the bills are addressed for you. It's just an example, identity theft can cause you to damage more serious than financial losses. The most common reason for identity theft is improper management of sensitive personal data. There are some things to be avoided when dealing with personally identifiable data: Never share your Aadhar/PAN number (In India) with anyone whom you do not know/trust .Never share your SSN (In US) with anyone whom you do not know/trust. Do not post sensitive data on social networking sites. Do not make all the personal information on your social media accounts public.Never share an Aadhar OTP received on your phone with someone over a call. Make sure that you do not receive unnecessary OTP SMS about Aadhar (if you do, your Aadhar number is already in the wrong hands) Do not fill personal data on the website that claim to offer benefits in return.

How India uses many prevention methods against Cyber Crime:-

Generally India made many Cyber Laws against these Cyber Crime happened in present scenario. These laws are made to protect all the citizens of India against very serious crimes.All these laws are made to protect people from all Traditional criminal activities are such as theft, fraud, forgery, defamation, and mischief are part of cyberspace. Cyber Laws in India prevent any crime done using technology, where a computer is a tool for cybercrime. The laws for cybercrime protects citizens from dispensing sensitive information to a stranger online.

Some of the Laws are as follows:-

1. Copyright Law:

In relation to computer software, source code, websites, cell phones contents etc.

2. Licensing Law:

In terms of software and source code.

3. Trademark Law:

With relation to domain names, meta tags , mirroring, framing , linking etc.

4. Semiconductor Law:

Which relates to the protection of semiconductor integrated circuit design and layouts.

5. Patent Law:

In relation to computer hardware and software.

6. Data Protection and privacy Law:

Aim to achieve a fair balance between the privacy rights of the individual and to interests of data controllers such as banks, hospitals, email service providers.

Ever since the introduction to cyber laws in India happened, IT Act 2000 was enacted and amended in 2008 covering different types of crimes under cyber law in India.

The main purpose of this act is to provide legal recognition of electronic commerce and to facilitate filing of electronic records with the government.

ITA 2008, as the new version of Information Technology Act 2000 is often referred, has provided additional focus on Information Security. It has added several new sections on offences included Cyber Terrorism and Data Protection .

Conclusion

Criminal behaviour on the Internet, or cybercrime, presents as one of the Major challenges of the future to India and International law enforcement. It already feature in many international crime involving drug trafficking, people smuggling, terrorism and money laundering. Digital evidence will become more commonplace, even in traditional crimes, and we must be prepared to deal with this new challenge. Law enforcement agencies around the world are working together to develop new partnerships, new forensic methodologies and new responses to cybercrime in order to ensure safety and security on the Internet. New skills, technologies and investigative techniques, applied in a global context, will be required to detect, prevent and respond to cybercrime. This "new business" will be characterized by new forms of crime, a far broader scope and scale of offending and victimisation, the need to respond in much more timely way, and challenging technical and legal complexities. Innovative responses such as the creation of „cyber cops", „cyber courts" and „cyber judges" may eventually require to overcome the significant jurisdictional issues. To prevent from all of these web attacks, there are some laws mainly based on people's concern around the world which helps them to secure their information and data from many unauthentic users around the world. Cyber law in India is not a separate legal framework. It's a combination of Contract, Intellectual property, Data protection, and privacy laws. With the Computer and internet taking over every aspect of our life, there was a need for strong cyber law. Cyber laws supervise the digital circulation of information, software, information security, e-commerce, and monetary transactions.

Refrences

[1] Artical on Cyber Crime written by : Michael Aaron Dennis, ENCYCLOPAEDIA BRITANNICA.

[2] https:www.myadvo.in/blog/what-is-the-cyber-law-in-india-byMYADVO.

[3] Cyber Crime control by-https:security boulevard.com

[4] How to Protect Yourself From Cyber Attacks? – Geeks for Geeks

[5] How to Prevent Cyber Crime in India? - MyAdvo.in

[6] Cyber Crime introduction by - Information Security and Cyber Law, by Poonam Singh.

AlphaZero: The New Boss

Akshat Kumar Jain[1], Gulista Khan[2]
Faculty of Engineering and Computing Sciences
iakshatkumarjain@gmail.com, Gulista.khan@gmail.com

***Abstract*— The field of chess raises very interesting challenges to computer science and in particular to Artificial Intelligence. Indeed, as we will see, computational models of chess need to take into account important elements of advanced human problem solving capabilities such as knowledge representation, reasoning, and learning. In this paper I describe and compare two main engines on the basis of a chess tournament. A computer program is capable of carrying and describing some creative moves of chess. The results will definitely surprising.**

***Keywords* — AlphaZero, Reinforcement Learning , Stockfish, IBM Deep Blue ,MONTE Carlo tree search, Alpha-beta tree search.**

INTRODUCTION

There has been research going on since the last few decades on how to beat a human expert or master level player with the algorithm. Many scientists like Charles babbage (The turk[1]) , Alan turing , CLAUDE E. SHANNON[2] , John von Neumann[3], Planning algorithms for artificial intelligence is always challenging. In designing the Model for the Chess game , different scientists give different approaches like when we talk about the John von Neumann he proposed two algorithms . The first one is based on the brute force search and the second one works on the concept of intelligence strategy that can simulate human intelligence (i.e. think like a human.Systems that have been successful in chess:There are some highly specified systems that have been successful in chess and also have had impact in real world domains like robotics , industrial control , or intelligent assistants. Mostly these systems use Model-based Reinforcement Learning (RL) that first learn the model of the environment's dynamics , and then planning with respect to learning model . Or we have Model-free RL -i.e. they took the rules from the or we say optimal policies /value functions and start from the scratch Some highly sophisticated systems are:

IBM's Deep Blue

The IBM Deep Blue supercomputer that defeated world chess champion Garry kasparov in 1997 employed 480 custom chess chips. This technique describes the design philosophy, general architecture, and performance of the chess chips, which provided most of deep blue's computational power. Article given by [4] in 1999 given a engine for this technique that was under IEEE micro.

A. STOCKFISH-

Stockfish is an open source chess engine developed by Tord Romstud , Marco Costalba and Joona Kiiski. This project started in November 2008, since then it has evolved only. It has state-of-art-engines based on Alpha-Beta Search and till now it has reached an indisputably superhuman in terms of chess. It can compare 70,000,000 moves per second as a player. This engine has been evaluated by human grandmasters since 2008. Also search extensions that are highly optimized using game specific heuristic.

B. AlphaZero-

Now, the latest technology is using two main methodologies, first one is deep neural networks and the second one is general reinforcement learning algorithm. It starts learning the game from scratch (Like babies learn games from scratch) but obviously with more computational power .

II. LITERATURE REVIEW

In 2017 ,Google's AlphaZero takes on chess on 4th december in Google headquarters, London. **AlphaZero surpasses the Stockfish 8 in 4 hours .**

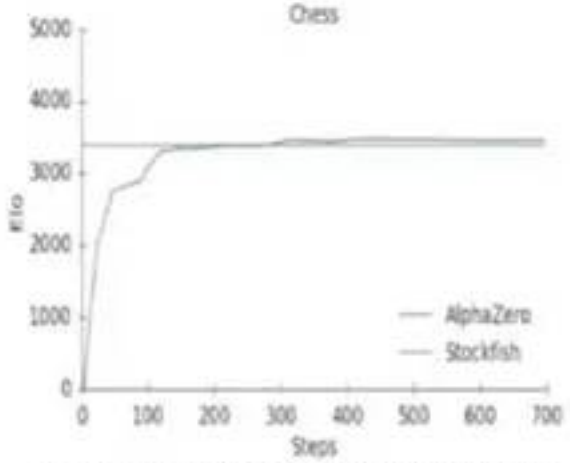


Figure 1: Elo rating of Stockfish v/s AlphaZeroa

In figure 1 x axis represents the measure of time which is concluded as training steps in thousands and y axis represents the elo rating in the game of chess.

Table 1:Summary of AlphaZero Results

Summary of AlphaZero Results

	Win	Draw	Lose
Chess vs. 2016 TCEC world champion Stockfish	28	72	0

Condition for this game is, both the engines will be allowed to have 1 minute per move. Stockfish is the strongest skill using 64 threads, same algorithm setting and architecture (except input/output planes) for all games.

Anatomy Of A World Champion Chess Engine : STOCKFISH

Domain knowledge, extensions, heuristics in 2016 Top Chess Engine Championship(TCEC) world champion Stockfish.

Figure 2: Depicting the Anatomy of a world champion chess Engine

B. Anatomy Of AlphaZero

Self-Play Reinforcement Learning with Monte Carlo Tree Search.

Figure 3: Depicting the Anatomy of AlphaZero

III. ANALYSIS OF ALGORITHMS

Now, we see how AlphaZero dominates Stockfish 8 in the 100 game match and didn't lose a single match against it. And take into consideration that Stockfish was already 10 years old when the match happened between these two engines. So stockfish was more greater in terms of experience and as we go further we will see that stockfish 8 check 70,000,000 moves per second and AlphaZero is around 80,000 moves per second still the matches goes in the favour of AlphaZero. In AlphaZero we use Monte Carlo Tree Search (MCTS) instead of Alpha-Beta Tree Search which was previously used in earlier systems.

The factors we take into consideration :

Scalability With Search Time

As we have seen alpha-beta search is dominated in these domains for 50 years now and there have been many studies that suggested MCTS or any other algorithm could not be competitive to alpha-beta search but here we that MCTS not only outperform the other programs but actually scaled up more efficiently than alpha-beta search .

Table 2: Depicting Moves per second by Stockfish and AlphaZero

Positions / second	Stockfish	Elmo	AlphaZero
Chess	70,000,000		80,000

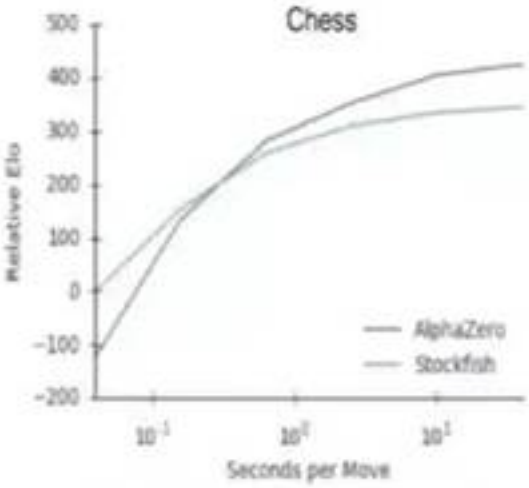


Figure 4: Depicting Moves per second by Stockfish and AlphaZero

It is similar to what John von neumann proposed in Type B[3].

B. AlphaZero Self Play

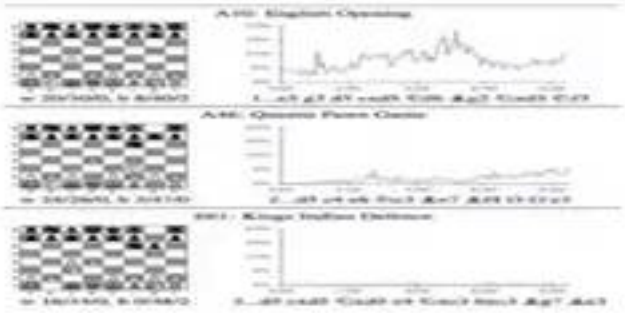


Figure 5(a): Opening moves Alphazero self play

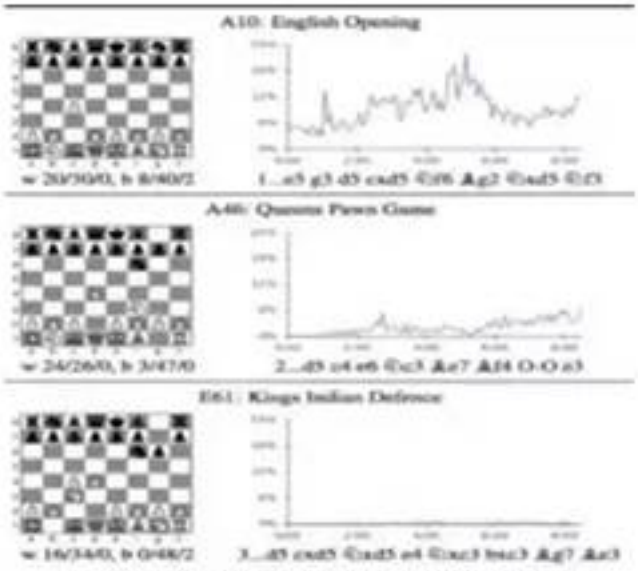


Figure 5(b): Opening moves Alphazero self play

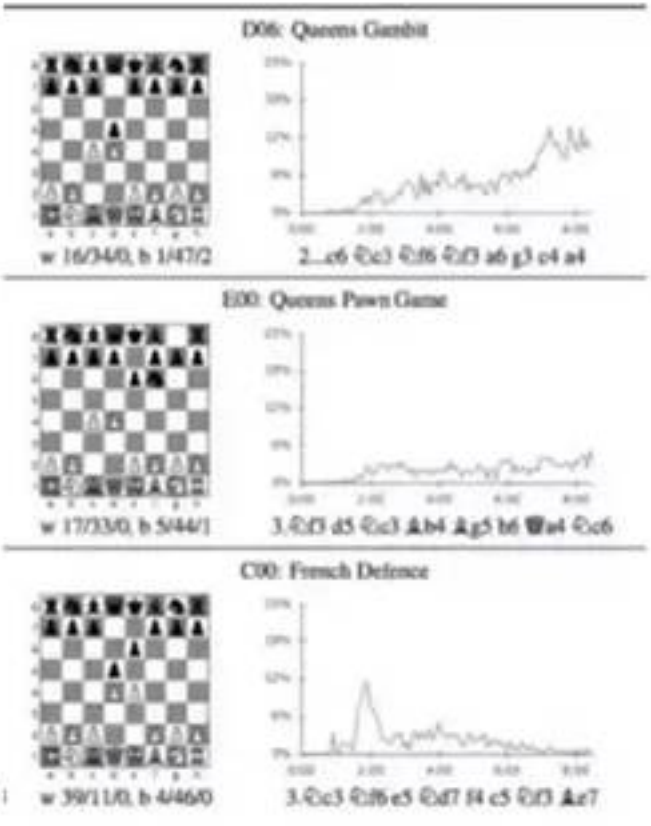


Figure 5(c): Opening moves Alphazero self play

AlphaZero trained for 9 hours by playing 44 million games against itself. Alpha Zero's openings are amazing. AlphaZero plays in a universal and balanced way, having both, the best of the humans and the computers. AZ's tactical strength is overwhelming, but it comes together with a deep strategic knowledge, only seen until now exclusively with humans, as you can see in the game using the Berliner Defence, which wins in 87 movements. AZ plays very well in blocked positions, as shown during the two games played with the French Defence too. AZ's openings are amazing: it has discovered and even overcome five centuries of human effort in hardly two hours of training. When AZ plays with black pieces, it shows a very solid position and rapidly occupies the center in a symmetrical way, like Karpov's style. When playing with white pieces, AZ likes to start with the Queen, but in an aggressive way, like Kasparov's style. AZ loves to give away pieces in the long term, with tactical sacrifices such as Tal's and other positional ones who could be signed by Petrosian. The way AZ plays against the Queens Indian Defence is sublime, from another galaxy, with outstanding ideas such as the sacrifice of the pawn in c4 during the match that wind in 68 movements. It is also impressive AZ's relentless execution of its positional advantage in some of the matches where AZ plays in inferiority, as it is its faultless technique in the final positions. We could easily say, without a risk of making a mistake that, from the analysis of the 10 games, AZ plays close to perfection.

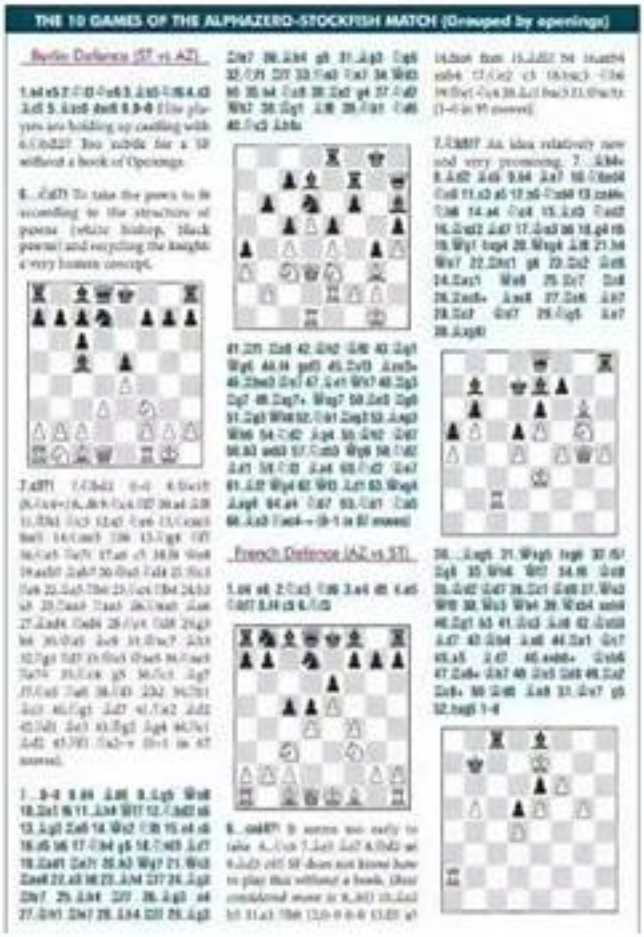


Figure 6. Games play by Stockfish and AlphaZero

CONCLUSIONS

Computer chess is most studied domain in history of Artificial Intelligence. AI algorithm development has been started since few decades. Some highly specified systems have been successful in chess like Deep Blue defeated kasparov in 1997, state of art now in disputable superhuman. Chess have more win over stockfish. State of art engines are based on alpha beta search.

REFERENCES

[1] Sources available at link https://spectrum.ieee.org/tech-talk /tech-history/ dawn-of-electronics/untold-history-of-ai-charles-babbage-and-the-turk

[2] .Sources available at link https://www.pi.infn.it/~carosi/chess/ shannon.txt

[3] Sources available at linhttps://timmccloud.net/blog-6%e2%80%8a-%e2%80%8aearly-ai-geniuses-claude-shannon-and-chess/

[4] .Sources available at link http://www.csis.pace.edu/~ctappert/dps/pdf/ai-chess-deep.pdf

[5] Sources available at link https://deepmind.com/blog/article/alphazero-shedding-new-light-grand-games-chess-shogi-and-go

[6] Sources available at link https://deepmind.com/research/publications/Mastering-Atari-Go-Chess-and-Shogi-by-Planning-with-a-Learned-Model

[7] Sources available at link https://deepmind.com/research/publications/general-reinforcement-learning-algorithm-masters-chess-shogi-and-go-through-self-play

[8] Sources Available at linkhttps://blog.stockfishchess.org/

To Overcome Network Problem using Network-on-chip

Name:- Parshav Jain
Teerthanker Mahaveer University, Moradabad
aj.parshav2201@gmail.com
Guide Name:-Dr.Arpit Jain

***Abtracts*--Network-on-Chip (NoC) is a newly introduced paradigm to overcome the communication problems of System-on-Chip architectures.Mapping applications onto mesh-based NoC architecture is an NP-hard problem and several heuristic methods have been presented to solve it so far. Scalability is the main problem of the heuristic methods and it is very difficult to conclude that one heuristic is better than the others. Integer Linear Programming (ILP) based methods determine the optimum mappings. However, they take very long execution times. In this paper, we propose a clustering based relaxation for ILP formulations.**

INTRODUCTION

The custom on-chip network, which targets a given application, has proved to be more efficient than the regular structure on-chip network design in [2]. The reason is that the communication requirement for each data flow is available in the design time, so the power consumption and packet latency are predictable once the links of networks are determined. Having this knowledge makes custom on-chip networks more efficient with topology synthesis as shown in [1], [2], [7]-[12]. Among those, [1], [2], [9] use a partition-based algorithm to reduce the time complexity. MPSoC are now integrating more and more processors on a single die with the increase in transistor budgets enabled by Moore's law. As the number of processor cores on a single die increases, the power consumption and wire delay will also have a significant increase, which makes the on-chip communication among cores becomes a critical issue. A scalable, energy efficient on-chip interconnect network is needed to address these difficulties in order to facilitate the on-chip communication named AT_NOC, to synthesize the topology by creating a series of refinement steps from an initial topology design, in which any pair of communicating nodes are connected by links. In each refinement, we pick the router that has the highest power consumption among the un-refined routers, and refine the sub-topology of this router to reduce the power consumption and keep the packet latency lower. Many previous topology synthesis approaches use a Steiner-tree-based topology construction (such as [2]). The reason we use an A Tree instead of the Steiner-tree is that an A Tree is the shortest path tree that can reduce the packet latency. By using the A Tree-based algorithm, in the sub-topology of the chosen router, the paths from all nodes to the chosen router are the shortest paths. Additional routers might be added into these shortest paths at some Steiner points. The locations of these added routers are chosen to minimize a cost function, which considers both power and packet latency. In the cost function, the power numbers of routers with different port sizes are measured by ORION [5], [6]. In order to predict the packet latency between any two nodes, we build a latency prediction model by noting that the latency between two routers is related to the injection rates of packets at the routers [7]. The latency prediction model is built on a latency-injection rate table, which is constructed by a simple simulation. For different

injection rates, we randomly inject packets into the wire and measure the average packet latency. By looking up this latency injection rate table, we can easily predict the packet latency under different traffic.

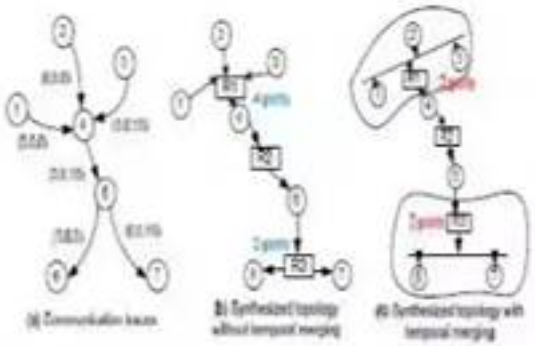


Figure1.Temporal merging based on communication traces

In this paper, we present a cluster-based ILP formulation for application mapping problem for mesh-based NoC architectures. Our method partitions the task graph, representing the given application, and the mesh into smaller sub-graphs and sub-meshes to decompose the given solution space into smaller polyhedral. It then maps each sub-graph onto the corresponding sub-mesh using our ILP-based method. Finally, it merges each mapping to determine the final solution. We implemented our method using commercial ILP tool [13] and tested its effectiveness on several multimedia benchmarks and randomly generated graphs. Our experiments show that the proposed method is very effective to reduce the execution times of ILP method while determining similar results.

Network-on-Chip Architecture and Function Layers:-

Network on chip is the term used to describe an architecture that has maintained redily designable solutions in face of communication-centric trends. In this section, we will briefly review some concepts on the design of an NoC communication system. Moreover, the No. C function can be classified into several layers, which will be introduced sequentially.

2.1. Network-on-Chip Architecture.: A typical No. C architecture consists of multiple segments of wires and routers as shown in Figure 1. In a tiled, city-block style of No. C layout, the wires and routers are configured much like street grids of a city, while the clients (e.g., logic processor cores) are placed on city blocks separated by wires. A network interface (NI) module transforms data packets generated from the client logic (processor cores) into fixed-length flow-control digits (flits). The flits associated with a data packet consist of a header (or head) flit, a tail flit, and a number of body flits in between. This array of flits will be routed toward the intended destination in a hop-by-hop manner from one router to its neighbouring router. Usually, for each data packet, the corresponding head flit specifies its intended destination. After examining the head flit, the router control logic will determine which output direction to route all the subsequent (body and tail) flits associated with this data packet according to the routing algorithm applied. In a city-block style No. C, each router has five input ports and five output ports corresponding to the north, east, south, and west directions as well as the local processing element (PE). Each port will connect to another port on the neighboring router via a set of physical interconnect wires(channels). The router's function is to route flits entering from each input port to an appropriate output port and then toward the final destinations. To realize this function, a router is equipped with an input buffer for each input port, a 5 × 5 crossbar switch to redirect traffic to the desired output port and necessary

control logic to ensure correctness of routing results as shown in Figure 2.

2.2. Network-on-Chip Function Layers. The No. C function can be classified into several layers: application, transport, network, data link, and physical layers. An NoC router should contain both software and hardware implementations to support functions of the layers.

2.2.1. Application Layer- At the application layer, target applications will be broken down into a set of computation and communication tasks such that the performance factors like energy and speed can be optimized. Placement of cores on anNoC has to be optimized to reduce the amount of total communication or energy but at the same time recognizing the limitations of any one particular link. The task mapping and communication scheduling problem is an instance of a constrained quadratic assignment problem which was known to be NP-hard [12]. Given a target application described as a set of concurrent tasks with anNoC architecture, the fundamental questions to answer are (1) how to topologically place the selected set of cores onto the processing elements of the network and (2) how to take into consideration the complex effects of network condition, which may change dynamically during task execution, such that the metrics of interest are optimized [13]. To get the best trade off between power and performance, application mapping and scheduling should be considered with several kinds of architecture parameters

.

2.2.2. Transport Layer. To prevent buffer overflow and to avoid traffic congestion, some management schemes should be applied to guide the transport of packets in an No. C. The transport layer addresses the congestion and flow control issues [14]. Key performance metrics of an No. C include low packet delivery latency and high throughput rate, and these metrics are critically impacted by network congestions caused by resource contentions. Accordingly, contention resolution is a key to avoid network congestions [14]. One of the most crucial issues for the contention resolution is, under a premise of a deadlock- and live lock-free routing algorithm, to enhance the utilization efficiency of available network resources in order to come up with a better communication performance.

2.2.3. Network Layer- Network topology or interconnect architecture is an important issue in this layer, which determines how the resources of network are connected, thus, refers to the static arrangement of channels and nodes in an interconnection network. Irregular forms of topologies can be derived by mixing different forms of communication architectures in a hierarchical, hybrid, or asymmetric way by clustering partition, which may offer more connectivity and customizability at the cost of complexity and area. In addition, optimization of a topology, which affects the connectivity of the routers and the distance of any one core to the other, is difficult. Furthermore, the trade off between generality and customization that, respectively, facilitate scalability and performance is important. As future designs be come more complex, the non-recurring costs of architecting and manufacturing a chip will become more and more expensive. A homogenous NoC is one where the cores and routers are all the same, while a heterogeneous NoC selects individual cores from an IP library and may have its communication architecture customized to suit the needs of an application. Since NoC designs must be flexible enough to cover a certain range of applications, most of the state-of-the-art NoC designs use a mesh or torus topology because of its performance benefitsand

high degree of scalability for two-dimensional systems, yet it may not achieve the best performance for a single application [15, 16].Conventional design of a router consists of circuit switched fabrics and an arbitration controller. In each arbitration decision, more than one path can be constructed by the crossroad switch as long as no contention exists between these paths. For most existing switch designs, virtual-channel flow-control-based router design, which provides better flexibility and channel utilization with smaller buffer size, is a well-known technique from the domain of multiprocessor networks [17–24].

2.2.4. Data Link and Physical Layers. The main purpose of data-link layer protocols is to increase the reliability of the link up to a minimum required level, under the assumption that the physical layer by itself is not sufficiently reliable [14]. The emphasis on physical layer is focused on signal drivers and receivers, as well as design technologies for resorting and pipelining signals on wiring. In addition, as technology advanced to ultradeep submicron (DSM), smaller voltage swings and shrinking feature size translate to decreased noise margin, which cause the on-chip interconnects less immune to noise and increase the chances of nondeterminism in the transmission of data over wires (transient fault) [2, 25–28]. Electrical noise due to crosstalk, electromagnetic interference (EMI), and radiation-induced charge injection will likely produce timing error and data errors and make reliable onchip interconnect hard to achieve.

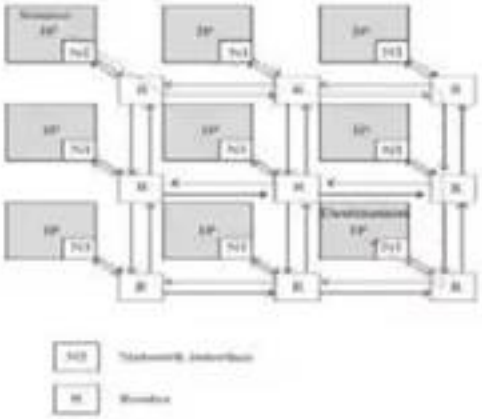


Figure 1: Typical NoC architecture in a mesh topology.

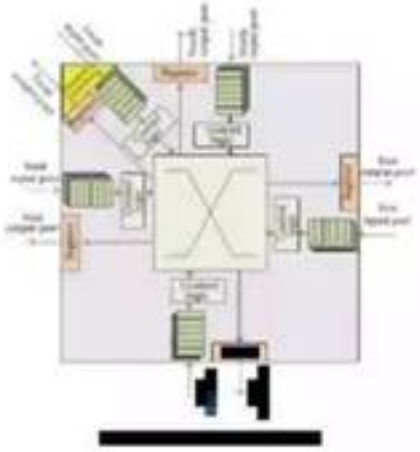


Figure 2: Typical NoC router architecture.

CLUSTER BASED METHOD:-

Our ILP-based mapping tool obtains optimum results for the stated problem. However, when the number of tasks in the application graph increases the computation time also increases dramatically, which makes this method inapplicable in practice. To remedy from this timing problem, we propose a cluster-based method to reduce the computation times. In this method, we decompose the mapping problem into several sub-problems and solve each sub-problem separately. In other words, we first decompose the mesh into sub-meshes and partition the application graph into smaller

sized clusters. We then apply our ILP-based mapping method for each cluster-sub-mesh pairs. The proposed clusterbasedmapping method follows the steps given below.

4.1. Mesh partitioning

Mesh dimensions are the designer guided inputs to our system.The system designer inputs Xdimand Ydimvalues such that jVj6 jTj= Xdim_ Ydim. Our mesh partitioning method is a recursive procedure. It cuts the given mesh M into two sub-meshes M1 and M2 and it continuously cuts the sub-meshes until each partition has at most t tiles. The stopping criteria t is a predefined value. From our experiments, we observed that our ILP-based system can map around 12 tasks in a tolerable time. Therefore, we used t = 12 in our experiments. The effects of the granularity of the partitions are twofold: If the number of nodes in a partition is big, then the ILP solution times increase dramatically. On the other hand, if we partition the graph into very small portions, then the final solution becomes far from the optimal one since the number of mapping options for each node decreases.

Xdim1 ¼ dXdim=2e: ð12Þ
Xdim2 ¼ Xdim_ Xdim1 ð13Þ
Ydim1 ¼ Ydim2 ¼ Ydimð14Þ

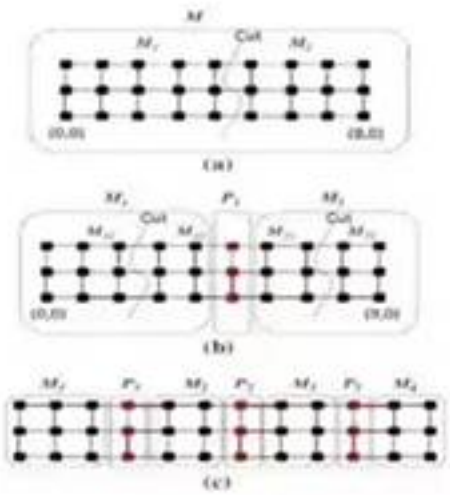


Fig. 2.Mesh partitioning example. (a) Initial mesh and the cut, (b) The sub-meshesafter the first cut, and (c) result. In the figures, Mirepresents a sub-mesh and Pj represents dummy tiles connecting two sub-meshes.

4.2. Graph clustering

Our graph clustering follows the similar recursive steps with the mesh partitioning. We recursively divide the application graph into clusters until each cluster contains the nodes less than the tiles of corresponding sub-mesh. We modified Kernighan–Lin algorithm [15] for our partitioning method. Before elaborating the details of our clustering method, we give some definitions as follows.

Definition 3.A cut CGA;GBof graph G(V,E) is a partition of V into GA and GB = V _ GA. The cut degree dGA;GBis the total number of edges crossing the cut CGA;GB . The cut degree dGA;GBof the cut CGA;GB can be determined by using the equation

8vi 2 GA; dGA;GB¼ X8ei;j2Ebi;j; ð16Þ

wherebi,jis a binary variable and it becomes 1 when vi 2 GA ^ vj2 GB. Otherwise, it is 0.

Definition 4.A node vi in cluster GA is called a free node if vi does not have any neighbor node in a dummy node set D and FA is the set of the free nodes in GA. Formally, FA = {vij"ei,j, (vjR D)}.

Definition 5.A node vi in cluster GA is a bound node if there is atleast one node vjconnected to vi, such that vjis a dummy node in a dummy node set D and BA is the set of the bound nodes in GA. Formally, BA = {vij$ei,j, (vj2 D)}. We define the free and bound nodes in a cluster to decide whichnodes are candidates to be swapped between two clusters. By only moving the free nodes between clusters, we force the neighbour nodes of the CTG to be either in the same cluster or in the neighbour clusters. The rationale behind this idea is to increase the probability that they may be mapped in one hop distance. Initially, all nodes are free nodes since there is no dummy node set before the partitioning starts. For each cluster, the sum of free and bound nodes gives us the total nodes in a cluster. That is, GA = FA [BA. In Fig. 3a, all the nodes are free nodes, whereas v9, v17, v8, and v16 are bound nodes in Fig. 3b.

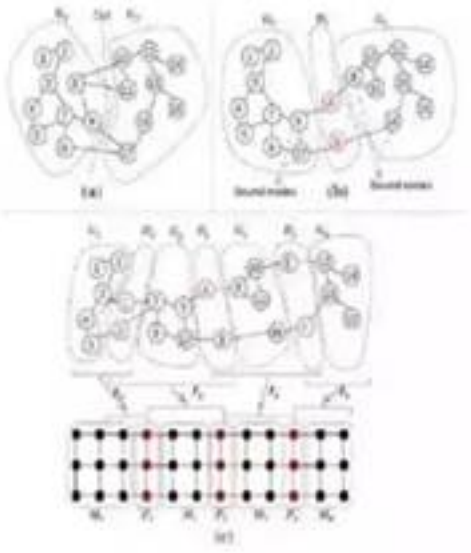


Fig. 3.Graph clustering.

5. Experimental results

We evaluated our cluster based method by comparing it with ILP solutions on different real benchmarks and randomly generated graphs. Before presenting the results, we demonstrate the working procedure of our cluster based method. For this demonstration, we used ILP and cluster-based methods to map multimedia benchmark 263-enc mp3-dec onto 4 _ 3 mesh. We present both these mapping in Fig. 4. In this figure, (a) presents CTG of multimedia benchmark 263-enc mp3-dec with weights given in kbits/s and (b) shows ILP-based mapping onto 4 _ 3 mesh, which took 1292 s resulting in 230,407 kbits/s total communication cost. Fig. 4c and d shows the mesh partitioning and graph clustering steps, respectively. Finally, Fig. 4e and f present the mapping and merging results, respectively. Our mappings took 0.9 s for the first cluster and 0.3 s for the second, resulting in a total communication cost of 230,426 kbits/s. As the numbers illustrate, we achieved tremendous time savings while we sacrificed 0.01% on the optimum result.

We tested our cluster based method on six multimedia bench marks and four custom generated graphs. We give the results in Table 2.We list the name and the number of nodes of these graphs in the first two columns of Table 2. Columns three and four give the total communication costs (CommCost) of ILP-based and cluster based methods, respectively. Note that we limit the running time of ILP tool to 8 h and accept its best solution returned within thistime limit. In our six experiments, ILP-based method could not obtain the solutions in these time limits. We show these solutions with the t.o. (timeout) in column six of Table 2. In column five of Table 2, we give the difference between our cluster based method and ILP-based method in percentages.

TABLE 2: Experimental results on multimedia benchmarks and custom generated graphs

CONCLUSION

- We proposed a new cluster based tecniquc for application mapping onto NoC structures.
- Our cluster-based mapping method can also beused to map the tasks in such a way that the communication is distributed over the chip evenly.
- Low cost to make chips for communication.

REFERENCES

[1] S.R. Vangal, et al., An 80-tile sub-100-WteraFLOPS Processor in 65-nm CMOS, IEEE J. Solid-State Circuits 43 (1) (2008) 29–41.

[2] A. Agarwal et al., Tile processor: embedded multicore for networking and multimedia, in: Proceedings of the IEEE Hot Chips 19, Stanford, CA, USA, August 2007.

[3] W.J. Dally and B. Towles, Route packets, not wires: on-chip interconnection networks,in: Proceedings of the 38th Design Automation Conf. (DAC 2001), June 2001, pp. 683–689.

[4] L. Benini, G. De Micheli, Networks on chips: a new SoC paradigm, IEEE Computer (2002) 70–78.

[5] B. Grot, et al., Express cube topologies for on-chip interconnects, HPCA 2009 (2009) 163–174.

An Overview of Pattern Recognition and Approaches of it

Rajat Varshney,
Ashok Kumar
[1]Scholar FOECS TMU, MORADABAD
[2]Associate Professor FOECS TMU, MORADABAD
[1]varshneyrajat999@gmail.com
[2]ashok.computers@tmu.ac.in

Abstract--Any object that we see in the world that forms a pattern whether it be an image of a car or speech signals like the word "yes" which produce an oscillating wave on oscilloscope. Pattern describe what we see in the world ,what we hear and what we sense. So the job of pattern recognition is a machine should be able to understand what we are seeing around us or what we are speaking. Pattern recognition is used to give human recognition intelligence to machine which is soul of today's many modern application. Pattern Recognition is recognition process which recognizes a pattern using a machine or computer. Researchers and scientists are evolved new pattern recognition techniques and apply them to many real life applications such as agriculture, robotics, biometrics, medical diagnosis, life form analysis, image processing, process control, information management systems, aerial photo interpretation, weather prediction, sensing of life on remote planets, behavior analysis, Speech recognition, automatic diseases detection system in the infected plants, cancer detection system etc. with combination of other technology

Keywords :- Approaches of pattern recognition, Data Acquisition, Pre Processing, Feature Extraction, Classification, Statistical pattern, Structural pattern.

INTRODUCTION

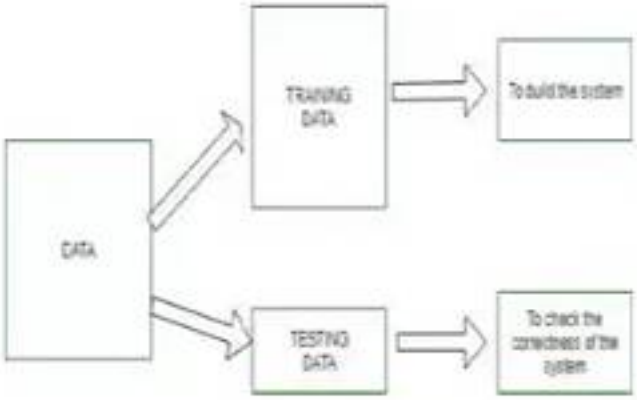
Pattern recognition is the branch of machine learning a computer science which deals with the regularities and patterns in the data that can further be used to classify and categorize the data with the help of Pattern Recognition System. In a typical pattern recognition application, the raw data is processed and converted into a form that is amenable for a machine to use. Pattern recognition involves classification and cluster of patterns. In classification, an appropriate class label is assigned to a pattern based on an abstraction that is generated using a set of training patterns or domain knowledge. Classification is used in supervised learning. Clustering generated a partition of the data which helps decision making, the specific decision making activity of interest to us. Clustering is used in an unsupervised learning.

Training and Learning in Pattern Recognition:-

Learning is a phenomena through which a system gets trained and becomes adaptable to give result in an accurate manner. Entire dataset is divided into two categories, one which is used in training the model i.e. Training set and the other that is used in testing the model after training, i.e. Testing set.

Training set : Training set is used to build a model. It consists of the set of images which are used to train the system. Training rules and algorithms used to give relevant information on how to associate input data with output decision. The system is trained by applying these algorithms on the dataset, all the relevant information is extracted from the data and results are obtained.

Testing set: Testing data is used to test the system. It is the set of data which is used to verify whether the system is producing the correct output after being trained or not. Testing data is used to measure the accuracy of the system. Example: a system which identifies which category a particular flower belongs to, is able to identify seven category of flowers correctly out of ten and rest others wrong, then the accuracy is 70 %



Approaches to pattern recognition:-

There are two fundamental pattern recognition approaches for implementation of pattern recognition system. These are:

- Statistical Pattern Recognition Approaches.
- Structural Pattern Recognition Approaches

Statistical Pattern :

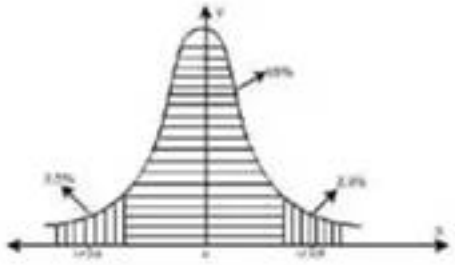
- Statistical Pattern Recognition Approach is in which results can be drawn out from established concepts in statistical decision theory in order to discriminate among data based upon quantitative features of the data from different groups. For example: Mean, Standard Deviation.
- The comparison of quantitative features is done among multiple groups.

1. Bayesian Decision Theory

- Bayesian decision theory is a statistical model which is based upon the mathematical foundation for decision making.
- It involves probabilistic approach to generate decisions in order to minimize the complexity and risk while making the decisions.
- In Bayesian decision theory, it is assumed that all the respective probabilities are known because the decision problem can be viewed in terms of probabilities.
- It can be said that, Bayesian decision theory is dependent upon the Baye's rule and posterior probability needs to be calculated in order to make decisions with the knowledge of prior probability

2. Normal Density

- Normal density curve is a bell shaped curve which is the most commonly used probability density function.



Normal Density Curve: Pattern Recognition Approaches

- Since it is based upon the central limit theorem, normal density concept is able to handle larger number of cases.
- The Central Limit Theorem States that - "A given sufficiently large sample size from a population with a finite level of variance, the mean of all samples from the same population will be equal to mean of population".

3. Discriminate Function

- Pattern Classifiers can be represented with the help of discriminate functions.
- Discriminate Functions are used to check, which continuous variable discriminates between two or more naturally occurring groups.

Structural Pattern:

we came across patterns with strong inherent structures, statistical methods give ambiguous results, because feature extraction destroys vital information concerning the basic structure of pattern. Therefore, in complex pattern recognition problems, like recognition of multidimensional objects it is preferred to adopt a hierarchical system, where a pattern is considered to be made up of simple sub-patterns, which are further composed of simpler sub patterns. In structural approach of pattern recognition a collection of complex patterns are described by a number of sub-patterns and the grammatical rules with which these sub patterns are associated with each other. This model is concerned with structure and attempts to recognize a pattern from its general form. The language which provides structural description of patterns in terms of pattern primitives and their composition is termed as pattern description language. Increased descriptive power of a language leads to increased complexity of syntax analysis system.

Advantages:-

- Pattern recognition solves classification problems.
- Pattern recognition solves the problem of fake bio metric detection.
- It is useful for cloth pattern recognition for visually impaired blind people.
- It helps in speaker diarization.
- We can recognise particular object from different angle.

Applications:-

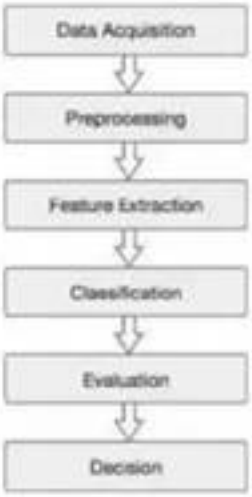
- **Image processing, segmentation and analysis**

Pattern recognition is used to give human recognition intelligence to machine which is required in image processing.

- **Computer vision :** Pattern recognition is used to extract meaningful features from given image/video samples and is used in computer vision for various applications like biological and biomedical imaging.
- **Seismic analysis**: Pattern recognition approach is used for the discovery, imaging and interpretation of temporal patterns in seismic array recordings. Statistical pattern recognition is implemented and used in different types of seismic analysis models.
- **Radar signal classification/analysis** Pattern recognition and Signal processing methods are used in various applications of radar signal classifications like AP mine detection and identification.
- **Speech recognition**: The greatest success in speech recognition has been obtained using pattern recognition paradigms. It is used in various algorithms of speech recognition which tries to avoid the problems of using a phoneme level of description and treats larger units such as words as pattern.

- **Finger print identification**
The fingerprint recognition technique is a dominant technology in the biometric market. A number of recognition methods have been used to perform fingerprint matching out of which pattern recognition approaches is widely used.

Component of Pattern Recognition:



Data Acquisition: The process consists of three major steps after data acquisition. Datasets for pattern recognition can be from a wide range of sources like satellite sensor data, ground based sensor data, medical images and so on. Once the dataset is acquired it is preprocessed, so that it is suitable for subsequent sub-processes.

Preprocessing: One of the most common preprocessing steps done in field of pattern recognition are normalization to zero mean and unit variance, especially for 1-D datasets. In the field of remote sensing most common preprocessing step required is re-gridding, which is basically assigning a spatio-temporally uniform grid to raw data. In many image processing applications, it is desirable to have a uniform spatial grid for the pattern recognition process.

Feature Extraction: The main goal of feature extraction is to reduce the data dimensionality and properly represent the original data in feature space. Features useful for classification process can be simple features like RGB values in color images, or complex features like energies from the Fourier Transform or Wavelet Transform of a time series. The feature extraction process usually consists of three steps

a. Feature construction is the step in which features are constructed from linear or non-linear combination of raw features.
b. Feature selection process is done using techniques like relevancy ranking of individual features.
c. Feature reduction process is used to reduce the no. of features especially when too many features are selected compared to the no. of feature vectors.

Classification: The main goal of feature extraction is to reduce the data dimensionality and properly represent the original data in feature space. Features useful for classification process can be simple features like RGB values in color images, or complex features like energies from the Fourier Transform or Wavelet Transform of a time series. The feature extraction process usually consists of three steps 1) Feature construction is the step in which features are constructed from linear or non-linear combination of raw features. 2) feature selection process is done using techniques like relevancy ranking of individual features and 3) feature reduction process is used to reduce the no. of features especially when too many features are selected compared to the no. of feature vectors.

Conclusion:-

A comparative view of all the models of pattern recognition has been shown which depicts that for various domains in this areas different models or combination of models can be used. In case of noisy patterns, choice of statistical model is a good solution. Practical importance of structural model depends upon recognition of simple pattern primitives and their relationships represented by description language. As compared to statistical pattern recognition, structural pattern recognition is a newer area of research. For complex patterns and applications utilizing large number of pattern classes, it is beneficial to describe each pattern

in terms of its components. A wise decision regarding the selection of Pattern grammar influences computations efficiency of recognition system. Pattern primitives and pattern grammar to be utilized depends upon the application requirements. Low dependence of neural networks on prior knowledge and availability of efficient learning algorithms have made the neural networks famous in the field of Patten Recognition. Although neural networks and statistical pattern recognition models have different principles most of the neural networks are similar to statistical pattern recognition models. To recognize unknown shapes fuzzy methods are good options. As each model has its own pros and cons, therefore to enhance system performance for complex applications it is beneficial to append two or more recognition models at various stages of recognition process.

References:-

[1] Snapp R., CS 295: Pattern Recognition, Course Notes, Department of Computer Science, University of Vermont,(http://www.cs.uvm.edu/~snapp/teaching/CS295PR/whatispr.html)

[2] Duda, R.O., Hart, P.E., and Stork D.G., (2001). Pattern Classification. (2nd ed.). New York: Wiley-Interscience Publication.

[3] Gutierrez-Osuna R., Intelligent Sensor Systems, Course Notes, Department of Computer Science, Wright State University, (http://research.cs.tamu.edu/prism/lectures/iss/iss_l9.pdf)

[4] Olszewski R. T. (2001) Generalized Feature Extraction for Structural Pattern Recognition in Time Series Data, PhD. Thesis at School of Computer Science, Carnegie Mellon University, Pittsburgh. Persaud K., Dodd G.: Analysis of discrimination mechanisms in the mammalian olfactory system using a model nose. Nature, vol. 299, 1982, pp. 352-355.

[5] Pearce T.: Computational parallels between the biological olfactory pathway and its analogue the electronic nose. Biosystems vol. 41, 1997, pp. 43-67.

[6] Di Natale C., Davide F., D'Amico A.: Pattern recognition in gas sensing. Sensors and Actuators B vol. 23, 1995, pp. 111-118 1995.

[7] Kowalski B.R., Wold S.: In Handbook of statistics vol. 2, P.R. Krishnaiah and L.N. Kanal eds., North Holland Publ., Amsterdam, The Netherlands, 1982, pp. 673 – 697.

[8] Hierlemann A., Schweizer-Berberich M., Weimar U., Pfau A., Göpel W.: Pattern recognition and multi component analysis. Sensors update vol. 2, W. Göpel, J. Hesse, H. Baltes (eds.), VCH, Weinheim, Germany, 1995

[9] Martinelli E., Pennazza G., Di Natale C., D'Amico A.: Chemical sensors clustering with the dynamic moments approach. Sensors And Actuators B vol. 2004, pp. 346-352.

[10] Di Natale C., Paolesse R., Macagnano A., Mantini A., D'Amico A.,Legin A., Lvova L., Rudnitskaya A., Vlasov Y.: Electronic nose and electronic tongue integration for improved classification of clinical and food samples. Sensors and Actuators B vol. 64, 2000, pp. 15-21.

[11] Jinhai Cai and Zhi-Qiang Liu. Pattern Recognition using markov random field Models. Pattern Recognition, 35(3):725–733, 2002.

PI &Fuzzy Logic Controller for Power Quality Control on Nonlinear Industrial Applications

Garima Goswami[1], Pankajkumar Goswami[2]
[1]Associate Professor, EE Department, TeerthankerMahveerUniversity, Moradabad
[2]Associate Professor,EC Department, TeerthankerMahveer University, Moradabad
Email: [1]garimag.engineering@tmu.ac.in, [2]pankajg.engineering@tmu.ac.in

Abstract—**The industry revolution requires many attributes to enhance productivity and reduces the production costs. In same series, the product quality follows the feature rules of smart industry systems. The quality is the prime concern among many; therefore, this paper elicits the design strategy of a controller system to improve power quality under industrial revolution 4.0. This helps in harmonic reduction and power quality (PQ) improvement at nonlinear load conditions in industrial applications. A design is modelled and evaluated for common converter application to compensate the harmonics for Single phase AC to DC bridge rectifier. Generally, it works as main converter in unregulated mode for most of the device application in automatic industry applications. The work describes the scheme where an auxiliary Synchronous Link Converter (SLC) is used for current compensation though shunt connection with the main converter unit.The adequate control on phase excitation results in elimination of harmonic components from the supply current and hence significant improvement in power quality. The turn on and turn off time is measured by an adequate signaling byPI/Fuzzylogic controller. This action results in advance filtering technique for nonlinear load applications in industrial system to avoid failure and faulty performance.**

Keywords: SAPF, APF, PI, FLC, PQ, Harmonics, MATLAB/Simulation.

1.Introduction

The non-linear loads are seen in large industrial devices like arc furnaces, variable frequency drives (VFD and high voltage rating rectifiers. The harmonics produced by them are typically confined and only observed by somearea experts only. But nowthe times have changed. The problems related to harmonics are now common in not only automation but in domestic world as well.As the no. of connected nonlinear loads is increased the overall sum of harmonics is also increasedwhich can destroy components like circuit breakers and fuses and records wrong measurements in utility meters. We use the nonlinear loads in our daily life as well as in industries also, that can produce harmonic distortions. These may be electronic lighting ballasts, PLCs, printers, fax machines, TVs, refrigerators and computers. Passive Filters can be used while working with a non-sinusoidal system to compensate the power quality problem but on account of their tuning for some frequencies they have limitations in their operating range. In this paper we have worked with active filter for harmonic reduction in line current.

2. Shunt Converter Scheme

The phenomenal attributes of Active Power Filter (APF) current compensation scheme is shown in figure 1, it contains parallel processing scheme of converters which is castoff for power quality improvement of uncontrolled nonlinear loads, which is the main objective of this paper. The main contribution of this paper is to design a shunt APF scheme to compensate the harmonic current in the line current. It is connected in shunt with the main dc converter unit with a resistive load along and a dc capacitor. Both the converters (main and auxiliary) are linked in parallel at both input and output terminals. The SLC is

controlled by an appropriate controller, made by switching device like IGBT. The gate pulse controls the turn on/off of IGBT in such a manner that the greater part of active power is diverted to the main converter. While, distorted power current component is produced by the core converter. This flows through the ancillary or secondary converter (SLC).

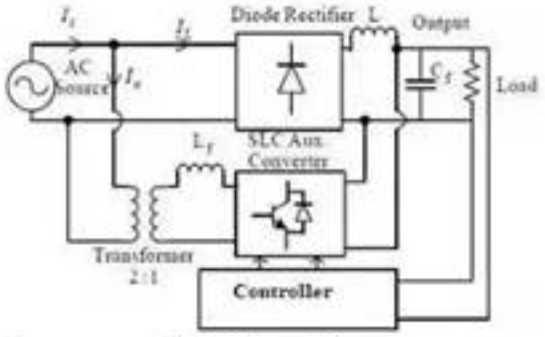


Fig.1 APF model

We have also focused on the strategy to create and verify the control of converter's parallel power processing scheme using MATLAB/Simulation. As soon as the angle amid the source current and voltage reaches to zero, it will cause the improvement of overall power factor and thus the power quality is also improved.Thus, the combination of auxiliary converter (SLC) and nonlinear load can be considered as a pure resistive circuit. The controlling of auxiliary converter should beresultant of input current of auxiliary converter and main converter. The controller we have used here is PI controller first and then fuzzy logic controller and after that compare the results of both.

3. Linear load Application: Analysis of Power Quality

In application of many devices where linear components are the prime entities, there such kind of models are generated, and it is found that a linear load exhibits a phase synchronization with sinusoidal wave outcomes as shown in fig.2.

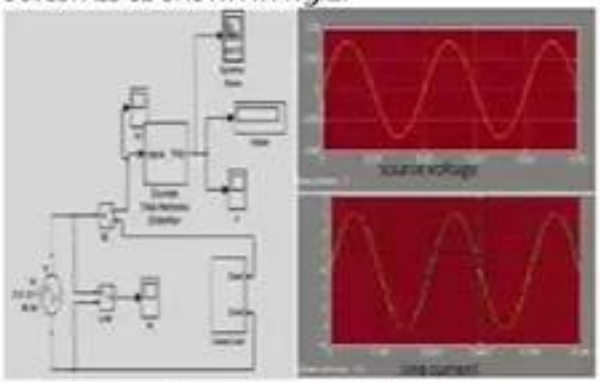


Fig.2 Model and results of linear load

4. Application of Non Linear load :Analysis of Power Quality

The same supply is linked to nonlinear load the main current will contain harmonics and the power quality becomes poor.

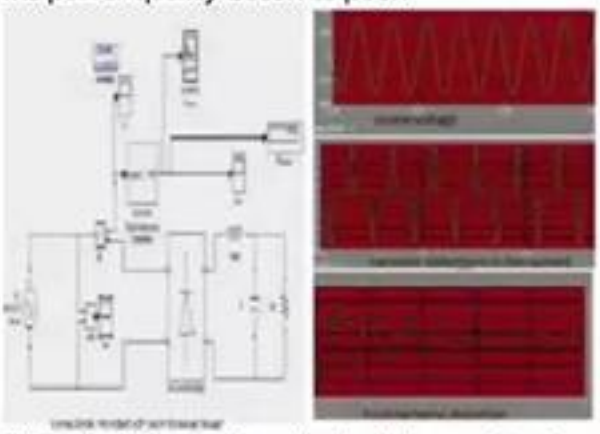


Fig.3 simulink model and simulation results of nonlinear load

5. Nonlinear Load Using PI Controller with SLC: Power Quality Improvement

The main schemes depict the implementation of auxiliary or secondary converter (SLC) in shunt with the nonlinear load as primary converter. This controls the turn on/off time of SLC is controlled using

PI controller the harmonics are reduced and the line current becomes sinusoidal again thus the power quality is improved.fig.4 isshowing the simulation diagram and simulation results of nonlinear load using PI controller.

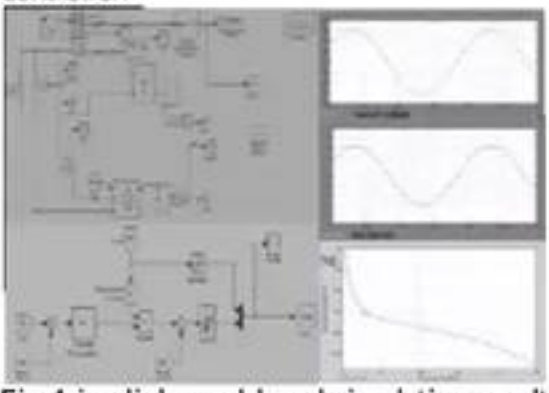


Fig.4simulink model and simulation results of nonlinear load with PI controller

6. Nonlinear Load Using Fuzzy Controller with SLC:Power Quality Improvement

The FLC is implemented to control the gate pulse of SLC, this retrieves the signal shapes of sinusoidalsource voltage and reduces the THD by5%, which can be depicted by fig.4, it shows fuzzy logic controller implementation on non-linear load.

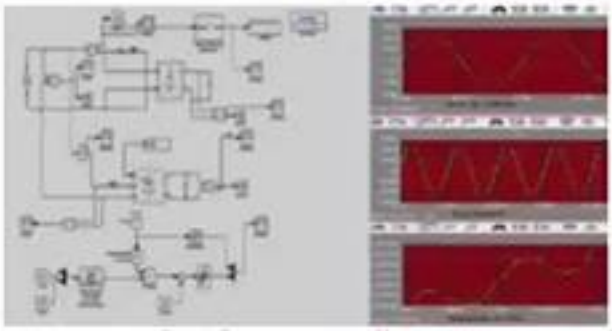


Fig.4 fuzzy controller

Conclusion

In this paper, a model is developed to diminish harmonics and enhances the quality of power on nonlinear load using SLC (synchronous link converter) for a common industrial solution. An implementation for PI control and fuzzy logic control has been done in the digital environment by using of MATLAB/Simulink. The different model shows sinusoidal waveform on linear applications but as soon as the non-linear device is applied main current signal became inaccurate thus power quality becomes poor. With the application of SLC in association with PI/Fuzzy controller to control adequate firing by gate signaling of IGBT andafter the simulation of designed model using MATLAB it has been found that the source current waveform became again sinusoidal with reduced distortions thus, we got the improved power quality.Table1 presents the analogous study of power quality control to compare the distortions in the four different cases.

Table 1: Analytical Observations

Type Load	Mains (V)	Current through Main Converter (A)
nonlinear	320	3.0 A Distortion less
nonlinear	320	3.0 A THD (117%)
nonlinear using SLC and PI controller	320	3.0 A THD (12%)
nonlinear using SLC and fuzzy logic controller	320	3.0 A THD (5 %)

Bibliography

[1]. Senthilkumar A.,Poongothai K.,SelvakumarS.,Silambarasan M. P.Ajay-d-Vimalraj"Mitigation Of Harmonic Distortion In Microgrid System Using Adaptive Neural Learning Algorithm Based Shunt Active Power Filter" published by Elsevier,2015, energy procedia,pp147-154.

[2]. R.Belaidi,A. Haddouche, H.Guendouz "Fuzzy logic controller based three- phase shunt active power filter for compensating harmonics and reactive power under unbalanced mains voltage" published by Elsevier,2012, energy procedia,pp560-570.

[3]. Dr. R.K. Tripathi, Member, IEEE &Mr. ChandreshverPratapSingh "Power Quality Control of Unregulated Non-linear Loads", Power, Control and Embedded Systems (ICPCES), 2010 InternationalConference on Nov. 29 2010-Dec. 1 2010 , 1 - 6

[4]. SinghB., SinghB. N., ChandraA., Al-HaddadK.,PandeyA., and KothariD. P. ,"A Review of Single-Phase Improved Power Quality AC-DC Converters," IEEE Trans. Ind. Electronics, vol. 50, No. 4, 2003,pp. 410-417

[5]. Luis A. Morán Juan W. Dixon José R. Espinoza, Rogel R. Wallace, "Using Active power filters to improvepower quality".

[6]. J. Nastran, R. Cajhen, M. Seliger, and P. Jereb, "Active power filter for nonlinear AC loads," IEEE Trans. Power Electron.,vol. 9, pp. 92-96, Jan. 1994.

[7]. Goswami G., Goswami P.K., "Simulation of Power Quality Control of Non-Linear Load using Fuzzy Controller at MATLAB", International Journal for Research in Science and Advance Technology ,Vol.3, 2013, pp.114-119

[8]. M.T.Benchouia,I. Ghadbane,A. Golea,K.Srairi,M.H.Benbouzid"Design and implementation of sliding mode and PI controllers based control for three phase shunt active power filter" published by Elsevier,2014, energy procedia,pp504-511.

Artificial Intelligence

Sejal Jain & Ayushi Jain (Students, CCSIT, TMU)

Mohammad Salim (Assistant Professor, CCSIT)

CCSIT, Teerthanker Mahaveer University,Moradabad.

Ayushijain2809@gmail.com

Sejujain1211@gmail.com

Abstract- AI research has focused on improving the decision-making capabilities of computers, i.e., the ability to select high-quality actions in pursuit of a given objective. When the objective is aligned with the values of the human race, this can lead to tremendous benefits. AI is the broader concept of machines being able to carry out tasks in a way that we would consider smart. AI are systems or devices which are built for specific task. These are far more common like systems designed to intelligently trade stocks and shares, or to maneuver an autonomous vehicle.

Introduction

The word Artificial Intelligence comprises of two words "Artificial" and "Intelligence". Artificial refers to something which is made by human and Intelligence means the ability to understand or think. There is a misconception that Artificial Intelligence is a system, but it is not a system. AI is implemented in the system. It is an intelligence where we want to add all the capabilities to a machine that human contains. AI stands for Artificial intelligence, where intelligence is defined acquisition of knowledge intelligence is defined as an ability to acquire and apply knowledge. The main aim of artificial intelligence is to increase the chance of success and not the accuracy of the model. It works like a computer program that does smart work. The goal is to simulate natural intelligence to solve complex problems. It leads to developing a system to mimic human to respond behave in a circumstance. AI goes for finding the optimal solution.

Current Uses of AI:

Although artificial intelligence evokes thoughts of science fiction, artificial intelligence already has many uses today, for example:

Email filtering: Email services use artificial intelligence to filter incoming emails. Users can train their spam filters by marking emails as "spam".

Personalization: Online services use artificial intelligence to personalize your experience. Services, like Amazon or Netflix, "learn" from your previous purchases and the purchases of other users in order to recommend relevant content for you.

Fraud detection: Banks use artificial intelligence to determine if there is strange activity on your account. Unexpected activity, such as foreign transactions, could be flagged by the algorithm.

Speech recognition: Applications use artificial intelligence to optimize speech recognition functions. Examples include intelligent personal assistants, e.g. Amazon's "Alexa" or Apple's "Siri".

Artificial Intelligence – What it's all about
Artificial intelligence (AI) traditionally refers to an artificial creation of human-like intelligence that can learn, reason, plan, perceive, or process natural language. Artificial intelligence is further defined as "narrow AI" or "general AI". Narrow AI, which we interact with today, is designed to perform specific tasks within a domain (e.g. language translation). General AI is hypothetical and not domain specific, but can learn and perform tasks anywhere. This is outside the scope of this paper. This paper focuses on advances in narrow AI, particularly on the development of new algorithms and models in a field of computer science referred to as machine learning.

How machines learn:
Although a machine learning model may apply a mix of different techniques, the methods for learning can typically be categorized as three general types:
Supervised learning: The learning algorithm is given labeled data and the desired output. For example, pictures of dogs labeled "dog" will help the algorithm identify the rules to classify pictures of dogs.
Unsupervised learning: The data given to the learning algorithm is unlabeled, and the algorithm is asked to identify patterns in the input data. For example, the recommendation system of an e-commerce website where the learning algorithm discovers similar items often bought together.
Reinforcement learning: The algorithm interacts with a dynamic environment that provides feedback in terms of rewards and punishments. For example, self-driving cars being rewarded to stay on the road.1

Why now?

Machine learning is not new. Many of the learning algorithms that spurred new interest in the field, such as neural networks, are based on decades old research. The current growth in AI and machine learning is tied to developments in three important areas:
Data availability: Just over 3 billion people are online with an estimated 17 billion connected devices or sensors. That generates a large amount of data which, combined with decreasing costs of data storage, is easily available for use. Machine learning can use this as training data for learning algorithms, developing new rules to perform increasingly complex tasks.
Computing power: Powerful computers and the ability to connect remote processing power through the Internet make it possible for machine-learning techniques that process enormous amounts of data.
Algorithmic innovation: New machine learning techniques, specifically in layered neural networks – also known as "deep learning" – have inspired new services, but is also spurring investments and research in other parts of the field.

Responsible Deployment

Principle: The capacity of an AI agent to act autonomously, and to adapt its behavior over time without human direction, calls for significant safety checks before deployment, and ongoing monitoring.

Recommendations Humans must be in control: Any autonomous system must allow for a human to interrupt an activity or shutdown the system (an "off-switch"). There may also be a need to incorporate human checks on new decision-making strategies in AI system design, especially where the risk to human life and safety is great.

Make safety a priority: Any deployment of an autonomous system should be extensively tested beforehand to ensure the AI agent's safe interaction with its environment (digital or physical) and that it functions as intended. Autonomous systems should be monitored while in operation, and updated or corrected as needed.

Privacy is key: AI systems must be data responsible. They should use only what they need and delete it when it is no longer needed ("data minimization"). They should encrypt data in transit and at rest, and restrict access to authorized persons ("access control"). AI systems should only collect, use, share and store data in accordance with privacy and personal data laws and best practices.

Think before you act: Careful thought should be given to the instructions and data provided to AI systems. AI systems should not be trained with data that is biased, inaccurate, incomplete or misleading.

If they are connected, they must be secured: AI systems that are connected to the Internet should be secured not only for their protection, but also to protect the Internet from malfunctioning or malware-infected AI systems that could become the next-generation of botnets. High standards of device, system and network security should be applied.

Acknowledgement

We would like to express our deepest appreciation **to Mohammad Salim Sir (Assistant Professor, CCSIT, TMU)** for his kind cooperation and encouragement which help us in completion of this paper.

Reference

[1]https://www.quora.com

[2] https://www.internetsociety.org/

BIG DATA IN HEALTH CARE

Bhumika Agarwal
Ritika Agrawal
Namit Gupta
BSc (H) Computer Science, TMU, Moradabad
BSc (H) Computer Science, TMU, Moradabad
Assistant Professor, TMU, MBD
bhumikaagarwal.dpr@gmail.com
Ritikaagrawal008@gmail.com
namit.k.gupta@gmail.com

Abstract— **Healthcare is one of the business fields with the highest Big Data potential. According to the prevailing definition, Big Data refers to the fact that data today is often too large and heterogeneous and changes too quickly to be stored, processed, and transformed into value by previous technologies.**

What is Big Data in Healthcare

"Big data in healthcare" refers to the abundant health data amassed from numerous sources including electronic health records (EHRs), medical imaging, genomic sequencing, payor records, pharmaceutical research, wearables, and medical devices, to name a few. Three characteristics distinguish it from traditional electronic medical and human health data used for decision-making: It is available in extraordinarily high volume; it moves at high velocity and spans the health industry's massive digital universe; and, because it derives from many sources, it is highly variable in structure and nature. This is known as the Data. With its diversity in format, type, and context, it is difficult to merge big healthcare data into conventional databases, making it enormously challenging to process, and hard for industry leaders to harness its significant promise to transform the industry.

Now that we live for a long time, treatment models have changed and many of these changes are operated by data. The doctor wants to understand as much about the patient as he can understand about a patient and the disease of his life - treatment at the initial level of any disease is far simpler and less expensive. With healthcare data analytics, prevention is better than cure and provides a comprehensive package of management insurance to take a comprehensive picture of a patient. The industry is trying to solve the problems of patient data: bits and bytes are collected everywhere and are stored in hospitals, clinics, surgeries, etc., so that communication can be done properly. Indeed, over the years, consuming a large amount of data for therapeutic use is expensive and time-consuming. With today's always better techniques, not only is this easy to assemble such data, but it is converted into relevant critical insights that can be used to

provide better care. This is the purpose of healthcare data analytics: it is too late to use data-driven search before estimating and solving a problem, but simultaneously assess method and treatment.

The Usefulness and Challenges of Big Data in Healthcare

Big data in health informatics can be used to predict outcome of diseases and epidemics, improve treatment and quality of life, and prevent premature deaths and disease development. Big data also provide information about diseases and warning signs for treatment to be administered. This will help not only to prevent co-morbidities and mortality but also assists government to save the cost of medical treatment. It is very useful not only in clinical medicine for diagnosis/detection but also in epidemiological research as the big data will provide huge amount of data. The government, non-governmental organization and/ or pharmaceutical companies can use the data to formulate policies, strategies, intervention or medical treatment such as drugs development. Big data has implications on healthcare on patients, providers, researchers, health professionals . Nowadays, there is an increasing demand for more information by the patients about their healthcare options or choices, and want participation in their health decision-making. The big data will help to provide patients with up-to-date information to assist them to make the best decision and to comply with the medical treatment. The Malaysia National Health and Morbidity Survey in 2015 has revealed that the number of obese Malaysians have risen to 17.7% compared to 4.4 % in 1996 and 17.5% of those aged 18 and above have diabetes compared to 11.6% in 2006. There is a need to capture and analyse this raw data information to provide better healthcare, accessibility, affordability and quality of healthcare from diagnosis, treatment and follow-up. In 2017, the Ministry of Health Malaysia (MoH) has launched the Malaysian Health Data Warehouse (MyHDW) to share information patient's medical records and knowledge among public, private hospitals and clinics. MyHDW aims to synchronise patients' data from public hospitals (including university hospitals, armed forces hospitals), private hospital and clinics along with National Registration Department (NRD), National Department of Statistics, and other health related agencies where it will serve as one stop centre to provide healthcare providers to make decisive decision on treatments. Most of the time, medical data are collected in silos in their respective healthcare centres and is governed and controlled by hospitals or clinics administrative departments. Should big data is successful implemented in Malaysia, it will reduce wasteful overheads and effective managed.The aim of this manuscript to highlight the usefulness and challenges of big data in healthcare worldwide generally as well as country like Malaysia.

Advantages of Big Data Big data
could reduce the recency bias or recency effect bias. Recency bias occurs when the recent events are weigh more heavily than earlier events in order to improve the situation, but it may lead to incorrect decisions. The real time information can also be incorporated into big data. Real time big data has many advantages. For example, any errors or trouble shoot in an organization can be identified immediately and the operational problem can be overcome. This will save time, cost and increase the productivity. The services also can be further improved as the real time provides the latest information on the subject matter. For instance, it will provide the complete information on the patients and at the same time able to administer medical intervention without any delay.

In healthcare, big data is also used in predictive analysis which is to identify and address the medical issues before it becoming an unmanageable problem. Healthcare professionals are able to reduce the risk and overcome the issue with the information derived from the big data.

Apart from that, big data is also able to help identify frauds in healthcare especially on insurance claims. Fraudulent, inconsistency and false claims can be flagged. This will facilitate insurance companies to prevent losses.

Big data can also benefit healthcare through data management, electronic medical records and data

analysis. The big data will help to find and identify the right population or target group. Big data consists of diverse group of population and certain group can be identified for risk assessment and screenings. The existence of big data will also allow development or modification of a program or intervention to target the health problem. It will enables clinical trials to be initiated immediately. Big data will give a clearer picture on the type of population as well as their medical problem. The pattern of the distribution or disease information will allow quick development of intervention program as well as targeting the affected group as early as possible. Data growth of pharmaceutical industries were derived from patients, caregivers, retailers and Research and Development (R&D). Big data could facilitate the pharmaceutical companies to identify new potential and effective drugs and deliver it to the users more quickly .

Issues with Big Data

There is a huge challenge in big data in terms of data protection, collection and sharing of health data and data usage. Big data analytics with the use of sophisticated technologies has the potential to transform the data repositories and make informed decisions. Issues such as privacy, security, standards and governance to be addressed. Information such as nano particulate therapy on cancer treatment could be also be incorporated in big data to provide an overview and best treatment for cancer especially when nanotechnology is important in drug delivery in cancer treatment. Apart from that adverse effects of drugs use could also be determined.

Security

Since the big data contained subject's personal information and their health history, it is important for the database to be protected from hacking, cyber theft and phishing, where the stolen data can be sold for a huge sum.Apart from the health information and personal information from the health system which can be hacked or stolen, other big data in other commercial organizations such as telecommunications companies (telcos), banks or financial institution are also vulnerable without the knowledge of the clients. Before big data can be implemented, it is necessary to ensure that the administration, privacy, security of the big data are well protected. Protection health information via transmission security, multilayer authentication, using anti-virus software, firewalls, data encryption are indeed vital. As the data becomes more regional and global, it become more complicated and have more serious impact on security, standards, language and terminology. The accessibility of the healthcare data need to be consistently reviewed and monitored.

Data Classification

Big data is a massive, less structured and heterogeneous. As such there is a need to identify and classify the data so that it can be used effectively. However, it is laborious to search for a specific data in the big data. The big data also required to be contextualized or pooled together so that it will become more relevant to specific individuals or groups.

Data Modeling

Although big data is excellent for modelling and simulation, there is a need to identify, structure and pool the proper relevant data so that it can be used to model the problems, which later can be used for intervention. Without the proper structured data, it is challenging to analyse and visualize the output and to extract specific information or data.

Cloud Storage

The cloud storage can be used to upload data or having the whole system designed in the cloud. Thus, the cloud will need to have sufficient space for the storage and sufficient speed for data upload at the same time. The storage apart involving words documentations, it should also able to store graphic type such as X ray, CT or MRI. The system should also be able to generate graphic presentations from the available data so that clinicians are able to visualize and understand quickly and take prompt decision .

Data Accommodation

One simplified big data system is require to accommodate all the data and it has to be compatible and simplified. This is to ensure that the users are able to retrieve the information without any hassle. It is a difficult task to get all the relevant systems to link to each other.

There is a culture of dissonance within individual organizations, where some parties may control the data for their own needs rather than for the organization as a whole.

Data Personnel

At this time, it is still an arduous task to find data scientists with expertise in statistics, computer science or information technology (IT). A standard protocol need to be in place for data entry so that all information entered are standardized by data entry person even though there will be changes in the data entry personnel. This is to ensure the continuity and standardized format of data entry.

Miscommunications Gap

The miscommunications or the gap between the users and data scientists is one of the biggest problems in relations to big data. The understanding of the users on data generated by data scientists' maybe low and this may affect the effective usage of big data. The health data from all clinics and hospitals need to be pooled together as stored at one-stop centre (big data). At the moment, all the information are kept separately. As such, it is difficult to get a clearer picture of the patients due to the incomplete information gathered. Thus, this waste a lot of time as the doctor will need to start all over from the beginning taking the patients history.
Since big data has the ability to predict future medical issues which is a positive thing, big data can also pose risk and undermine doctors. The patients too will rely on the technology rather consulting the healthcare practitioners.

Data Nature

The integration of data will not only involve data within the healthcare system but also external data. Although it gives potential benefits, it is also challenging in terms of privacy, security and legal matters. The healthcare data usually consists of patients who are seeking treatment in the hospitals or clinics but none on healthy individuals. With the inclusion of healthy individuals in the database, it will help to provide better understanding on the nature of the disease and intervention. As the data becomes more current, it is necessary that the information are passed to the users immediately for clinical decision making and to improve the health outcomes.

Technology Incorporation

Lack of information to support the decision making, policy planning or strategy is one of the problems in big data. The processes of redefining and in adopting of technology is slow and this can impact the healthcare, care delivery and research. Without the technology, big data is unable to generate and disseminate information. Most the time, data are fragmented and dispersed among various stakeholders such as providers, vendors, organizations and payers. The solution to this is to have all the data uploaded in one 'warehouse'.

Conclusion

Big Data has a great potential changing the healthcare outlook such as in drug discovery, patients personalization care, treatment efficiency, improvement in clinical outcomes, and patients safety management.

A Congestion Control Algorithm: To Improve Dissemination of Event Driven Message in VANET

Dr. Kirti Shukla[1] and Amit Shukla[2]
[1]CCSIT, TMU, Moradabad
[21]CCSIT, TMU, Moradabad
[1]drkirti.computers@tmu.ac.in
[2]amit_1shukla@rediffmail.com

***Abstract*— Mobile ad hoc network (MANET) is a collection of mobile computers or devices that cooperatively communicate with each other without any pre-established infrastructures such as a centralized access point. There are several issues in VANET. One of them is congestion control. In case of increase in the number of beacon messages broadcasted by many vehicles, the communication channel will easily be congested. So, to overcome this problem we have proposed an algorithm that increases the availability of communication channel for emergency messages over the beacon messages.**

Keywords: **MANET, VANET, Mobility.**

INTRODUCTION

Vehicular Ad hoc Network (VANET) is a form of mobile ad-hoc network (MANET) that provides communication among the vehicles and vehicle-to-roadside infrastructure by wireless communications. It first came into existence when it was used by the US government Department of Transportation. Indeed, because of its wide application in society that promises to revolutionize the way we drive, various car manufacturers, government agencies and standardization bodies have organized national and international consortia devoted exclusively to VANET. Examples include the Car-2-Car Communication Consortium [1], the Vehicle Safety Communications Consortium [2], and Honda's Advanced Safety Vehicle Program among others. The first thing comes into mind is to provide safety and convenience for travelers. The Intelligent Transportation System (ITS) can provide wide variety of services such as routes to improve safety and reduce transportation times and fuel consumption.There are two types of safety messages in ad hoc networks; beacon messages and emergency message. The beacon safety messages are generated after a certain period of time for the neighboring vehicles to make aware of them to the speed, location etc.These messages are preventive in nature, and its objective is to avoid the occurrence of dangerous situations. On the other hand, the emergency messages are generated if any abnormal condition may occur [3], [4].Communication delay and reliability are two stringent requirements for event-driven safety messages. The safety message will propagate from a source outwards as far as possible in order to inform as many nodes in the network as possible about the situation. As a result, such messages have the highest priority. Due to the VANET's unique characteristics, such as scalability, high robustness expectations, strict delay requirements and security issues; the design of such a technology becomes an extraordinary challenge for the wireless research community. Many congestion control algorithms in Vehicular Networks (VANETs) have been studied. However, most of congestion control algorithms are not directly applicable to uni-priority of event-driven safety messages the emergency messages must be delivered to each neighboring node without any delays. A single delayed or lost emergency message could result in loss of life. To resolve this issue we should keep in mind that the emergency message transmission takes place before the beacon messages.The uni-priority of event-driven safety messages are caused by the traffic of the same priority. So, to solve this problem many scheduling algorithm has been proposed. When every node in the network has messages to send, a good organized measure of broadcast performance is the average rate at which *any* particular node receives packets

successfully from *any* other source. We call this the *broadcast efficiency*. This can be achieved by minimizing the number of transmitted packets, but still achieving a high number of messages by all nodes in a specific geographic region. Many simulation-based works have been conducted to analyze similar performance metric. VANETs' safety applications will rely on broadcasting as the major block for localization, routing and dissemination of safety and warning messages to all vehicles in their neighborhood. Vehicles will be equipped with sensors and GPS systems to collect information about their position, speed, acceleration and direction to be broadcasted to all vehicles within their range. Upon receiving and processing this information, vehicles can detect and avoid potential dangers.

2. OBJECTIVE AND SCOPE OF WORK

Vehicular ad hoc network has received a lot of interest in a last couple of years. To ensure safe and reliable communication within VANET message priorities are evaluated according to the type of message whether it is event driven or beacon. As one of the main issues of VANET is the high demand of ITS applications for both safety and comfort purposes, it is not good to alter the performance of these applications (by reducing the transmission of power or beacon transmission rate) to prevent network congestion. To cope with this problem we have proposed an algorithm that ensures the availability of control channel for the emergency messages. Exchange of Information between vehicle to vehicle and vehicle to infrastructure plays very important role in order to decrease the message crowd and to improve the performance in terms of reliability and delay. In this we will concentrate on the feasibility of deploying the safety application by reducing the number of beacon message propagation and also simulate the result.As discussed by Vedha Vinodha.D, Mrs.V.Seethalakshmi in [5], the transmission of event-driven messages within a geographical area as in Fig. A particular vehicle produces a hazard warning message (emergency message) in case a dangerous situation is detected This emergency message should be propagated on the road as quickly and reliably as possible, in order to enable the drivers of approaching vehicles to undertake adequate

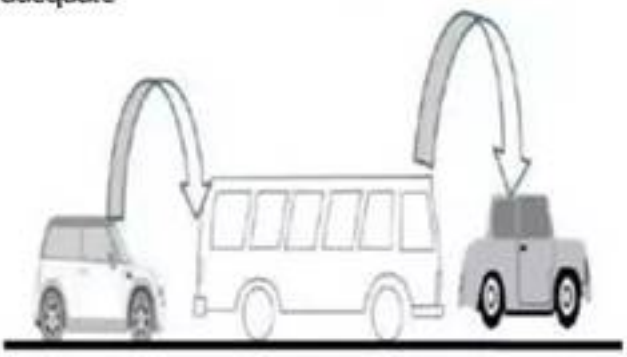


Fig. A Car to car communication

Countermeasure for safety and security of the self and the neighboring nodes.

3. LITERTURE REVIEW/RELATED WORK

Congestion control algorithm in Vehicular Networks (VANETs) has been extensively studied. However, most of congestion control algorithms are directly applicable for event-driven safety messages. The event-driven safety messages stringent requirement has on delay and reliability. If any event driven message is lost then it will result in loss of life. It's very important to keep the CCH channel free from Congestion.

In research paper [6], Bouassida, M.S., and Shawky developed a congestion control approach based on the concept of dynamic priorities-based scheduling. On the other hand, the congestion control algorithm for event-driven safety messages was developed by Zang, Y.P., Stibor, L., Cheng, X., Reumerman, H. J., Paruzel A., & Barroso, A in [7]. This congestion control approach evaluated the performance of the Safety Electronic Brake Light with Forwarding (EEBL-F). In [8], J.,Chen, H.C. proposed congestion control algorithm for DSRC based on safety applications. However, they just assumed the CCH channel is successfully reserved for event-driven applications without testing the success rate for event-driven safety messages. By Yu-Chih Wei1 and Yi-Ming Chen in [9], the idea of beacon-based trust is introduced to estimate and to verify

constantly a vehicle's position, velocity, and drive direction. In a similar study in [10], YOUSEFI Saleh, FATHY Mahmood, BENSLIMANE Abderrahim emphasized on theoretical analysis for finding the best values of design parameters such as road traffic situation, e.g., speed, density, level of danger and develop methods for setting optimum or sub-optimum values of the design parameters. Again this work is not sufficient to make the control channel free in case of safety messages.

Research by W. Zhang, A. Festag in [11] proposed smart efficient rebroadcast scheme algorithms to prevent the congestion channels problem by limiting the forwarded packets. The blindly broadcasting beacon message will cause a lot of redundancy packets and lead the broadcast storm problem. The purpose of this algorithm is to ensure the delivery of higher priority message before the less priority message. According to [12], Robert Lasowski and Claudia Linnhoff-Popien consider beaconing as a service (BaaS).For this they propose two approaches service-oriented beaconing strategies, Beacon Forwarding Service (BFS) and Beacon Rate Control Service (BRCS), which are based on the following design principles:

• Vehicles send beacons with a minimum interval of 2 Hz and 500 ms lifetime.

• Every vehicle can request a beacon update from its neighbors. Hereby, the requestor is specified as a service user (SU) that triggers a service at the service provider (SP) by sending a service request message (SREQ).

• The behavior of SP and the particular service characteristics can be influenced by an SU specifying appropriate service attributes within the SREQ message.

• Single-hop propagation is basically used. However, a requested beacon is forwarded using one additional hop.

• A dual radio concept is mainly applied.

These are the specific conditions or assumptions at which beaconing can be considered as service.

The challenges for the existing research are that any congestion control algorithm is not able to control the beacon message. Above research only discusses how we can check the worthiness of the nodes that are transmitting the beacon message at very high rate or how we can compensate beaconing as a service. This research includes the detection of type of message (beacon or event driven) and after detection how we can control the situation.

4. METHODOLOGY USED

The event-drive detection method monitors the event-driven safety message and decides to start the congestion control algorithm whenever event-driven safety message is detected or generated. The congestion control algorithm will launch immediately the queue freezing method for all MAC transmission queues except for the event-driven safety message. In order to send event-driven safety massage timely, we have to control the transmission of beacon message. The event-driven detection method has been used in the existing congestion control algorithm by Zang, Y.P., Stibor in [13].

With the help of research [14] by Mohamad Yusof Darus , our proposed scheme has three phases:

a. Congestion Detection
i. Emergency Detection
ii. Beacon Detection
b. Scheduling
c. Rebroadcasting Scheme

```
/* Congestion Control */
If ((event-driven safety message is locally generated)
or (event-driven messages is globally detected))
{
Block all MAC queues except for the event-driven
Safety messages
}
Else {
If (Queue length for beacon message> Threshold)
{
Discard CCH channel for beacon messages
}
Else {
If (no. of event-driven messages detected >1) {
Block all MAC queues except for the event driven
Safety messages queues based on PRIORITY based
Scheduling
}
```

}
}

Working of the proposed algorithm has been described with the help of flowchart given below as in [15].

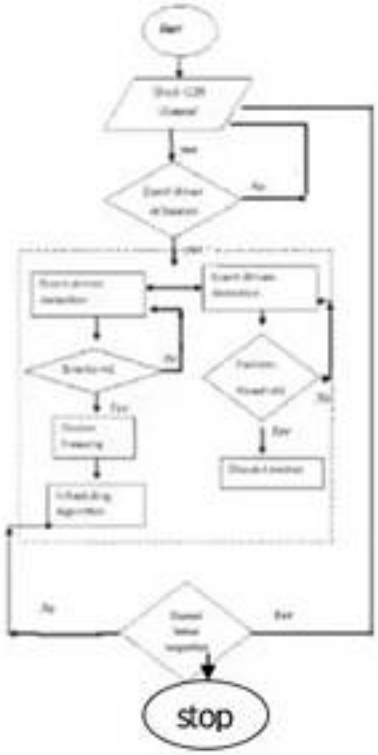


Figure1: Flowchart steps of the proposed congestion control algorithm

4.1 Congestion Detection: The purpose of the congestion detection is to monitor
Communication channel and detect congestion. We will apply emergency detection method and develop a new measurement-based detection method in proposed congestion control. The emergency detection method will block lower priority packets if the node detects emergency message. While the measurement-based detection method monitor the communication channel and detect communication channel for congestion. The communication channel is congested if the packet queues of beacon messages exceed the defined threshold, and the congestion control will discard further beacon messages. In dense network, we assumed the high number of beacon messages generated by vehicles.

4.2 Scheduling: In VANET, the packets with same priority are scheduled with FIFO approach. But FIFO technique is not suitable for all VANETS. So for this purpose fully distributed congestion (FDC) control algorithm is used. This algorithm set different priorities for each VANET application. The priorities depend on how crucial this information is for vehicle safety. The highest priority is given to emergency message, such as road accident or malfunctioning of brakes.

4.3 Rebroadcasting Scheme: In VANETs, its shared wireless medium, blindly broadcasting of packets may lead to frequent contention and collisions in transmission among neighbouring nodes.

5. EXPECTED OUTCOME

In this Paper, we have tried to expose the strong and weak points of some of the existing congestion control algorithms in VANETs. Our proposed algorithm will control the message crowd and make the communication channel available to the warning messages .It will definitely improve the efficiency of the communication channel as well as it ensures the timely delivery of the event driven messages in VANET environment. In future work, we are also planning to verify and evaluate performance of our proposed congestion control algorithms using network simulator.

REFERENCES

[1]. Car 2 Car Communication Consortium, http://www.car-to-car.org/.
[2]. US Department of Transportation, National Highway Traffic Safety Administration, "Vehicle safety communications consortium," http://www-nrd.nhtsa.dot.gov/pdf/nrd-12/CAMP3/pages/VSCC.htm

[3] M. Khabazian, and M.K. Ali, "A Performance Modeling of Connectivity in Vehicular Ad Hoc Networks", IEEE Transactions On Vehicular Technology, vol. 57, no. 4, pp. 2440 – 2450, July 2008.

[4] M. Li, W. Lou, et al., "OppCast: Opportunistic Broadcast of Warning Messages in VANETs with Unreliable Links," Proc. of 6th International Conference on Mobile Ad-hoc and Sensor Systems,Macau, pp. 534-543, 2009

[5] Vedha Vinodha.D, Mrs.V.Seethalakshmi"Analusis of safety measures and quality routing in vanets" In International Journal of Modern Engineering Research (IJMER) www.ijmer.com Vol.2, Issue.2, Mar-Apr 2012 pp-062-066 ISSN: 2249-6645

[6] Bouassida, M.S., and Shawky, M. (2008). "On The Congestion Control Within Vanet".1stIFIP Wireless Days. pp. 1-5.

[7] Zang, Y.P., Stibor, L., Cheng, X., Reumerman, H. J., Paruzel A., & Barroso, A. (2007)."Congestion Control in Wireless Networks for Vehicular Safety Applications". In Proc. Of The 8th European Wireless Conference.

[8] He, J., Chen, H.C. et al. (2010). Adaptive Congestion Control for DSRC VehicleNetworks, IEEE Communications Letters, Vol. 14, No. 2.

[9] Yu-Chih Wei12 and Yi-Ming Chen2"Efficient Self-Organized Trust Management in Location Privacy Enhanced VANETs"

[10] YOUSEFI Saleh, FATHY Mahmood, BENSLIMANE Abderrahim"Performance of beacon safety message dissemination inVehicular Ad hoc NETworks (VANETs)" Journal of Zhejiang University SCIENCE A 2007 8(12).

[11] W. Zhang, A. Festag, et al. "Congestion Control for Safety Messages in VANETs: Concepts and Framework", In Proceeding 8th Conference on ITS Telecommunications (ITST), Thailand, 2008, pp. 199-203

[12] Robert Lasowski and Claudia Linnhoff-Popien, University of Munich "Beaconing as a Service: A Novel Service-Oriented Beaconing Strategy for Vehicular Ad Hoc Networks" IEEE Communications Magazine October 2012

[13] Zang, Y.P., Stibor, L., Cheng, X., Reumerman, H. J., Paruzel A., & Barroso, A., Congestion Control in Wireless Networks for Vehicular Safety Applications.

[14] Mohamad Yusof Darus , Kamalrulnizam Abu Bakar. "Congestion Control Framework for Emergency Messages in VANETs" International Journal of Research and Reviews in Computer Science (IJRRCS)Vol. 2, No. 3, June 2011.

[15] Kirti Shukla , Dr. C.K.Jha " An algorithm to Ensure the Availability of Communication Channel for Event Driven Messages in VANET" International Journal of Computer (0975 – 8887) Volume 151 – No.9, October 2016

AINA: MODERN APPROACH FOR REALTIME TRAFFIC CONTROAL

1st Naman Gupta
College Of Computing Sciences & IT
Teerthanker Mahaveer University
Moradabad, India
ngstudies.tk@gmail.com

2nd Gagan Gupta
SRM Institute of Science & Technology
SRM University
Chennai, India
guptagagann@gmail.com

3rd Zamin Ahmed
College Of Computing Sciences & IT
Teerthanker Mahaveer University
Moradabad, India
ansarizamin.78699@gmail.com

4th Chhavi Vishnoi
College Of Computing Sciences & IT
Teerthanker Mahaveer University
Moradabad, India
vishnoichhavi@gmail.com

4th Dr. Danish Ather
College Of Computing Sciences & IT
Teerthanker Mahaveer University
Moradabad, India
danishather@gmail.com

***Abstract*—Proposed system in the document represents an AI which is capable of detecting the real time traffic according to the density of the vehicles present on the road with the help of real time video captured and image processing techniques.**

Keywords— **Image Processing, Jamming, Compactness.**

I. INTRODUCTION

The rapid increment in population hence, leading growth in the usage of vehicles, therefore traffic increment in different ways. The increasing crowd on the roads is the main cause of slower speed, longer waiting time, accidents and irritation. So to overcome the same issue, we are proposing a newly modern approach for the real time traffic control which will be able to detect the real time traffic based on the crowd of vehicles in all the lanes with the help of camera and image processing system and at the same time AI will select which side traffic should be clear first and the traffic lights will be controlled accordingly. The major cause which is identified by us in traffic system is crowd of vehicles and this necessitates to be observed intimately to make sure the development of transportation is carried out efficiently.

II. EASE OF USE

In accumulation to that, traffic jamming has been associated with more holds in work, delay in go, and may cause violation in traffic rules. The custom Traffic signals or traffic lights are situate at fixed timing and are not capable to distinguish traffic compactness on roads. With the improvement of this machinery tools, the systems can be turned brilliance and more clever. The potential of isolated scheming and monitoring is not a complex task as compare to a few years back. With today's faster internet trends and

technologies complex systems are developed to hand on data at high speed. This communiqué has worked as vertebrae for some amazing technical improvement which was unrestricted in the market.This research allow individual one of the probable solution to conquer such difficulty of traffic jamming, by utilization of Arduino, Raspberry PI, with Image processing potential.

Figure 1 TRAFFIC JAMS ON SIGNALS

III. ALREDY PROPOSED METHOD

Loads of study tries to discover solutions for transportation and traffic administration using special approaches by means of sensors, artificial intelligence mechanisms, wireless sensor networks and digital image processing techniques.

i. In an arrangement of Infrared sensors managed to reckon the amount of vehicles on every lane of the side road and documentation the data on the cloud with Bluetooth association, traffic thickness in order is feed to cluster algorithms which were based on KNN algorithm.

ii. An additional plan intended for IoT based Traffic Signal Arrangement by means of ultrasonic sensors has been done. in which ultrasonic sensors were deployed at each 50 meter of street to imprison the traffic thickness and converse to Arduino to manage the traffic lights as a result, thickness data is transmit using Wi-Fi toward Raspberry Pi wherever examination through on a serious overcrowding and not as much of traffic with date and time and the same communicate to the web page of cloud that can be view by the Traffic police establishment for supplementary breakdown. This method require a enormous amount of sensors spread intimately which is not a possible resolution and organization of such figure of sensors is not fairly uncomplicated in addition by means of ultrasonic sensors, which compute the distance primarily, for detecting substance is a devastate of assets.

IV. DESIGN OF THE PROPOSED APPROACH

The planned approach hub is to supervise traffic compactness from side to side camera grabbing imagery in concurrent, after that comparing it by means of the reference image. The information is communicates to the server and can be remotely monitored and controlled. In accumulation to that for disaster circumstances we comprise a RF spreader in the ambulance and recipient in the traffic signal. We will execute this method for traffic calculating in a 4 traffic lane crossroads. This organism also considers walker trying to cross the road throughout green indication it will turn on an alarm and caution the walker and traffic police about the same.

This method is too efficient by means of the thought so as to, at what time a vehicle annoying to travel constant throughout red sign it resolve

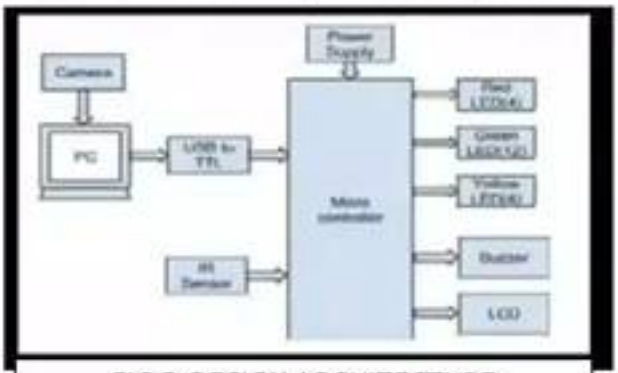


FIG 2: DESIGN ARCHITECTURE

turn on an alarm to warn the driver of the vehicle and the traffic.

Design Architecture:

The plan of the method is shown in Fig2. The planned system consists of 3 efficient entities, the server, IoT protocol M2X, and Traffic Control Monitoring Embedded method that is accountable for receiving and collecting traffic compactness. At first, the picture is taken by the camera of the traffic crossroads while it is open (Traffic compactness identical to zero) which form the orientation picture shown in Fig 3.

The camera incessantly shoots the traffic crossroads and gathers real-time picture as given away in Fig.4. By digital image processing methods, Raspberry Pi Microcontroller computes the dissimilarity surround by evaluating the real-time pictures with the orientation image given away in Fig.5. Since color in sequence is not significant in the procedure of formative the compactness of traffic, it is favorable to adapt the diverse frame of the imagery to grayscale as given away in fig 6. The grayscale picture after that converted to color black and white binary image demonstrated in figure 7.

FIG.3: REFERENCE IMAGE

If the two images are the similar, the outcome of the dissimilarity will be zero in addition to the whole dissimilarity frame will emerge black, so we can be acquainted with that the node is not containing any vehicles. If there are vehicles in the pasture of apparition of the camera, the dissimilarity frame will consequence in black and white where the black pixels stand for a like parts among the two images and the white pixels pass on to the diverse fraction ensuing as of the occurrence of vehicles. By measure up to the amount of black and white pixels in the dissimilarity frame, traffic compactness could be obtained. In the casing of the majority of the pixels in black, it

FIG.4: REAL TIME IMAGE

revenue that the parallel fraction among the two images bigger than the dissimilar parts and as a result node is typically free of vehicles and traffic compactness is low down in the reverse case as the majority of the pixels in the white which means and that the dissimilar parts resultant from The occurrence of vehicles in the field of apparition of the camera is bigger and so the traffic is far above the ground and the additional the white area in the panel, the bigger traffic compactness.

FIG.6: GRAY SCALE IMAGE

Compactness in sequence is uploading to IoT cloud Platform M2x (Server) by means of a Wi-Fi correlation, this in sequence is available by desktop application intended to observe and manage the traffic signals by the reliable of the procedure. Control instructions are sent to the cloud platform from side to side the desktop gui platforms to be composed by the entrenched system and associated via raspberry pi microcontroller to the manage the component consists of a instance relay that controls traffic light times.

A. IMPLEMENTATION AND SIMULATIONS:

The system is executed with coding for accomplishment of the design:
1) Initialization and Setup of the Raspberry PI 3 with the proper wifi and hotspot devices.
2) For connection of the traffic lights with the Raspberry PI GPIO code.
3) Building a GUI based user platform in Java for communiqué to Raspberry PI to activate the Traffic Signals distantly.
4) M2X Server setup.

The subsequent stepladder will make clear the replication ladder:

- Java UI platform application is urbanized to manage information statics in Server.
- Image processing imitation in Matlab to make sure the traffic compactness
- Managing the GPIO Pin for raspberry pi.
- Take into custody the concurrent picture by means of Raspberry Pi 3.
- Dispensation the concurrent image to compute the traffic compactness.
- Distributions of data from Raspberry pi 3 to server, to attain management by means of the server.

ACKNOWLEDGMENT

The above given metod is totally focused on surmount of Traffic congestion situations experience by some real time users or drivers.

The method would first and foremost focus on the picture imprison clicked by means of camera. The imprison image clicked would be cross-checked with a predetermined image weighed down in the server to recognize the compactness. Depending on the compactness, the traffic arrangements are the activated for the intersection. This decreases on the whole waiting time and consequences in smoother traffic. The method would function mechanically based on the compilation of compactness imagery send as of the location to the server. Prospective suggestion: A lot of improvements on the method are predict with more updation that might be modified for a variety of applications where distant supervision and calculating is necessary. The method can have

additional incorporation like occurrence of incident detection and breakdown announcement etc.

REFERENCES

[1] Dr.Brenner, "Consultant for Intelligent Transportation System Studies", Muscat, 2015.

[2] Dynamical model of traffic congestion and numerical simulation M. Bando, K. Hasebe, A.

[3] Nakayama, A. Shibata, and Y. Sugiyama Phys. Rev. E 51, 1035 – Published 1 February 1995.

[4] The Economics of Traffic Congestion Richard Arnott and Kenneth SmallAmerican Scientist

[5] Review of road traffic control strategies M. Papageorgiou ; C. Diakaki ; V. Dinopoulou ; A. Kotsialos ; Yibing Wang

[6] Estimating Road Traffic Congestion using Vehicle Velocity W. Pattara-atikom ; P. Pongpaibool ; S. Thajchayapong

AN ANALYSIS OF HARD CLASSIFICATION AND SOFT CLASSIFICATION APPROACHES IN REMOTE SENSING DATA

Mohan Vishal Gupta[1], Abeer Masroor[2] , Vandana khanna[3]
[1]Assistant Professor,FOECS, TMU, Moradabad
[2]BCA4[th]sem,FOECS, TMU,Moradabad
[3]BCA4[th]sem,FOECS, TMU,Moradabad
[1]mohan.vishal01@gmail.com
[2]07abeerkhan@gmail.com
[3]Vandnakhanna1010@gmail.com

***Abstract*—In the process of designing real word applications, Hard classification and Soft classification approaches are now becoming prominent techniques. The information regarding thematic maps can be easily extracted with the reinforcement of appropriate algorithm for image classification. Pure and mixed pixels constitute remote sensing images. In digital image analysis, a pixel is generally considered as a unit association to a single land cover class. Nonetheless, due to limited resolution, pixels often represent ground areas which comprises of two or more different land cover classes. Because of this reason, it has been recommended that fuzziness should be domicile in the classification procedure so that pixels may have multiple or partial class membership. In this scenario, a measure of the strength of membership for each class is output by the classifier, resulting in a soft classification technique. This paper bull's eye on hard and soft classification approaches in Remote Sensing Data.**

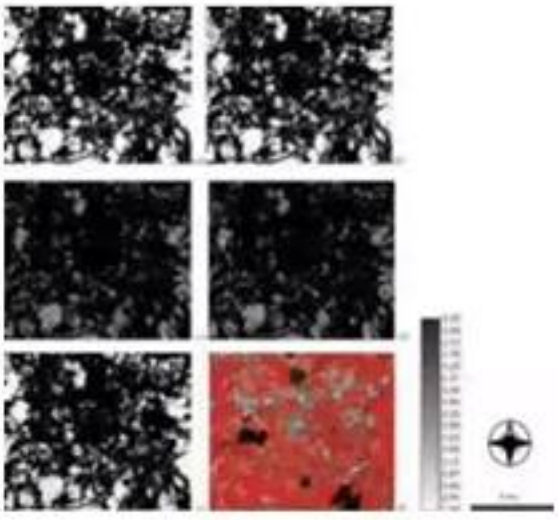
***Keywords*—Remote Sensing, Hard classification approaches, Soft classification approaches, bull's eye, fuzzy means.**

INTRODUCTION

Remote sensing fraternity has used digital image classification for many applications, such as resource utilization, environmental impact analysis and other socio-economic applications. Remote Sensing(RS)can be defined as the science of classification of earth layer characteristics and inference of their graphical and physical properties using electromagnetic mission as a standard of communication. Classification of remotely sensed data into the maticmaps remains a challenge due to many factors, such as, selection of sensed data, features types present ,image processing and classification approaches. The term classification is defined by Chambers Twentieth Century Dictionary as the "act of forming into a class as per a rank or order of person or things".

In Remote Sensing, basically two Classification methods are used-

1. **Soft Classification-**
   Soft classification provides more information and potentially more accurate result, especially for coarse spatial resolution.



Fig(1) Soft Classification mapping

2. **Hard Classification-**
   It make a definitive decision about the l and cover class that each pixel is allocated to a single class

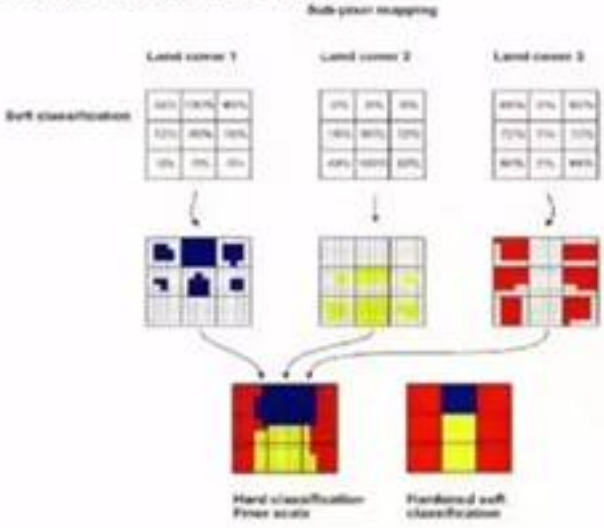
Fig (2) Hard classification mapping

3- General Review-

In hard classification, class is assigned to pixel is crisp i.e. pixel belongs to one of the class from all classes. The classified pixel is either completely belongs to a class or not [4]. This is called hard classification (Ghosh, 2013). Although in real world the pixel has some spatial resolution and can cover a mixture of two or more class features on ground. The pure pixels are rare. Most likely, boundaries of classes have the mix pixel. Therefore the soft classification approach was developed [5][4]. Soft classification is used to produce class proportions within a pixel ill order to increase the classification accuracy [2][4] and to produce meaningful and appropriate land cover composition [8][28] .One of the most popular fuzzy clustering [15] methods are the fuzzy c- means (FCM) [5] which is an unsupervised classifier that in an iterative process assigns class membership values to pixels of an image by minimizing an objective function. Although, a few studies on the use of FCM have been reported, the major limitations of FCM are the probabilistic sum to one constraint. Therefore, besides using this classifier, another fuzzy set clustering method, namely possibilistic c- means (PCM) (Krishnaparam and Keller, 1993,1996), which relaxes this constraint so as to be robust to the noise (i.e. Pixels with a high degree of class mixtures) present in the dataset, has also been implemented[4].Remote sensing images contain a mixture of pure and mixed pixels. In digital image classification, a pixel is frequently considered as a unit belonging to a single land cover class.

Types of Classification Techniques with their classifiers-

1 Hard classification Approaches- Recent advances in supervised image classification have shown that conventional „hard" classification techniques, which allocate each pixel to a specific class, are often inappropriate for applications where mixed pixels are abundant in the image (Foody et al. 1996). . The conventional hard classification methods, which assume that the pixels are pure, force the mixed pixels to be allocated to one and only one class. This may result into a loss of pertinent information present in a pixel. Mixed pixels may thus be treated as error, noise or uncertainty in class allocation for hard classification methods. The conventional use of hard classification methods that allocate one class to a pixel may tend to over- and under estimate the actual aerial extends of the classes on ground and thus may provide erroneous results (Foody,
2002). Different statistical algorithms in past have been used for allocating mixed pixels.
Hard Classification techniques can be further classified into two main types :-
1. Maximum Like Hood Classifier-
2. K-Mean Classifier
3. Minimum Distance-to-mean Classifier Mixed pixels are assigned to the class with the highest proportion of coverage to yield a hard classification. Due to which a considerable amount of information is lost (11).To overcome this loss, soft classification was introduced.



Fig(3)-pixel diagram of hard classification approaches

Hard classifiers-

Hard classifiers make a definitive decision about the land cover class that each pixel is allocated to a single class. maximum likelihood, minimum distance, artificial neural network, decision tree, and support vector machine are basically hard classifiers. Basically hard classification techniques are of two types-

1. Linear mixture modeling
2. Fuzzy classification

II.SOFTCLASSIFICATION APPROACHES

The extraction of land cover from remote sensing Images [22],[23]has traditionally been viewed as a classification problem where each pixel in the image is allocated to one of the possible classes. So remotely sensed data of the earth may be analysed sensing has thus be come an important data source for providing effective land use land cover information particular at regional to global scales. Digital image classification is usually performed to retrieve this information using arrange of statistical pattern recognition or classification technique (supervised and unsupervised) such as maximum like hood classifier, k- mean classifier, the minimum Distance to mean classifier etc. There classifiers allocate each pixel of the remote sensing image to a single land use land cover class.

Artificial Neural Network:

Until recently, supervised classification of space-borne remotely sensed data has been achieved traditionally with Maximum Likelihood(ML)approach.

2) FCM Fuzzy c- Mean(PCM) Clustering FCM- is FCM is a method of clustering which allows one piece data to be long to two or more clusters that may be employed to partition pixels of remote sensing images into different class membership values [1][40].The objective function FCM is

$$J_m(U,V)=\sum_{i=1}^{n}\sum_{j=1}^{c}(\mu_{ij})^m \| x_i - v_j \|_A^2$$

[9][10]

(1)

Subject to constraints

Where xi is the vector denoting spectral response I (i.e. a vector of spectral response of a pixel), V is the collection of vector of cluster centers, and vj, μij are class membership values of a pixel(members of fuzzy c-partition matrix),c and n are number of cluster and pixels respectively, m is a weighting exponent($1<m<\infty$) ,$\|x_i - b_j\|^2_A$,thesquared distance (dij) between xi and vj , and is given by,

$$d_{ij}^2 = \| x_i - v_j \|_A^2 = (x_i - v_j)^T A (x_i - v_j)$$ [9][13] (3)

3) **Possibilities C-Mean(PCM) Clustering-**

The formulation of PCM is based on a modified FCM objective function, whereby an additional term called is regularizing also included. PCM is also an iterative process where the class membership values are obtained by minimizing the generalized least- square error objective

function [5][40], given by,

$$\sum_{i=1}^{n} \mu_{ij} > 0 \text{ for all j}$$

$$0 \le \mu_{ij} \le 1 \quad \text{For all i,j} \qquad [7][9]$$

where ηj is the suitable positive number..

and, η j depends on the shape and the average size of the cluster j and its value may be computed as;

$$\eta = K \frac{\sum_{i=1}^{N} \mu_{ij}^{m} d_{ij}^{2}}{\sum_{i=1}^{N} \mu_{ij}^{m}} \qquad [7][9]$$

Where K is a constant and is generally kept as 1. The class memberships, μ_{ij} are

$$\mu_{ij} = \frac{1}{1 + \left(\frac{d_{ij}^{2}}{\eta_j} \right)^{\frac{1}{(m-1)}}} \qquad [5][13]$$

IV. DISCUSSION AND CONCLUSION

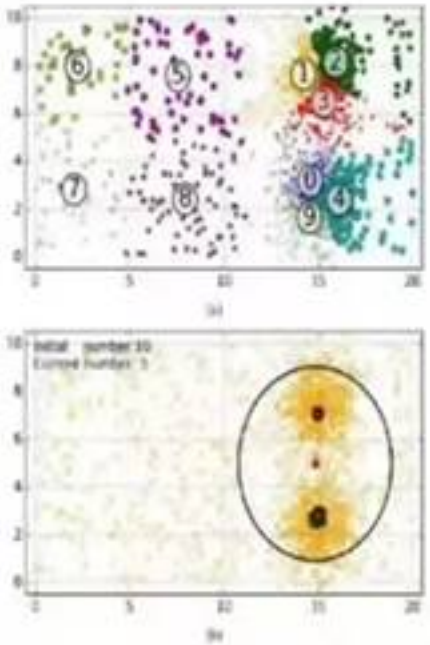
The expected outcomes from this research work would be as follows:
In this paper is focused on soft classification approaches and uncertainty problem for classification and introduce a new entropy(without reference) based criterion.

REFERENCE

[1] Yannis, S. A., and Stefanos, D. K.: Fuzzy Image Classification Using Multi-resolution Neural with Applications to Remote Sensing. In: Electrical Engineering Department, National Technical University of Athens,Zographou15773, Greece, (1999).

[2] LARK R. M., and BOLAM H. C Uncertainty in Prediction of Spatially Variable Data on Soils, Geoderma, vol.77, pp.263- 282,(1997).

[3] Ranjana Sharma , and R.K Dwivedi A Review of Soft Classification Approaches on Satellite Image & Accuracy Assessment In Proceeding of Fifth International Conference on Soft Computing for Problem Solving. Vol 437 of the series Advances in intelligent System and Computing pp 629-639,(2015)



[4] ADAMS, J.B., SMITH, M.O. and GILLESPIE, A.R.: Imaging Spectroscopy: Interpretation based On Spectral Mixture Analysis. In: C.M. Pieters and P..A.J. Englert (Eds), Remote Geochemical Analysis: Elemental and miner a logical composition, pp. 145–166 (1993)

[5] Kumar, A., Ghosh, S. K., and Dadhwal V. K.:A Comparison of The Performance of Fuzzy Algorithm Versus Statistical Algorithm Based Sub-Pixel Classifier for Remote Sensing Data. In: Proceedings of mid-term symposium ISPRS,ITC-The Netherlands. ,(2006)

[6] Bezdek, J. C.: Pattern Recognition with Fuzzy Objective Function Algorithms. In: Plenum, New York, USA, (1981)

[7] Mertens K. C., Verbeke L. P. C., Ducheyne E. I. and Wulf R. R. De.: Using Genetic Algorithms in Sub-Pixel Mapping. In: International Journal Remote Sensing, Vol. 24,no. 21,pp.4241–4247,(2003)

[8] Shalan, M. A., Arora M. K,Ghosh S. K.: An Evaluation of Fuzzy Classification from IRS IC LISS III Data. In: International Journal of Remote

Sensing In: vol. 23,pp. 3179-3186,(2003)

[9] 10.PAL, M. and MATHER, P.M.: An Assessment Of The Effectiveness Of Decision Tree Methods For Land Cover Classification.
In: Remote Sensing of Environment, vol.86, pp.554–565,(2003)

[10]A Review of Soft Classification
Approaches on Satellite Image and Accuracy Assessment
https://link.springer.com/chapter/10.1007/98-981-10-0451-3_56

[11]Alpine P., Atkinson P. M.: Sub-Pixel Land Cover Mapping For Per-Field Classification. In: International Journal Remote Sensing

PEER – PEER MESSAGE AUTHENTICATION WITH DIGITAL SIGNATURE IN MOBILE ADHOC NETWORK

MOHD SALMAN (Senior Faculty) Salmank64@gmail.com,
MOHD KHUBEB KHAN Student B.Tech (CTIS) khubeb626@gmail.com,
I-Nurture TMU Moradabad

Abstract– **The Main Objectives of this research are, We are Developing a Digital Signature System in which a sender send a packet with digital sign to multiple users, the receiver verify the signature. Multicast Authentication based on Batch Signature [MABS] utilizes an efficient asymmetric cryptographic primitive called batch signature which supports the authentication of any number of packets simultaneously with one signature verification, to address the efficiency and packet loss problems in general environments. The enhanced scheme combines MABS with packet filtering to alleviate the DoS impact in hostile environments. MABS provides data integrity, origin authentication and non-repudiation as previous asymmetric key based protocols. MABS can achieve perfect resilience to packet loss in lossy channels in the sense that no matter how many packets are lost the already-received packets can still be authenticated by receivers.**

KEYWORDS– mobile ad hoc networks, wireless networks, transport protocols, performance evaluation, explicit feedback, TCP

INTRODUCTION

Following the widespread use of the Internet, especially the World Wide Web since 1995, MOBILE ADHOC networking has become a buzz word at the beginning of the new millennium. New terms such as MOBILE ADHOC communications, MOBILE ADHOC local area networks (WLANs), MOBILE ADHOC web, MOBILE ADHOC application protocols (WAP), MOBILE ADHOC transactions, MOBILE ADHOC multimedia applications, etc. have emerged and become common vocabulary for computer and information professionals. Among the emerging MOBILE ADHOC technologies, WLANs have gained much popularity in various sectors, including business offices, government buildings, schools, and residential homes. The set of IEEE 802.11 protocols (especially 11a, 11b, and 11g), nicknamed wi-fi, have become the standard protocols for WLANs since late 1990s. A digital signature is a mathematical scheme for demonstrating the authenticity of a digital message or document. A valid digital signature gives a recipient reason to believe that the message was created by a known sender, such that the sender cannot deny having sent the message (authentication and non-repudiation) and that the message was not altered in transit (integrity). Digital signatures are commonly used for software distribution, financial transactions, and in other cases where it is important to detect forgery or tampering.

II RELATED WORK

As we have stated that, MABS can achieve perfect resilience to packet loss in lossy channels in the sense that no matter how many packets are lost the already-received packets can still be authenticated by

receivers. In Symmetric Key Secure data transmission coding schemes (such as the Data Encryption Standard) which use only one digital key in both encoding and decoding a message. In contrast, asymmetric key cryptography schemes (such as the Pretty Good Privacy) use two different digital keys, one for coding and the other for decoding. Multicast Authentication based on Batch Signature utilizes an efficient asymmetric cryptographic primitive called batch signature which supports the authentication of any number of packets simultaneously with one signature verification, to address the efficiency and packet loss problems in general environments. MABS provides data integrity, origin authentication and nonrepudiation as previous asymmetric key based protocols. Public key is a value provided by some designated authority as an encryptionkey that, combined with a private key derived from the public key, can be used to effectively encrypt messages and digital signatures. In Private key is an encryption/decryption key known only to the party or parties that exchange secret messages. In traditional secret key cryptography, a key would be shared by the communicators so that each could encrypt and decrypt messages. Basically, multicast authentication may provide the following security services: Data integrity: Each receiver should be able to assure that received packets have not been modified during transmissions.Data origin authentication: Each receiver should be able to assure that each received packet comes from the real sender as it claims. Nonrepudiation: The sender of a packet should not be able to deny sending the packet to receivers in case there is a dispute between the sender and receivers. All the three services can be supported by an asymmetric key technique called signature. In an ideal case, the sender generates a signature for each packet with its private key, which is called signing, and each receiver checks the validity of the signature with the sender's public key, which is called verifying. If the verification succeeds, the receiver knows the packet is authentic.

RSA SIGNATURE

RSA is based on the simple arithmetical fact that it is relatively easy to multiply two large prime numbers but extremely difficult to work backward from the product to find those prime numbers. This technique allows the unique public encryption key (the product of prime numbers) to be disclosed to any one but which can be decoded only with the secretprivate key (the prime numbers). RSA is the standard encryption method for important data, especially data that's transmitted over the Internet. The RSA signature scheme consists of four phases: Phase 1: This is only for how to generate a key before transfer the packets. To it, the sender has to choose any numeric value which should belongs to any group of the public key. So any sender has to collect the key of private from a group of the public key. Phase 2: In this phase, we want to provide some signature to every packet before it has to send. To accelerate the authentication of multiple signatures, the batch verification can be used. Given N packets, the sender want to give a private key to verify the batch (Packet) in the receiver side. Phase 3: The received batch will be verified here. Before the batch verification, the receiver must ensure all the

messages are distinct. To avoid the attacking on the sender's data, this is easy to implement because sequence numbers are widely used in many network protocols and can ensure all the messages are distinct and the data will be verified it has any data loss then it has to go for next step of process. Phase 4: In this phase, the receiver would like to check the received data has a perfect authorization or not. If this has the proper authentication, all the batches are removed the signature and merge the data together to view to the receiver.

COMPARISON OF MABS-B AND MABS-E

Basic scheme: MABS-B The basic scheme MABS B targets at the packet loss problem, which is inherent in the internet and MOBILE ADHOC networks. It has perfect resilience to packet loss no matter whether it is random loss or burst loss. In some circumstances, however, an attacker can inject forged packets into a batch of packets to disrupt the batch signature verification, leading to Dos. A naive approach to defeat the Dos attack is to divide the batch into multiple smaller batches and perform batch verification over each smaller batch and this divide and conquer approach can be recursively carried out for each smaller batch which means more signature verifications at each receiver. In worst case the attacker can inject forged packets at very high frequency and expect that each receiver stops the batch operation and recovers the per packet signature verification which may not be viable at resource constrained receiver devices. Enhanced scheme: MABS-E The Enhanced scheme MABS-E, which combines the basic schemeMABS-B and packet filtering mechanism to tolerate packet injection in particular, the sender attaches each packet with a mark which is unique to the packet and cannot be spoofed. At each receiver, the multicast stream is classified into disjoint sets based on marks. Each set of packets comes from either the real sender or the attacker. The mark design ensures the packet from the real sender never falls into any set of packets from the attacker. Next each receiver only needs to perform Batch verify over each set. If the result is TRUE, the set of packets is authentic. If not, the set of packets is from the attacker, and the receiver simply drops them and doesn't need to divide the set into smaller subsets for further batch verification. Therefore, a strong resilience to Dos due to injected packets can be provided. 4.1 Existing System Authentication is one of the critical topics in securing multicast in an environment attractive to malicious attacks. An overloaded router drops buffered packets according to its preset control policy. TCP provides a certain retransmission capability; multicast content is mainly transmitted over UDP, which does not provide any loss recovery support. The instability of MOBILE ADHOC channel can cause packet loss very frequently. The smaller data rate of MOBILE ADHOC channel increases the congestion possibility. This is not desirable for applications like real time online streaming or stock quotes delivering. End users of online streaming will start to complain if they experience constant service interruptions due to packet loss, and missing critical stock quotes can cause severe capital loss of service subscribers. Therefore for applications the quality of service is critical to end users.

EXISTING SYSTEM

The proposed system overcomes the above mentioned drawbacks. Multicast Authentication based on Batch Signature [MABS] utilizes an efficient asymmetric cryptographic primitive called batch signature which supports the authentication of any number of packets simultaneously with one signature verification, to address the efficiency and packet loss problems in general environments. The enhanced scheme combines MABS with packet filtering to alleviate the DoS impact in hostile environments. MABS provides data integrity, origin authentication and nonrepudiation as previous asymmetric key based protocols. MABS can achieve perfect resilience to packet loss in lossy channels in the sense that no matter how many packets are lost the already-received packets can still be authenticated by receivers.

III PROPOSED ALGO

Consider a set of users U with each user u having a signing public key-private key pair (PKu, SKu). To aggregate signatures on a subset of users in U, each user in that subset produces a signature σu on any message Mu. These signatures are aggregated by an aggregating party into a single signature σ, which is the same length as a single signature σu. The aggregating party has access to all the public keys, the messages, and signatures on those message, but it does not have access to any private keys. For the verifier, given a signature σ and the identities of the users who had signatures in the message, the verifier can be convinced that those users signed the message.Since the final aggregate signature is the same as the length of a single signature, we will present an aggregate signature scheme based on BLS signatures [3] described in Section 3.1. It is important to note that this scheme can produce short signatures if specific elliptic curves are used, and a summary of this adaptation on elliptic curves to produce short signatures is also presented above. The aggregation scheme has five algorithms: Key Generation, Signing, Verification, Aggregation, and Aggregate verification. All the parameters are the same as that described in the co-GDH signature scheme above. In fact, the key generation, signing, and verification are exactly the same as the scheme above. We will state them again below for completeness, and then we will provide two additional algorithms that allow us to aggregate signatures and verify these aggregate signatures.

Key Generation

Pick random $x \; R \leftarrow Zp$, and compute $v \leftarrow g \; x \; 2$. The public key is $v \in G2$. The secret key is $x \in Zp$.

Signing- Given a secret key x and a message $M \in \{0, 1\} *$, compute $h \leftarrow (Hash)H(M)$, where $h \in G1$, and $\sigma \leftarrow h \; x$. The signature is $\sigma \in G1$.

Verification- Given a public key v, a message M, and a signature σ, compute $h \leftarrow (Hash)H(M)$ and verify that $e(\sigma, g2) = e(h, v)$ holds.

Aggregation- For the aggregating subset of users, assign to each user an index i, ranging from 1 to k. Each user ui provides a signature $\sigma i \in G1$ on a message $Mi \in \{0, 1\} *$ of his or her choice. The messages Mi

must all be distinct. Compute $\sigma \leftarrow Qk\ i=1\ \sigma i$. The aggregate signature is σ.

Aggregate Verification- Given an aggregate signature $\sigma \in G1$ for an aggregating subset of users, indexed as before, the original messages $Mi \in \{0, 1\}^*$ and public keys $vi \in G2$ for all users ui . To verify the aggregate signature σ:

1. Ensure all messages Mi are distinct, and reject otherwise.

2. compute $hi \leftarrow H(Mi)$ for $1 \leq i \leq k$, and accept if $e(\sigma, g2) = Qk\ i=1\ e(hi , vi)$ holds. Like the co-GDH signature, the bilinear aggregate signature requires only a single element of G1 and has the same length as any individual signature. Therefore, if we use BLS signatures for the individual signatures, we can get a short aggregate signature. Q We will briefly show correctness for the aggregate signature scheme. Given, that $\sigma = i\ \sigma i = Q\ i\ h\ xi\ i$ where hi is the hashed message Mi for user i and the public key for each user i is $vi = g\ xi\ 2$. Using the bilinear properties, the left-side of the aggregation verification becomes: $e(\sigma, g2) = e(Q\ i\ h\ xi\ i , g2) = Q\ i\ e(hi , g2)\ xi = Q\ i\ e(hi , g\ xi\ 2) = Q\ i\ e(hi , vi)$,which is equal to the right hand side. In the next section, we will prove security of this scheme.

IV COMPARISON OF MOBILE ADHOC NETWORK IN RESPECT TO TRANSFER PROTOCOLS AND PERFORMANCE

Type	Coverage	Performance	Standards	Applications
MOBILE ADHOC PAN	Within reach of a person	Moderate	MOBILE ADHOC PAN Within reach of a person Moderate Bluetooth, IEEE 802.15, and IrDa Cable replacement for peripherals	Cable replacement for peripherals
MOBILE ADHOC LAN	Within a building or campus	High	IEEE 802.11, Wi-Fi, and HiperLAN	Mobile extension of wired networks
MOBILE ADHOC MAN	Within a city	High	Proprietary, IEEE 802.16, and WIMAX	Fixed MOBILE ADHOC between homes and businesses and the Internet
MOBILE ADHOC WAN	Worldwide	Low	CDPD and Cellular 2G, 2.5G, and 3G	Mobile access to the Internet from outdoor areas

REFERENCES

[1] Cox, John (2002). "Report forecasts WLAN 'last-mile' boom". Network World Fusion, 08/05/02. http://www.nwfusion.com/news/2002/0805alex.html

[2] IEEE 802.11 (1999). MOBILE ADHOC LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications. http://standards.ieee.org/getieee802/download/802.11-1999.pdf

[3] WLAN Association (2002). "MOBILE ADHOC Networking Standards and Organizations", WLANA Resource Center, April 17, 2002. http://www.wlana.org/pdf/wlan_standards_orgs.pdf

[4] KLC Consulting (2003). "Change MAC Addresses on Windows 2000 & XP". http://www.klcconsulting.net/Change_MAC_w2k.htm

[5] Wright, Joshua (2003). "Detecting MOBILE ADHOC LAN MAC Address Spoofing". http://home.jwu.edu/jwright/papers/wlan-mac-spoof.pdf

[6] Vollbrecht, John, David Rago, and Robert Moskowitz (2001). "MOBILE ADHOC LAN Access Control and Authentication", a white paper from Interlink Networks Resource Library, 2001. http://www.interlinknetworks.com/images/resource/WLAN_Access_Control.pdf

[7] Interlink Networks (2002a). "MOBILE ADHOC LAN Security using Interlink Networks RAD Series AAA Server and Cisco EAP-LEAP", Application Notes at Interlink Networks Resource Library, 2002. http://interlinknetworks.com/images/resource/MOBILE ADHOC_lan_security.pdf.

[8] Walker, Jesse R. (2000). "Unsafe at any key size: an analysis of the WEP encapsulation", 802.11 Security Papers at NetSys.com, Oct 27, 2000. http://www.netsys.com/library/papers/walker-2000-10-27.pdf

A REVIEW PAPER ON
ARDUINO BASED PREPAID METER USING GSM MODULE

[1]Pratik Korde, [2]Nimit Jain, [3]Dr. Garima Goswami
[1&2] UG Student, Department of Electrical Engineering, Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad(U.P.),
[3]Associate Professor, Department of Electrical Engineering, Faculty of Engineering & Computing Sciences, Teerthanker Mahaveer University, Moradabad(U.P.),

Abstract: The process of revenue collection in Indian electricity department comprises various stages such as manual meter reading, based on that readings bills are generated and then distributed to each of consumers and industrial premises, which makes it complex and time consuming. Also human errors can't be avoided here. Various researchers had provided effective solution for this problem. A GSM technology can facilitate the users to verify the electricity consumption status and transparency is maintained between electricity department and the consumer as both will have access to continuous monitoring of energy meter. Also the use of GSM technology provides prepayment facility and in other perspective this promotes cashless economy. The use of relay here makes sure that no balance should lead to instant cutoff of electricity in consumer premises. All this system is handled securely by Arduino Uno. For the developing countries like India this will be a better solution for electricity monitoring and billing. It is made in such a manner that it is cost effective and much better than conventional meters. In this paper six research papers have been discussed based on various aspects of pre-paid energy meter.

Keywords: GSM module, Arduino Uno, Energy meter, Relay.

Introduction

In India, the revenue collection process is slow and lengthy. Also the billing process is manual and requires a lot of human labor. The process involves taking meter readings manually, then processing that reading for costing and generating the bill for the same. This may cause a lot of errors as it is complex and process is not in a centralized control. The distribution of bill to a mapped location also a lot of time consuming process. Here we can't avoid any mistake or error in this process as manual operation is done. All these problems can have a solution by using the prepaid energy meter system. This system provides an automated way of bill payment. It takes the readings automatically and the information is sent to the authority and the consumer too. This will reduce the human effort and will eliminate the complexity in billing process. It also reduces collection form the consumers living in an isolated area and distanced villages and deployment of human labor in such cases.

consumed by domestic, commercial and sometimes industrial users. With the growing population of energy consumers, smart meters are timely innovation which eases the energy management system. Utility companies can monitor consumption, automatically disconnect defaulting consumers, update tariff, and have a secured database and consumption pattern of a mapped location. The consumers on the other end can also monitor their energy consumption in real-time, recharge their accounts, monitor tariff rates and hence improves the demand response. Unfortunately,

the energy sector is bedevilled by several challenges resulting from the deployment of electricity smart meters. They are energy theft, cyber-attacks, mismanagement and erroneous billing etc. and thus, various research aspects to curb the challenges have been ongoing. This paper proffers a solution of reducing human involvement in energy management for both utility companies as well as consumers. All the monitoring and control features are provided access via a dedicated web portal, anywhere, anytime provided there is Internet connection. Efficient usage of electricity has become an important concern worldwide. This has urged utilities throughout the world to shift from conventional electromechanical meters to smart meters which provide better security and control [1],[2].Smart meters equipped with prepayment facility has become a rapidly growing technology because it allows the utilities to manage their cash flow more efficiently [3].Majority of the energy meters currently used in Sri Lanka are electro mechanical energy meters which are gradually being replaced by digital and electronic energy meters [4]. Sri Lankan Power sector is currently focusing on introducing smart meters for domestic consumers as a method of implementing demand side management [4].Prepayment Energy Meter is a veritable tool for electrical energy consumption measurement for both the electricity distribution companies and the consumers. Also, the awareness on the need for more prudent management of energy, especially electricity, demands an improvement on this tool of measurement. The prepayment meter as an electronic equipment is intelligent and therefore is able to keep record of events of its operations in databases. In most traditional prepayment meters, some of these records can only be accessed through the keypad and the display on the screen. This is so because the meters are not made to be accessible wirelessly and therefore they cannot be monitored remotely through wireless means. For example, the unit balance as well as unit consumption cannot be obtained by sending Short Message Service (SMS) to the meters. Again, meters are not able to report last token recharge; time of power failure and restore on demand through SMS from mobile devices. Figure 1 shows the block diagram of proposed prepaid energy-meter module.

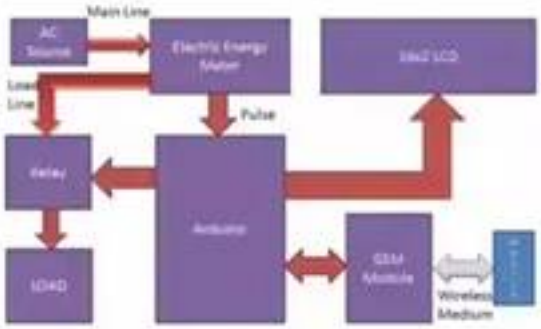


Figure 1. Block diagram of pre-paid energy meter module.

Literature Review

*In 2017 Nazmat Toyi*net.al.[5] told that energy fuels the growth and development of any country, and as such effective monitoring, measurement, billing and access control is imperative. They presented a device that uses the evolving Internet of Things (IoT) technology in the design and implementation of an Internet based prepaid energy meter often referred to as smart meters. The energy measurement and billing system is automated. The system employs the ATMega328p and ESP8266 to operate a dual core microprocessor unit with one core dedicated to energy sensing and measurements, while the other handles the network connectivity, storage, computations and overall system performance. They used the HTML5 technology to develop a highly interactive mobile and web frontend Graphic User Interface (GUI) application that allows for consumers to have access to monitor and control their consumption pattern while the utility companies can monitor and control customers and their billing systems. They

observed that the IBEPM is an improvement over the conventional prepaid meters; it uses the IoT technology in proffering solutions to the energy monitoring and management. Unlike the conventional prepaid meters, this solution offers a highly interactive GUI interface for both consumers and utility companies. It also automates the energy system, as it relates to achieving a smart grid system. The system has been designed to resort to a local server and database, upon resumption of internet connection, all information are synchronized with the web server. However, it is important to point out that for the purpose of this work, the billing is handled locally by the web server and has not been interfaced with any online payment platform agencies. Also further improvements could be made on the project to include load control on the consumer platform for a high Demand Side Management (DSM).

In 2016, W.D.A.S. Rodrigo et.al [6]invested that most of the developing countries are moving in to smart meters equipped with prepayment facility to measure electricity in order to reduce the financial losses faced by utilities due to consumer reluctance to make bill payments on time. Prepaid smart meters enable consumers to effectively manage their electricity usage. But the main drawback of the currently available prepaid meters is their high cost which makes them infeasible for developing countries. Their research work is based on a final year university project on designing and implementing a digital prepaid energy meter which is affordable for domestic consumers in a developing country like Sri Lanka. The prepaid energy meter described in their work is a single phase230V/40A energy meter which consist of a metering devise designed according to theIEC1036 (1996-09) standard and a prepaid module that uses GSM/GPRS technology to communicate with the utility server. The design of a230V/40A single phase digital prepaid energy meter for domestic consumers with improved metering and billing facilities to eliminate major draw backs of existing energy metering systems, has been done. Designing of the metering devise and the prepaid module are explained separately in their work. The major advantage of the designed system is its ability to upgrade the existing energy meters into prepaid energy meters with the attachment of prepaid modules which eliminates the need to entirely replace the energy meter. They ensured that the proposed prepaid energy meter will be very useful for the power utilities in developing countries with large population who use traditional energy meters because upgrading the existing energy meters is more economical than replacing them fully with a prepaid energy meters.

In 2017 Kumarsagar M.Dangeet.al [7] aimed at a project to minimize the queue at the energy meter billing counters and to restrict the usage of energy meter automatically, if the bill is not paid. The project also aims at proposing a system that will reduce the loss of power and revenue due to power thefts and other illegal activities. The work system adopts a totally new concept of "Prepaid Energy Meter". The GSM technology is used so that the consumer would receive messages about the consumption of power (in watts) and if it reaches the minimum amount, it would automatically alert the consumer to recharge. This technology holds good for all electricity distribution companies, private communities, IT parks and self-containing housing projects. The implementation of their project will help in better energy management, conservation of energy and also in doing away with the unnecessary hassles over incorrect billing. The automated billing system will keep track of the real time consumption and will leave little scope for disagreement on consumption and billing.It is observed that one of the faulty subsystems contributing to the huge revenue loss in Nigerian Power Sector is the metering and billing system. Errors get introduced at every stage of energy billing, like: errors with electro-mechanical meters, human errors while

noting down the meter reading; and error while processing the paid bills and the due bills. The remedy for this drawback is a prepaid energy billing. There are clear results from many countries, where prepaid system has reduced the revenue loss by a large amount. A GSM-based Energy Recharge Interface which contains a prepaid card equivalent to a mobile SIM card. The prepaid card communicates with the power utility using GSM communication network. Once the prepaid card is out of balance, the consumer load is disconnected from the utility supply by the latching Relay (contactor). The power utility can recharge the prepaid card remotely through GSM/SMS mode base on customer requests. The results obtained shows good system performance. A prior billing is bound to do away with the problems of unpaid bills and human error in meter readings, thereby ensuring justified revenue for the utility. It has been observed that putting a full stop at the wastage of electricity, the problem of load shedding can be dealt with ease. It is being said that half of India still don't get electricity which no longer will be true. Man power will be limited as there won't be any need of personally visiting each and every electricity meter as it was in the earlier days. The monopolistic power distribution market in asia is gradually transforming into a competitive marketplace. Differentiation in service is going to be the key competitive factor to the improve market share in the deregulated power markets prepaid meters with their advantages over conventional ones are likely to help power distributors to differentiate and offer value –added services to consumers. Encourage consumers to opt for prepaid meters on a voluntary basis and offering tariff or non-tariff incentives to those consumers who prepaid their power changes would help the utilities to implement this system.

In 2018 Henry Erialuode Amhenrior et.al [8]worked on a Short Message Service (SMS) Based Prepayment Energy Meter Monitoring System for Consumers and Utility Companies is developed. It was told that this is borne out of the desire of consumers to be able to monitor their meters especially their consumption. Also, the utility companies need to be able to monitor energy meters wirelessly especially for energy auditing and other control as may be needed. The Energy Meter consists of ADE7755 for consumption pulse measurement which is recorded by arduino Atmega328P. The recorded pulses are sent to Atmega2560, the main controller of the system on its request for update every second. This controller also manages unit according to consumption and other activities of the meter. It is made SMS capable by interfacing Atmega2560 with SIM900 Global System for Mobile Communications (GSM) module. The system also has a server consisting of Atmega328P and SIM900 GSM module that enables the utility company to access the meter. The server is interfaced to a PC which is used for management and administrative Platform. The SMS communication command is developed in C++ to achieve the monitoring functionality of the metering system. The SMS duration test shows a mean time of 32.7s with a standard deviation of 13.71. The SMS Command Reliability Test carried out shows a success rate as high as 100% and the highest failure rate of 5.88%. The results obtained show that GSM-Based SMS is a good platform for energy meter monitoring. The meter developed in their work uses SMS for communication through the GSM modem. As shown in the Usage Command Development section, several commands are used for communication with the meter for monitoring. Some of the information the communications seek include, unit balance, unit consumed, time of power failure and time of powerre store. Other monitoring communications capabilities of the meter are checking the token recharge into the meter, credit warning alert, wireless meter disconnection and connection. The SMS communication is a two-way communication and this enables the

activities of the meter to be monitored wirelessly. The results obtained show that SMS is very efficient, effective and successful in achieving the monitoring aspects of this work as proposed. The success of recordingn egligible duration in the SMS communication and high success rate in the command reliability test are dependent on the efficiency of the chosen mobile network, though this was not investigated. The outcome of their work shows that the consumers and the distribution companies can communicate with the meter to obtain information through the GSM SMS platform. These information can be used for various purposes for the benefit of both parties especially in energy usage monitoring and auditing. With this, the objective of this work which bothers on communicating and monitoring of Prepayment Meters through SMS has been fully realized.

In 2015, Shraddha Yadav et.al [9]presented in their survey that the electricity energy saving scheme is used in business, agriculture, domestic and general purpose. The problem occurs in post paid scheme is, there is no control of use of electricity from the consumer side and the problem of collection of meter reading and also in generating the bill. In their work technique used for prepaid scheme using smart meter included the embedded system and GSM for sending and receiving the SMS through GSM network. Smart meter is a meter which is attached with the existing meter in embedded system which helps the consumer to send a SMS for their day to day power consumption. The aim of their work is to control the consumption of electricity in consumer side. Establish a communication network between the consumer and service provider using GSM. Service provider verify the meter id and card number and
accept the request and recharge the meter. Apart from it their work minimized the queue at the electricity billing countersand to retrieve the electricity automatically. The work also aims at proposing a system that will reduce the loss of power and revenue due to power theft and other illegal activities. The automated billing system will keep doing of real time consumption and will leave little scope for disagreement on consumption and billing. The work also addressed about various debuggingtools such as Keil 4 Vision. Smart meter enable two-way communication between the meter and the central system. Smartmeters are also believed to be a less costly alternative to traditional time of uses meter and are intended to be used on a wide scale with all customer classes. It has been observed that the design of Smart Energy Meter using GSM technology facilitate the users to pay for the electricity before its consumption. An arrangement is also made to intimate the user with the help of GSM communication module when their credit in their balance goes low. This system has been proposed as an innovative solution to the problem of affordability in utilities system. Since a microcontroller based system is being designed, the readings can be continuously recorded. This reduces human labor and at the same time increases the efficiency in calculation of bills for used electricity. This Smart energy understanding device will create awareness on unnecessary wastage of power and will eventually reduce wastage of power. This module will reduce the burden of energy providing by establishing the
connection easily and no theft of power will take place. Customers want processed data and they want the usage of energy data to be easy and user friendly whereas this project aims at a low cost and trouble free system. This system provides elaborate consumer profiling which helps demand and consumption control of resources and thus reduces thehuman operator meter reading operation cost.

In 2016, Sushant Karadet.al [10] presented the design and modelling of GSM-based Energy Recharge System for prepaid metering. They told that the present system of energy billing in India is based on post-paid, contains

lots of error and also time and labour consuming. Errors get introduced at every stage of energy billing like errors with electro-mechanical meters, human errors, processing errors. The aim of the developed system is to minimize the error by introducing a new system of Prepaid Energy Metering using GSM. The GSM is used to provide the communication between user and provider. This will enable the user to recharge their electricity account from home. The system is based on LPC2148 microcontroller. Hardware system of LPC2148 includes the necessary devices within only one MCU such as USB, ADC, DAC, Timer/Counter, PWM UART etc. The results obtained shows good system performance and error free. It has been concluded that the design of Smart Energy Meter using GSM technology can make the users to pay for the electricity before its consumption. In this way, consumers hold number of units and then use the electricity until the unit exhausted. If the available units are exhausted then the notification message send to the consumer's registered number and electricity supply is cut-off by a relay. This reduces the human labour and at the same time increases the efficiency in calculation of bills for used electricity. Prepaid Energy Meter will bring a solution of creating awareness on unnecessary wastage of power and will tend to reduce wastage of power. They ensured that their work will reduce the burden of energy providing by establishing the connection easily and no theft of power will take place.

Conclusion

After reviewing the above six research papers it can be concluded that prepayment systems have been proposed as an innovative solution to the problem of affordability in utilities services. In spite of being a popular system in European and African countries, the use of such mechanisms remains controversial. Among the main arguments in favor of its dissemination are the advantages concerning lower costs of arrears, running costs and finance charges for the service provider and the better allocation of resources it implies for users. The arguments against prepaid meters are based on the higher cost of the technology and the possibility of self-disconnection of low-income users. The monopolistic power distribution market in Asia is gradually transforming into a competitive marketplace. Differentiation in service is going to be the key competitive factor to improve market share in the deregulated power markets. Prepaid meters with their advantages over conventional ones are likely to help power distributors to differentiate and offer value-added services to consumers. Encouraging consumers to opt for prepaid meters on a voluntary basis and offering tariff or non-tariff incentives to those consumers who prepay their power charges, would help the utilities to implement this system. It would be a better option for the areas where more amount of consumers with unpaid bills are found. The topmost and the perfect solution for the consumers who don't pay there bills on time. Apart from this the information flow among the consumers surely will lead to better utilization of the energy.

References

[1] M. Anas, N. Javaid, A. Mahmood, S. M. Raza, U. Qasim and Z. A. Khan,"Minimizing Electricity Theft," in 2012 Seventh InternationalConference on P2P, Parallel, Grid, Cloud and Internet Computing,Victoria, BC, 2012.

[2] A. de Souza, D. Gastaldello, F. Fernandes and Z. Vale, "Smart meters asa tool for energy efficiency," in Industry Applications (INDUSCON),2014 11th IEEE/IAS International Conference, Juiz de Fora, 2014.

[3] K. Ramadan, E. Zakaria and D. M. Eltigani, "Prepaid Energy MetersNetwork via Power System Communication," in Computing,

Electricaland Electronics Engineering (ICCEEE), 2013 International Conference,Khartoum, 2013.

[4] PUCSL, "Public Utilities Commission of Sri Lanka," July 20 13.[Online]. Available:http://www.pucsl.gov.lk/tamil/wp-content/uploads/2013/07/Smart-Metering-in-Sri-Lanka-Final.pdf.. [Accessed 23 102015].

[5] Nazmat Toyin,Olufenka AYODELETimilehin,David OLORUNTOBAAbdulrahaman Okino OTUOZENasir FARUK, " Development of an Internet Based Prepaid Energy Meter" IEEE 3rd International Conference on Electro-Technology for National Development (NIGERCON) 2017.

[6] W.D.A.S. Rodrigo, H.K.I.S. Lakmal, N.S. Roshani, S.W.M.G.S. Samarakoon, and S.S. Samararatne "A Prepaid Energy Meter Using GPRS/GSM TechnologyFor Improved Metering And Billing" International Journal of Computer Science and Electronics Engineering (IJCSEE) Volume 4, Issue 2 ISSN 2320–4028 2016.

[7] Kumarsagar M.Dange,Sachin S. Patil,Sanjay P. Patil "Prepaid Energy Meter using GSM Module" International Journal of Engineering Science InventionISSN (Online): 2319 – 6734, ISSN (Print): 2319 – 6726Volume 6, Issue 2, February 2017, PP. 80-85.

[8] Henry Erialuode Amhenrior "Development of an SMS-Based Prepayment Energy Meter Monitoring System for Consumers and Utility Companies" American Journal of Embedded Systems and Applications 6(1): 37-45ISSN: 2376-6069 (Print); ISSN: 2376-6085 (Online) 2018.

[9] Shraddha Yadav, Prateekshapandey " A Survey Paper on Prepaid ElectricityDistribution System" International Journal of Application or Innovation in Engineering & Management (IJAIEM)Volume 4, Issue 12, ISSN 2319 – 4847December 2015.

[10] Sushant Karad1, Yogesh Kadam, Kalyani Jagtap, Pooja Ghadge "Gsm Based Prepaid Energy Meter" International Journal of Advance Engineering and ResearchDevelopment, Volume 3, Issue 4, April -2016.

Attacks And Solution For Internet Security

Siddhartha Saxena1, Mayur Vishnoi 2 , Aaditya Jain 3 Assistant Professor
College of Computing Sciences and Information Technology, Teerthanker Mahaveer university, Moradabad
Uttar Pradesh, India
siddhartha.saxena70@gmail.com
mayurvishnoi@gmail.com
jain.aaditya58@gmail.com

Abstract: *Security is a fundamental component of every network design. When planning, building, and operating a network, youshould understand the importance of a strong security policy. Network Security is a security policy that defines what people can and can't do with network components and resources. The fundamental purpose of a network security is to protect against attacks from the Internet. There are many different ways of attacking a network such as: Hacker/Cracker attacks whereby a remote Internet user attempts to gain access to a network, usually with the intention to destroy or copy data. The major attacks to network security are passive attack, active attack, distributed attack, insider attack, close: in attack, Phishing Attack, Hijack attack, Password attack etc. However a system must be able to limit damage and recover rapidly when attacks occur. So there are various solutions when any of above attacks occurs. Some of the common solutions of these attacks are firewalls, user account access controls and cryptography, Intrusion Detection Systems (IDSs), Network Address Translation (NAT), Stateful Packet Inspection etc. It is always said that "Prevention Is Better Than Cure" some most common preventions that can be taken to be secured are to keep your operating system updated and by using a reputable antivirus program. [1]*

Keywords: Threats, Trojan, Vulnerable,Sniffers,Botnets, virus, enclave, buffer overflow, protocol, Firewalls, Malicious, Phishing, Sniffers

1. Introduction

With an increasing amount of people getting connected to many networks, the security threats that cause very harm are increasing also. Network Security is a major part of any network that needs to be maintained because information is passing through or passed between many routers, computers etc and it is very vulnerable to attack.[2]

In the past, hackers were highly skilled programmers who understood the details of computer communications and how to exploit vulnerabilities. Today almost anyone can become a hacker by downloading tools from the Internet. These complicated attack tools and open networks have generated an increased need for network security and dynamic security policies.

The easiest way to protect a network from an outside attack is to close it off completely from the outside world. A closed network provides connectivity only to trusted known parties and sites; a closed network does not allow a connection to public networks. As they have no Internet connectivity, networks designed in this way can be considered safe from Internet attacks. However, internal threats still exist.

Network security starts with authenticating, commonly with a username and a password. Once authenticated, a firewall enforces access policies such as what services are allowed to be accessed by the network users. Though effective to prevent unauthorized access, this component may fail to check potentially harmful content such as computer worms or Trojans being transmitted over the network. Anti:virussoftware or an intrusion prevention system (IPS) helps to detect and inhibit the action of such malware. An anomaly:based intrusion detection system may also monitor the network like wires traffic and may be logged for audit purposes and for later high:level analysis. Communication between two hosts using a network may be encrypted to maintain privacy. With the development of large open networks, security threats have increased significantly in the past 20 years. So to get secured from these threats preventions should be taken before hand. However instead of closing the network from outside world there are some alternate solutions also to these network attacks. [7]

2. Types of Attack

Classes of attack might include passive monitoring of communications, active network attacks, close:in attacks, exploitation by insiders, and attacks through the service provider. Information systems and networks offer attractive targets and should be resistant to attack from the full range of threat agents, from hackers to nation:states. A system must be able to limit damage and recover rapidly when attacks occur.

There are eleven types of attack:

1.1) Passive Attack

A **passive attack** monitors unencrypted traffic and looks for clear:text passwords and sensitive information that can be used in other types of attacks. **Passive attacks** include traffic analysis, monitoring of unprotected communications, decrypting weakly encrypted traffic, and capturing authentication information such as passwords. Passive interception of network operations enables adversaries to see upcoming actions. Passive attacks result in the disclosure of information or data files to an attacker without the consent or knowledge of the user.

1.2) Active Attack

In an **active attack,** the attacker tries to bypass or break into secured systems. This can be done through stealth, viruses, worms, or Trojan horses. Active attacks include attempts to circumvent or break protection features, to introduce malicious code, and to steal or modify information. These attacks are mounted against a network backbone, exploit information in transit, electronically penetrate an enclave, or attack an authorized remote user during an attempt to connect to an enclave. Active attacks result in the disclosure or dissemination of data files, DoS, or modification of data.

1.3) Distributed Attack

A **distributed attack** requires that the adversary introduce code, such as a Trojan horse or back: door program, to a "trusted" component or software that will later be distributed to many other companies and users Distribution attacks focus on the malicious modification of hardware or software at the factory or during distribution. These attacks introduce malicious code such as a back door to a product to gain unauthorized access to information or to a system function at a later date.

1.4) Insider Attack

An **insider attack** involves someone from the inside, such as a disgruntled employee, attacking the network Insider attacks can be malicious or no malicious. Malicious insiders intentionally eavesdrop, steal, or damage information; use information in a fraudulent manner; or deny access to other authorized users. No malicious attacks typically result from carelessness, lack of knowledge, or intentional circumvention of security for such reasons as performing a task.

1.5) Close: in Attack

A **close: in attack** involves someone attempting to get physically close to network components, data, and systems in order to learn more about a network Close: in attacks consist of regular individuals attaining close physical proximity to networks, systems, or facilities for the purpose of modifying, gathering, or denying access to information. Close physical proximity is achieved through surreptitious entry into the network, open access, or both.

One popular form of close in attack is **social engineering** in a social engineering attack; the attacker compromises the network or system through social interaction with a person, through an e:mail message or phone. Various tricks can be used by the individual to revealing information about the security of company. The information that the victim reveals to the hacker would most likely be used in a subsequent attack to gain unauthorized access to a system or network.

1.6) Phishing Attack

In phishing attack the hacker creates a fake web site that looks exactly like a popular site such as the SBI bank or PayPal. The phishing part of the attack is that the hacker then sends an e:mail message trying to trick the user into clicking a link that leads to the fake site. When the user attempts to log on with their account information, the hacker records the username and password and then tries that information on the real site.

1.7) Hijack Attack

Hijack attack in a hijack attack, a hacker takes over a session between you and another individual and disconnects the other individual from the communication. You still believe that you are talking to the original party and may send private information to the hacker by accident.

1.8) Spoof Attack

Spoof attack in a spoof attack, the hacker modifies the source address of the packets he or she is sending so that they appear to be coming from someone else. This may be an attempt to bypass your firewall rules.

1.9) Buffer Overflow

Buffer overflow a buffer overflow attack is when the attacker sends more data to an application than is expected. A buffer overflow attack usually results in the attacker gaining administrative access to the system in a command prompt or shell.

1.10) Exploit attack

Exploit attack in this type of attack, the attacker knows of a security problem within an operating system or a piece of software and leverages that knowledge by exploiting the vulnerability.

1.11) Password Attack

An attacker tries to crack the passwords stored in a network account database or a password: protected file. There are three major types of password attacks: a dictionary attack, a brute: force attack, and a hybrid attack. A dictionary attack uses a word list file, which is a list of potential passwords. A brute: force attack is when the attacker tries every possible combination of characters.

3. Security Threats

According to IT Security.com the following are ten of the biggest network threats:

1. Viruses and Worms: A virus is a malicious computer program or programming code that replicates by infecting files, installed software or removable media. Whereas a worm is a program or script that replicates itself and moves through a network, typically travelling by sending new copies of itself via email.

2. Trojan Horses: The Trojan Horse, at first glance will appear to be useful software but will actually do damage once installed or run on your computer. Some Trojans are designed to be more annoying than or they can cause serious damage by deleting files and destroying information on your system.

3. SPAM: Spam is any kind of unwanted online communication.

4. Phishing**:** Phishing is the attempt to acquire sensitive information such as usernames, passwords, and credit card details (and sometimes, indirectly, money) by masquerading as a trustworthy entity in an electronic communication.

5. Packet Sniffers: Computer network administrators have used packet sniffers for years to monitor their networks and perform diagnostic tests or troubleshoot problems.

6. Maliciously Coded Websites: Malicious code is the term used to describe any code in any part of a software system that is intended to cause security breaches or damage to a system.

7. Password Attacks: Password attacks are the classic way to gain access to a computer system is to find out the password and log in.

8. Zombie Computers and Botnets : In computer science, a zombie is a computer connected to the Internet that has been compromised by a hacker, computer virus or trojanhorse and can be used to perform malicious tasks of one sort or another under remote direction. Botnets of zombie computers are often used to spread e:mail spam and launch denial:of:service attacks. Most owners of zombie computers are unaware that their system is being used in this way. Because the owner tends to be unaware, these computers are metaphorically compared to zombies. [3]

4. Solution of Network Security

The recommendations to protect your company against Phishing and Spear Phishing include: [9]

1. Never open or download a file from an unsolicited email, even from someone you know (you can call or email the person to double check that it really came from them)
2. Keep your operating system updated
3. Use a reputable anti:virus program
4. Enable two factor authentication whenever available
5. Confirm the authenticity of a website prior to entering login credentials by looking for a reputable security trust mark
6. Look for HTTPS in the address bar when you enter any sensitive personal information on a website to make sure your data will be encrypted

4.1 Security measures

A state of computer "security" is the conceptual ideal, attained by the use of the three processes: threat prevention, detection, and response. These processes are based on various policies and system components, which include the following:

1. User account access controls and cryptography can protect systems files and data, respectively.
2. Firewalls are by far the most common prevention systems from a network security perspective as they can (if properly configured) shield access to internal network services, and block certain kinds of attacks through packet filtering. Firewalls can be both hardware: or software:based.
3. Intrusion Detection Systems (IDSs) are designed to detect network attacks in progress and assist in post:attack forensics, while audit trails and logs serve a similar function for individual systems.

correctly configured firewall will prevent most attacks and may use a combination of the following processes to offer protection:

1. **Steal the network:** This is a process in which thefirewall effectively 'hides' the protected network so that it does not appear on the Internet.
2. **Stateful Packet Inspection**: Stateful packet inspectiontechnology analyses each packet as it travels through the firewall to make sure that it is legitimate and that the source and destination of each packet are valid.
3. **Network Address Translation (NAT):** NAT removesthe IP addresses of computers behind the firewall and replaces them with a single public IP address.
4. **Closing unused ports:** Depending on the configurationof the firewall unused ports, often the subject of hacking attacks can be closed.[5]

Protection of Network from Cyber Attacks:

1. Install IDS/IPS with the ability to track floods (such as SYN, ICMP, etc.)
2. Install a firewall that has the ability to drop packets rather than have them reach the internal server. The nature of a web server is such that you will allow HTTP to the server from the Internet. You will need to monitor your server to know where to block traffic.
3. Have contact numbers for your ISP's emergency management team (or response team, or the team that is able to respond to such an event). You will need to contact them in order to prevent the attack from reaching your network's perimeter in the first place.
4. Ensure that HTTP opens session's time out at a reasonable time. When under attack, you wish to reduce this number.
5. Ensure that TCP also time out at a reasonable time.
6. Install a host:based firewall to prevent HTTP threads from spawning for attack packets.[6]

4. "Response" is necessarily defined by the assessed security requirements of an individual system and may cover the range from simple upgrade of protections to notification of legal authorities, counter:attacks. In some special cases, a complete destruction of the compromised system is favoured, as it may happen that not all the compromised resources are detected.[4]

Preventing network attacks

There is also Denial of Service (DoS) and distributed DoS attacks resulting in loss of services such as email, Internet connectivity or causing servers to run almost at a standstill. A

5. The Future of Network Security

Care taken about network security:

IT departments can no longer simply protect the network perimeter and call their network secure. Cloud services, mobile devices, remote workers and wireless networks are all expanding the network boundary beyond its traditional reach. And as networks become more complicated, IT departments are becoming more concerned with how they can effectively secure data. So phos and research company Vanson Bourne surveyed 571 IT decision makers worldwide to gain a deeper understanding of the impact of these changes to network security. And to discover which issues are causing IT teams the most grief, and how they plan on managing the expanding network perimeter.

- In some attacks, the attacker tries to break the security systems through stealth, viruses, worms, or Trojan horses.
- In attacks like phishing attack the hacker creates a fake web site that looks exactly like a popular site such as the SBI bank and thus fools the user and retrieves the information.

Computer and network technologies have intrinsic security weaknesses. These include protocol weaknesses, operating system weaknesses, and network equipment weaknesses. Common examples of technological weaknesses are: : HTTP, FTP, ICMP and other protocols are inherently insecure such as operating system security holes and problems.

Thus there are still some attacks which are not yet solved and some are going through researches and are hoped to be solved in mere future.

6. Conclusion

- Network Security is a very broad field and being a Network Security manager is not an easy job. There are still threats such as password attacks that have no prevention.
- Many of the threats set out to get personal information.

Reference

[1] http://computernetworkingnotes.com/network:security:access:lists:standards:and:extended/types:of:attack.html
[2] http://www.itsecurity.com/features/network:security:threats:011707
[3] http://www.itsecurity.com/features/network:security:threats:011707
[4] http://en.wikipedia.org/wiki/Computer_security
[5] http://fastnet.co.uk/help:and:support/troubleshooting:kno

wledge/knowledge:base/network/779.html
[6] http://www.sophos.com/en:us/security:news:trends/securi ty:trends/how:to:protect:your:network:from:cyber:attacks .aspx
[7] https://en.wikipedia.org/wiki/Phishing
[8] https://en.wikipedia.org/wiki/Internet_security#Phishing
[9] https://en.wikipedia.org/wiki/Malware

Energy- Efficient Routing Protocols For Wireless Sensor Network

Mayur Vishnoi 1, Siddhartha Saxena 2,Aaditya Jain 3 Assistant Professor
College of Computing Sciences and Information Technology, Teerthanker Mahaveer university, Moradabad
Uttar Pradesh, India

mayurvishnoi@gmail.com
siddhartha.saxena70@gmail.com
jain.aaditya58@gmail.com

Abstract: There has been plenty of interest in building and deploying sensor networks. Wireless sensor network is a collection of a large number of small nodes which acts as routers also. These nodes carry very limited power source which is non-rechargeable and non-replaceable which makes energy consumption an significant issue. Energy conservation is a very important issue for prolonging the lifetime of the network. As the sensor nodes act like routers as well, the determination of routing technique plays a key role in controlling the consumption of energy. This paper describes the framework of wireless sensor network and the analysis and study of various research work related to Energy Efficient Routing in Wireless Sensor Networks.

Index Terms: Energy Efficient Routing, Wireless Sensor Network, PDORP, DSR, PEGASIS, LEACH, TEEN, APTEEN

1 INTRODUCTION

Wireless sensor network gained popularity in recent years due to the advancement in wireless communication technology and a rapidly developing zone for research. WSN refers to a system of sensor hubs associated through a wireless medium [1][2]. Every hub comprises of Handling capacity (at least one CPU, DSP chips Microcontroller) may contain different sorts of memory (program, information and flash memories), have a power source (e.g., batteries and sun-powered cells), and contain different sensors and actuators [3]. Energy conservation is a big issue in WSN as sensor hubs carry limited non-rechargeable power source and it is not easy to replace the nodes which makes power saving important to increase the lifetime of nodes. Energy efficient routing protocols are required to minimize the utilization of the power resources and prolonging the network lifetime path while transferring data [4].

1.1 Wireless Sensor Network

WSN is a network of small, self-sufficient gadgets called sensors which gather distinctive sorts of Physical or Environmental Conditions e.g temperature, sound, vibration, weight, movement at various areas and process information and transmit thedetected data to clients [5]. These sensors are utilized to gather the data from the environment and transfer it to the base station. A base station gives an association with the physical world where the gathered information is handled, broke down and exhibited to helpful applications [2] [6]. WSNs contain a large number of these sensor hubs, and these sensors can transmit data either among each other or straightforwardly to an outside base station . A large number of sensors can be deployed in various applications to detect various events like pressure, movement of object, fire etc. [7]. The basic design of sensor node is as shown in Figure 1.1.

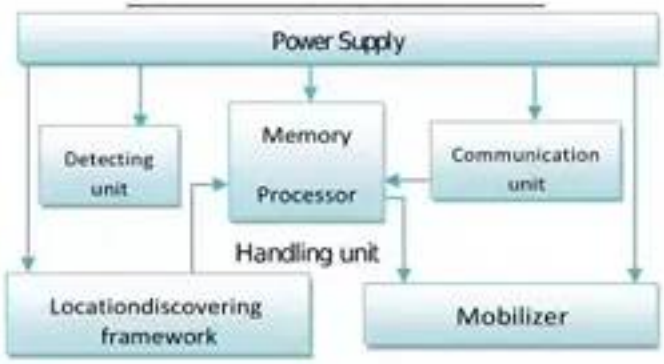


Fig.1.1. *Framework of sensor hub[1]*

The sensor hub is a self-ruling little gadget that comprises of chiefly four units that are sensing (detecting), Processing (handling), communication and power supply [1].

- *Sensing unit*: are normally made out of two subparts: Sensors and analog to digital converter(ADC). Sensor sense data in form of analog signals and these signals then converted to digital signals by ADC and then forwarded to handling unit.
- *Handling unit*: It is associated with a small memory and deals with the strategies that make the sensor hub work together with alternate hubs to complete the allocated detecting undertakings.
- *Communication unit*: It associates the hubs to the network.
- *Power source* is the most vital segments of a sensor hub. It might be upheld by sun-powered cells. There are additionally different subunits, which are application subordinate. The majority of routing procedures and detecting undertakings require the information of area with high exactness. In this way, it is normal that a sensor hub has a location discovering framework.[3]

2 Routing in WSN

Routing strategies are required for transferring data between the sensor nodes and the base station [1] [2]. Routing in WSN is different than traditional IP network routing because it exhibits a number of unique characteristics such as it is unrealistic to build a global addressing scheme for a large number of sensor nodes, secondly as opposed to regular correspondence systems all utilization of sensor systems require the stream of detected information from numerous sources to a specific BS [8]. Different routing techniques are proposed for remote sensor network and these conventions can be classified as per different parameters. The classification of routing methods is shown in figure 1.2[1].

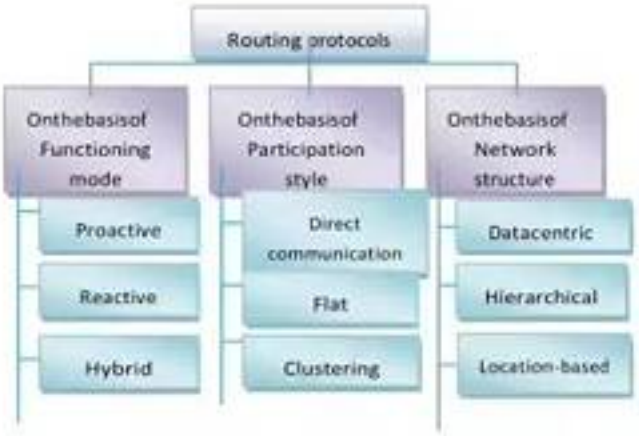


Fig 1.2. Classification of routing protocols

Functioning mode based routing protocols The function of a wireless sensor network specifies its application. Therefore, routing protocols can be categorized according to the operation used to satisfy a WSN function as follows:

- Proactive Protocols:These protocols are also called as table-driven protocols. In Proactive, the data is transmitted to a BS through the predefined route. For example LEACH, PEGASIS.
- Reactive Protocol: In Reactive Protocol the route is established on demand. The route is established dynamically i.e.Network -based route is found when needed. TEEN, AODV, DSR are some reactive protocols.
- Hybrid protocols: All the routes are found initially and then improved at the time of sending data. These protocols possess the concepts of both reactive and proactive. For example APTEEN.

Participation style based routing protocols Some WSNs consist of homogeneous nodes, whereas some consist of heterogeneous nodes and these nodes participate differently in every network i.e. according to remaining energy of nodes, cluster head etc. Based on this concept we can classify the protocols as:

- Direct Communication protocols: In this type of protocols the information sensed by nodes is sent directly to Base Station(BS). SPIN is this type of protocol."
- Flat protocols: In this, the nodes search for the valid path and then transmit it to BS. For example Rumor Routing protocol.

- Clustering Protocols: In this, the area is divided into clusters and Cluster heads are assigned to each cluster. All the nodes in the cluster send data to corresponding cluster heads and then cluster head sends it to Base station. For example TEEN

Network-based routing protocols

Network-based routing protocols depend on the strategy how the network is prearranged. Such protocols fall under three categories:

- Data Centric protocols: These are query based and they depend on the naming of the desired data. The BS sends queries within a certain region to get information and waits for a reply from the nodes. Nodes in a particular region collect the specific data based upon the queries. SPIN is a data-centric protocol.
- Hierarchical protocols: In this, the nodes with lower energy are used to capture information and nodes with higher energies are used to process and transfer it that is why it is used to perform energy e ffi cient routing. TEEN, APTEEN are hierarchical protocols.
- Location Based: In these, the location of nodes must be known to find an optimal path using flooding. To get the information about location of0 node GPS is used. For example GEAR.

2.1 Energy efficient routing protocols in WSN Energy efficiency of a network is a significant concern in wireless sensor network (WSN). These days networks are becoming large, so information gathered is becoming even larger, which all consume a great amount of energy resulting in an early death of a node. Therefore, many energy efficient protocols are developed to lessen the power used in data sampling and collection to extend the lifetime of a network.

Following are some energy efficient routing protocols:

1. LEACH "Low-Energy Adaptive Clustering Hierarchy"

In this type of hierarchical protocol, most of the nodes communicate to cluster heads (C.H) [1] [8]. It consists of two phases:

(i). The Setup Phase: in this phase, the clusters are ordered and then Cluster Head(CH) has been selected. The task of CH is to cumulate, wrapping, and forward the information to the base station (Sink) [2].

(ii). The Study State Phase: in the previous state, the nodes and the CH have been organized, but in the second state of "LEACH", the data is communicated to the base station (Sink). Duration of this phase is longer than the previous state. To minimize the overhead, the duration of this phase has been increased. Each node in the network, contact with the cluster head, and transfer the data to it and after that CH will develop the schedule to transfer the data of each node to base station [8] [2].

2. PEGASIS "Power-Efficient Gathering in Sensor Information Systems"

It is a "chain-bases protocol" and an upgrading of the "LEACH". In "PEGASIS" every node transfers only with a close neighbor to direct and obtain information. It receipts turns communicating to the BS, thus decreasing the quantity of energy consumed per round [9]. The nodes are in this way that a chain should be developed, which can be completed by the sensor nodes along with using an algorithm. On the other hand, the BS can compute this chain and transmission of it to all the sensor nodes. [10]To develop the chain, it is expected that all nodes have universal information of the system and that a greedy algorithm is engaged. Thus, the structure of the chain will begin from the remote node to the nearer node. If a node expires, the chain is rebuilt in the similar method to avoid the lifeless node [11].

3. TEEN "Threshold sensitive Energy Efficient sensor Network protocol" The TEEN is a hierarchical protocol designed for the conditions like sudden changes in the sensed attributes such as temperature. For a reactive network, the first developed protocol was TEEN [12]. The reduction of the number of transmissions is the purpose of a hard threshold, which is done by allowing the nodes to transmit only when the sensed attribute is in the range of interest. The number of transmissions is reduced by soft threshold by avoiding all the transmissions which might occur when the sensed attribute is changed slightly or not changed. TEEN is well applicable for time important problems and is likewise quite efficient in terms of saving energy and response time. It also allows the user to manage the power utilization and accurateness to suit the application [13].

4.APTEEN "Adaptive Threshold sensitive Energy Efficient Sensor Network"

The "APTEEN" is an expansion of "TEEN" and goals at both taking episodic data gatherings and replying to time-critical events. As soon as the BS formulates the clusters, the C.H transmits the features, the values of threshold and schedule of transmission to all nodes.[12] After that, the C.H performs information accumulation, which has as a consequence to preserve power. The main advantage of "APTEEN" in contrast to "TEEN", is that nodes utilize a smaller amount power. on the other hand, the primary disadvantages of APTEEN are the complication and that it results in lengthier deferment times [14].

5. Directed Diffusion

Directed diffusion is data-centric routing protocol for collecting and publishing the information in WSNs [15]. It has been developed to address the requirement of data flowing from the sink toward the sensors, i.e. when the sink requests particular information from these sensors. Its main objective is extending the network lifetime by realizing essential energy saving. In order to fulfill this objective, it has to keep the interactions among the nodes within a limited environment by message exchange. A localized interaction that provides multipath delivery is a unique feature of this protocol. This unique feature with the ability of the nodes to respond to the queries of the sink results in considerable energy savings [1] [15].

6. Energy-Efficient Sensor Routing (EESR)
EESR is a flat routing algorithm [16] proposed particularly to decrease the power utilization and data latency, and to give scalability in the WSN. Mainly, it consists of Gateway, Base Station, Manager Nodes, and Sensor Nodes [17] [18]. Their duties are: Gateway Delivers messages from Manager Nodes or forms other networks to the Base Station, which has extra specification than normal sensor nodes. It sends and receives messages to/from Gateway. Moreover, it sends queries and collects data to/from sensor nodes. Manager Nodes and Sensor Nodes collect data from the environment and send it to each other in 1-Hop distance till the Base Station [16].

3 LITERATURE REVIEW

Ahmad, A., Latif, K. Javaid N. Khan et. al. (2013) [20] investigated on clustering procedure which is most well recognized directing strategy in WSNs. Because of differing need of WSN application productive vitality use in directing conventions is very still a potential field of research. Authors presented new energy efficient directing technique in this research. This strategy is utilized to defeat the fundamental trouble of energy hole and coverage hole. In their strategy, they have controlled these issues by presenting density controlled uniform circulation of hubs and settled an ideal number of Cluster Heads in each round. Lohan, P. and Chauhan, R. et. al.(2012) [21] presented the GeographyInformed Sleep Scheduling and Chaining Based Routing (GSSC) algorithm in wireless sensor network. As detector nodes are power restraint, the system lifetime improved by utilizing the energy of nodes very proficiently. GSSC saves power by discovering alike nodes from routing perspective by using their geological information, it senses nearly similar information and then turning off needless nodes to eliminate data redundancy. This chaining based routing can lessen energy spending of data transferring with the help of multi-hop routing technique. Their simulation outcome (using MATLAB) demonstrate that GSSC achieved considerable increment in network lifespan than LEACH and PEGASIS. Seongsoo Jang, Ho-Yeon Kim and Nam-Uk Kim et. al. (2011) [22] worked on the development of the Wireless Sensor Network technology, ubiquitous technology comes to the fore as the core technology in the future. In the WSN, energy efficiency of the whole network is a key difficulty that has to be solved. Clustering is one of routing methods to enhance energy efficiency. The author suggests a new method, "EnergyEfficient Clustering scheme with Concentric Hierarchy (EECCH)," a centralized clustering scheme intended at overcoming shortcomings of LEACH and LEACH-C both. By drawing circles with the base station as its center, the base point separates network nodes into some levels. The clusters have different numbers of its member nodes to eliminate inequality in energy dissipation through this process; it becomes possible to improve energy efficiency. Saravana Kumar R., Susila S.G. and Raja J. et. al (2010) [23] have done research work on WSN. It consisting of a large number of sensors and as the sensor operates on a limited power source, it is challenging to design an energy efficient routing protocol that can diminish the delay while providing highenergy efficiency and extended network lifetime. Author analyzes the fundamental distributed clustering routing protocol Low Energy Adaptive Clustering Hierarchy, also proposed a novel routing method and data aggregation method in which the sensor nodes form the cluster and the cluster-head chosen based on the remaining power of the individual node calculation without re-clustering and the node scheduling scheme is adopted in each cluster of the WSN. Results using MATLAB shows that the proposed routing protocol considerably reduces energy utilization and enhance the total lifespan of the wireless sensor network compared to the LEACH protocol. Gurbinder Singh Brar et. al., (2016) [24] proposed PDORP protocol which is transmission-based energy aware routing protocol. The proposed protocol PDORP has the characteristics of both power efficient gathering sensor information system(PEGASIS) and DSR routing protocols. Hybridization of genetic algorithm and bacterial foraging optimization is associated with proposed routing technique to distinguish energy proficient ideal ways. The execution examination, correlation through a hybridization approach of the proposed routing convention, gives improved result involving less piece mistake rate, a lesser amount of postponement, reduced energy consumption, and improved throughput, which prompts to enhanced QoS and drag out the lifetime of the system. S. Lindsey, C. Raghavendra et. al. (2002) [19] proposed the Power-Efficient Gathering in Sensor Information Systems (PEGASIS), which avoids the assumption of direct communication and reduces the relatively large overhead of the LEACH protocol. In PEGASIS, the nodes form a chain, and each node stores in its routing table the addresses of an upstream and a downstream node. The data collection process is initiated at the far end of the chain. Each intermediate node aggregates the received data with its local

TABLE I. *Comparison of various routing protocols*

	CLASS	LIFETIME	ENERGY EFFICIENT	THROUGHPUT	SCALABILITY
LEACH [2]	HIERARCHICAL	VERY GOOD	HIGH	VERY HIGH	HIGH
PEGASIS [19]	HIERARCHICAL	VERY GOOD	HIGH	VERY HIGH	GOOD
TEEN [13]	HIERARCHICAL	GOOD	GOOD	SATISFACTORY	GOOD
APTEEN [14]	HYBRID	VERY GOOD	GOOD	HIGH	GOOD
DIRECTED DIFFUSION [15]	FLAT	GOOD	HIGH	SATISFACTORY	RESTRICTED
EESR [16]	FLAT	VERY GOOD	HIGH	HIGH	HIGH

data before transmitting the result to its upstream neighbor. The last node in the chain is responsible for transmitting to the sink node. Liu Wenjun and Yu Jiguo et. al. (2009) [6] proposed that rather than allowing the nodes to transmit directly to the base station, a novel scheme of clustering was proposed. Clustering provides resource utilization and minimizes energy consumption in WSNs by reducing the number of sensor nodes that involve in the long-distance communication. They used an energy-efficient clustering and routing scheme for wireless sensor networks (EECR) which includes distributed nodes clustering, dynamic cluster head rotation, and inter-cluster routing selection. In clustering stage they used uneven clustering mechanism in which cluster heads (CHs) which are closer to the base station (BS) have smaller cluster size than those farther from BS, thus they can conserve some power for inter-cluster data forwarding. For the dynamic cluster head rotation mechanism, the sensor hubs perform cluster head function in turn which balances power consumption well among CHs. Gherbi Chirihane & Aliouat Zibouda et al. (2015) [25] proposed a distributed energy efficient adaptive clustering protocol with Data Gathering for WSN reduces the energy consumption and network lifetime is extended. The clustering techniques are used efficiently with distributed cluster heads. The node's ratio is turned off for fixed time period and sleep control laws are designed to reduce the cost function. The scenario displays random deployment of nodes and the total simulation time is decomposed using resource reservation. The technique distributed energy efficient adaptive clustering protocol with Data Gathering (DEACP) reduced the overall network energy consumption, balance the energy consumption among the sensors and extend the lifetime of the network by making the clustering efficient in complexity of message and time, welldistributing the cluster-heads across the network, the load balancing done well and as a result transmission power of the node is reduce which subsequently reduces the energy consumption .

4 CONCLUSION AND FUTURE SCOPE

In addition to many applications of wireless sensor networks, it is necessary to transmit information appropriately with regard to power utilization and network lifespan as well as limited resources of such networks. The most significant difficulty in such networks is routing and transferring data to the destination node in compliance with the energy problem. Therefore, energy-efficient routing protocols have significant and effective roles in wireless sensor networks. They are divided into three major groups based on data, network structure and reliability. In this study, energy-efficient routing protocols were investigated in wireless sensor networks. Then the essential classifications were introduced and related parameters of corresponding protocols were compared to each other. Despite the fact that these protocols are performing well in terms of energy conservation but issues like quality of service (QoS) would be expected to address to ensure utilization of most energy proficient way for data transfer and in addition ensuring guaranteed data transfer rate or delay. Another interesting issue in routing is that the majority of the

present routing conventions accept that the sensor hubs and the sink is stationary. In circumstances, for example, on the battlefield where the sink and maybe the sensors should be versatile. In such cases, new routing techniques are required keeping in mind the end goal to deal with the overhead of portability and topology changes in such power constrained circumstances. Integrating WSN with wired networks(i.e. Internet) is other possible future research for routing protocols .

REFERENCES

[1] Kazem Sohraby, Daniel Minoli and Taieb Znati, "Wireless Sensor Networks", ELSEVIER Inc., 2007.

[2] N. A. Pantazis, S. A. Nikolidakis, and D. D. Vergados, "Energy-efficient routing protocols in wireless sensor networks: A survey," IEEE Commun. Surv. Tut., vol. 15, no. 2, pp. 551-591, 2013.

[3] Y. Li, M. T. Thai, W. Wu, "Wireless sensor networks and applications", New York: Springer Science+Business Media, LLC pp. 7-11, 2008.

[4] Pallavi S. Katkar and Prof. (Dr.) Vijay R. Ghorpade, "A Survey on Energy Efficient Routing Protocol forWireless Sensor Networks", (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 6, 2015.

[5] Jayashri Deb Sinha and Subhabrata Barman, "Energy Efficient Routing Mechanism in Wireless Sensor Network", IEEE conference on Recent Advances in Information Technology,2012.

[6] Liu W. and Yu J., "Energy Efficient Clustering and Routing Scheme for Wireless Sensor Networks", IEEE International Conference on Intelligent Computing and Intelligent Systems, pp: 612-616, 2009.

[7] Jamal N. Al-Karaki and Ahmed E. Kamal, "Routing techniques in Wireless sensor networks: a survey", IEEE Wireless Communications, pp:6-28, 2004.

[8] J. N. Al-Karaki, and A. E. Kamal, "Routing techniques in wireless sensor networks: A Survey," IEEE Wirel. Commun., vol. 11, no. 6, pp. 6-28, 2004.

[9] S. Lindsey and K. M. Sivalingam. "Data Gathering Algorithms in Sensor Networks Using Energy Metrics." IEEE Transactions on Parallel and Distributed Systems, 13(9): 924-934, 2002.

[10] Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks.",2005 John Wiley & Sons, Ltd. ISBN: 0-470-09510-5

[11] Jayashri Deb Sinha and Subhabrata Barman, "Energy Efficient Routing Mechanism in Wireless Sensor Network", IEEE conference on Recent Advances in Information Technology,2012.

[12] Roseline, R.A., Sumathi, P, Local clustering and threshold sensitive routing algorithm for Wireless Sensor Networks, Devices, Circuits and Systems (ICDCS), 2012 International Conference, IEEE, 2012.

[13] A. Manjeshwar and D. Agrawal," TEEN: A routing protocol for Enhanced Efficiency in Wireless Sensor Networks," In Proceedings of 15th International Parallel and Distributed Processing Symposium (IPDPS'01) Workshops, USA, California, 2001, pp. 2009-2015.

[14] A. Manjeshwar, D. Agrawal," APTEEN: A Hybrid Protocol for Efficiency Routing and Comprehensive Information Retrieval in Wireless Sensor Networks," In Proceedings of International Parallel and Distributed Processing Symposium, Florida, 2002, pp.195-202.

[15] K.Sohraby, D.Minoli, T.Znati 'WIRELESS SENSOR NETWORKS, Technology, Protocols, and Applications" Published by John Wiley & Sons, Inc., Hoboken, New Jersey. 2007.

[16] H. Oh and K. Chae, "An Energy-Efficient Sensor Routing with low latency, scalability in Wireless Sensor Networks", IEEE 2007 International Conference on Multimedia and Ubiquitous Engineering, pp 147-152, May 2007.

[17] H. Oh, H. Bahn and K. Chae, "An Energy-Efficient Sensor Routing Scheme for Home Automation Networks," IEEE Transactions on Consumer Electronics, Vol.51, No.3, pp.836-839, Aug.2005.

[18] A. Norouzi, M. Dabbaghian, A. Hatamizadeh and B. Berk Ustundag, "An Improved EL Gossiping Data Distribution Technique with Emphasis on Reliability and Resource Constraints in Wireless Sensor Network," IEEE international ISBN: 978-1-4673-5613-8©2013 IEEE Conference on Electronic Computer Technology, Kuala Lumpur, 7-10 May 2010, pp. 179-183.

[19] Lindsey S. and Raghavendra C. S., "PEGASIS: Powerefficient gathering in sensor information systems", IEEE Aerospace Conference, pp: 1125-1130, 2002.

[20] Ahmad A., Latif, K., Javaid, N., Khan, A. and Qasim U., "Density controlled divide-and-rule scheme for energy efficient routing in Wireless Sensor Networks," Electrical and Computer Engineering (CCECE), 2013 26th Annual IEEE Canadian Conference on, vol., no., pp.1,4, 5-8 May 2013.

[21] Lohan P. and Chauhan R., "Geography-informed sleep scheduled and chaining based energy efficient data routing in WSN," Electrical, Electronics and Computer Science (SCEECS), 2012 IEEE Students' Conference on, vol., no., pp.1,4, 1-2 March 2012.

[22] Seongsoo Jang, Ho-Yeon Kim, Nam-Uk Kim and TaiMyoung Chung, "Energy-Efficient Clustering scheme with Concentric Hierarchy," RF and Microwave Conference (RFM), 2011 IEEE International, vol., no., pp.79,82, 12-14 Dec. 2011.

[23] Saravanakumar R, Susila S.G. and Raja J., "An energyefficient cluster based node scheduling protocol for wireless sensor networks," Computational Intelligence and Computing Research (ICCIC), 2010 IEEE International Conference on, vol.1-5, pp.28-29 Dec. 2010.

[24] Brar G. S., Rani S., Song H. and Ahmed S. H., "Energy Efficient Direction-Based PDORP Routing Protocol for WSN", IEEE Special Section on Green Communications and Networking for 5g Wireless, Vol. 4, pp: 3182-3194, 2016.

[25] Gherbi Chirihane & Aliouat Zibouda, "Distributed energyefficient adaptive clustering protocol with data gathering for large-scale wireless sensor networks", Programming and Systems (ISPS), 12th International Conference. IEEE.2015.

OTSU's and K-Means Algorithms Result Analysis in Image Segmentation

Neeraj Kumari
Research Scholar, U.K. Technical University, Dehradun, Uttarakhand, India
neeraj.computers@tmu.ac.in

Abstract: Segmentation is the initial phase in examining or translating a picture consequently. Specifically applications, similar to picture pressure or picture acknowledgment, whole picture can't be handled straightforwardly. Thus numerous segmentation procedures are proposed to fragment a picture before preparing it. This made it conceivable to create numerous methods which are right now utilizing as a part of various businesses and farming field. They are either connected for evaluating or reviewing nature of sustenance items and Fruits. These created strategies utilize thresholding and grouping way to deal with get appropriate sectioned yield. This paper focused on K-Means Algorithm and OTSU's Algorithm for image segmentation. This approach portions the Mango natural product pictures especially which are nonroundabout and caught in different enlightenment, for example, low, Medium and high power. K-Means Algorithm is eminent strategy for picture segmentation. Distinctive shape Mango organic product pictures are fragmented appropriately alongside dark scale. After the segmentation procedure thresholding are connected on the sectioned picture. Thresholding calculation "Otsu's thresholding" is connected to enhance the effectiveness of the last yield picture. The diagnostic outcome demonstrates the exact segmentation of mango Image utilizing this approach.

Keywords: Segmentation, Otsu's Algorithm, **K-Means Algorithm, Thresholding**

1. Introduction

In more seasoned days, human relies on its vision qualities to separate amongst ready and unripe natural products. Yet, this technique had high rate of blunders due to sickness, diversion and different variables amid working hours. This likewise may impacts the working rate of framework. So to diminish this disappointment rate human began to design new strategies [8][10][19]. Separating the data from pictures and understanding them for a few errands is a vital normal for Machine learning. Likewise, picture division is one of the underlying strides in bearing of understanding pictures and after that finds the diverse protests in them. Innovation progression on the picture division procedure has encountered huge development both in principle and application.

Picture division procedure was broadly utilized as a part of example acknowledgment and picture grouping in numerous regions, for example, horticultural, restorative and legal. Image segmentation is the first step for analyzing an image as well as important and challenging process of image processing [2][3]. In image segmentation technique image is divided into meaningful regions/classes having similar properties and features. With the help of image segmentation required information can be extracted for application. Many real world applications are using image segmentation process like Content Based Image Retrieval, Object Detection, Medical Imaging, Traffic Control System, etc. Segmentation process can be performed into two ways, segmentation on a specific part or region of image or segmentation on the complete image [1]. Image segmentation classification is given in Figure 1.

A. Region Based Segmentation

In this technique image is divided into regions or clusters according to the discontinuity property of pixels. Pixels with same property are grouped into one region [20].

1. Threshold: For image segmentation thresholding is considered as the simplest method. In thresholding each pixel of image is replaced by a pixel black if the pixel intensity < assigned constant X or a pixel white if the pixel intensity > assigned constant X.

2. Clustering: In clustering the objects are organized in the different classes based on their characteristics. A cluster is considered as the group of objects based on similarity and dissimilar with the objects belonging to different clusters. A various types of clustering techniques have been introduced for effective image segmentation [20].

In K-Mean image is divided into K groups/ clusters. A cluster is defined in the form of k centroids. Selection of a point for a particular cluster is done according to the closeness of point with the cetrtoids. If not closer to that cluster's centroid than in other cluster. Selection of best centroids in K-means clustering is done by alternating data points for the cluster using current centroids and centroids selection based on the current data points to cluster

II. Related Work

Thresholding-based image segmentation technique is good enough for partitioning natural images correctly [1]. In this research manual segmentation, Otsu's thresholding discussed. On the basis of these three techniques one improved thresholding technique is formed. The analysis results showed that TsTN has the ability to produce good segmentation. Segmentation techniques based on Clustering algorithm Histogram matching was used for detecting the ripeness rate of fruits and vegetables [2]. Colored images of fruits and vegetables are used as an input data. Some threshold levels are set to find the maturity level fruits and vegetables. Fuzzy homogeneity vectors and the fuzzy co occurrence matrix concept is used for image segmentation. Homogeneity vectors and the fuzzy membership function are combined for feature extraction of image [23].

An improved clustering algorithm with colour classification technique is used for segmenting the fruit images [3]. Morphological Operation, Edge Detection, Threshold, Clustering techniques are used for segmenting different food and food products images [4]. MATLAB is used for implementing and analyzing. Bacterial foraging optimization algorithm is used to find the defects on fruit surface. In this research work a novel approach of image segmentation is used for segmentation and segregation of infected fruit surface based on color features [08].

In this ABFOA approach and RGB decomposition is used for better result. A hybridized model with the combination of Morphological Operations and Watershed Segmentation technique (MOWS) focused on the segmentation techniques for overlapped regions [09]. Surface color features of fruit are extracted then segmented the defective part of fruits using K-Means Clustering and Fuzzy C-Means algorithms [11].

Gaussian low-pass filter (GLPF) is used for removing noise. K–Mean clustering algorithm is used for the defect segmentation of fruits [13]. Three to four clusters are used for defect segmentation. For experimental result defected apples are used as a case study. In addition of this ANN (artificial neural network) and Genetic Algorithms are also used for image segmentation [11].

III. Used Algorithm

The K-mean calculation is based on prominent bunching calculation and widely used for information mining, image classification, bioinformatics and numerous different fields. This calculation functions admirably with little datasets. In this paper we focused on modified kmean calculation for image classification.

A .K-Means Clustering Algorithm

K-means clustering is performed into three steps:

1. Data features are extracted.
2. Vector space is created.
3. Natural clustering is identified. In this method objects are clustered around the cancroids ui $\forall i = 1$.

In K-Means algorithm initially k pixels are selected randomly as the initial centroids for clustering. The selected centroid work for creating clusters and is used to determine which pixels belong to it. Remaining algorithm uses the iterative process as follows:

Step1: Clusters having closet centroid are assigned to the cluster. Euclidean distance is used for similarity computation, less distance represents more similar they are. That is based on pixel's intensity distribution.

Step2: Centroids initialization by k random intensities.

Step 3: Repeat step 4 and 5 until there is no more change in cluster labels.

Step 4: Image point clustering based on the distance of their intensity values from the centroid intensity values.

In this algorithm k is used as the number of clusters, i represents the number of iteration on

over all the intensity values, j iterates over all the centroids (for each cluster) and i are the centroid intensities.

After completion of clustering image is segmented based on the formed clusters. Each cluster of pixels form a separate image.

B. OTSU's Thresholding Algorith

We have performed thresholding with Otsu's thresholding. Thresholding technique is utilized to change over the dim level or paired picture into highly contrasting pixels. In this assessment, Otsu strategy was added to ascertain edge esteem consequently, and along these lines empower us to separate objects of enthusiasm from its experience.

Otsu's thresholding gives worldwide thresholding. Worldwide limit esteem is figured consequently which is utilized to get a power picture into a paired picture with im2bw. There is no code determined for taking out noise before thresholding the picture, so it contains some measure of commotion exhibit.

Otsu's calculation takes 3 seconds to create the yield. The strategy does not function admirably with variable brightening. Area of intrigue is less. It incorporates superfluous points of interest.

Otsu's thresholding technique includes repeating through all the conceivable limit esteems and figuring a measure of spread for the pixel levels each side of the edge, i.e. the pixels that either falls in closer view or foundation. The point is used to discover the limit esteem where the aggregate of forefront and foundation spreads is at its base.

IV. EXPERIMENTAL RESULT

In our experimentation we use basic segmentation methods, K-Means clustering algorithm and Otsu's Thresholding based segmentation techniques. In our experiment mangoes are selected as a case study. Basic segmentation technique is used for the segregation of mango from its background and other objects. Focused algorithm of this paper K-Means clustering and Otsu's threholding are used for segmenting the image based on color.

K-means algorithm is based on number of used clusters k for segmentation and Otsu's thresolding is based on number of created classes N. In this demonstration we used k=2 and N=2,3 and 4.

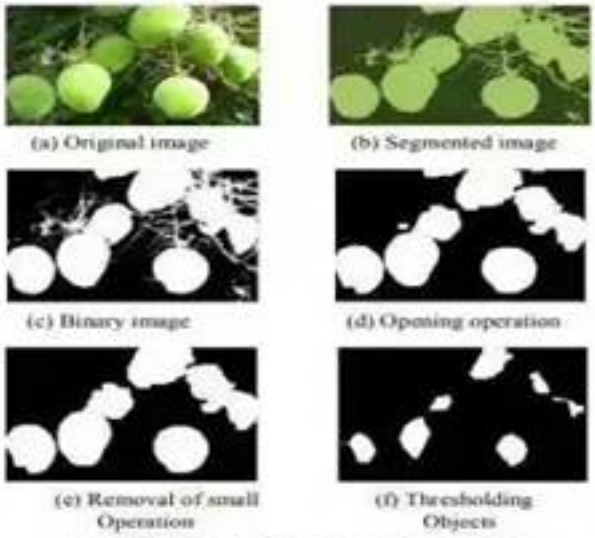


Fig. 2: Basic Thresholding based Segmentation

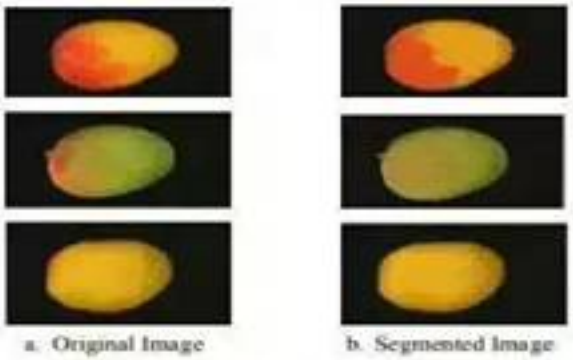


Fig. 3: K-Means based Segmentation

In experimentation of K-means based image segmentation, Fig. 3, we used two clusters.(a) is original image and (b) is segmented image. In Fig. 4 (a) is the original image and (b),(c),(d) are the Otsu's threshold based segmented images with N=2, N=3and N=4 respectively. N is the number of classes for segmentation. Original Image N=2 N=3 N=4.

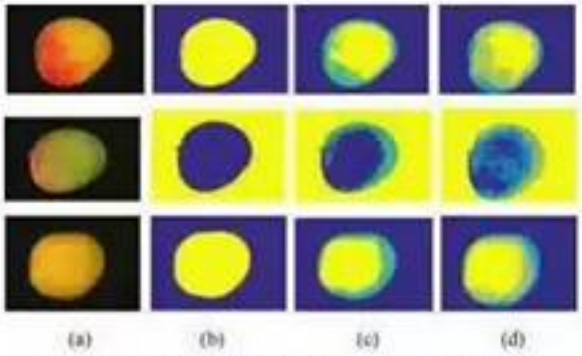


Fig. 4: Otsu's Thesholding based Segmentation (N=2,3,4)

TABLE 1: RESULTS OF SEGMENTATION TECHNIQUES

Techniques	Result
Original Image	0.289
K-means clustering	0.486
Global Thresholding	0.477
K-Means & OTSU's	0.283

References

[1] SharifahLailee Syed Abdullaha, Hamirul'AiniHambali, NursuriatiJamil, "Segmentation of Natural Images Using an Improved Thresholdingbased Technique", ELSVIER, International Symposium on Robotics and Intelligent Sensors 2012 (IRIS 2012), doi: 10.1016/j. proeng.2012.07.266

[2] MeenuDadwal, V. K. Banga, "Color Image Segmentation for Fruit Ripeness Detection: A Review", 2nd International Conference on Electrical, Electronics and Civil Engineering (ICEECE'2012) Singapore April 28–29, 2012.

[3] Miss MonaliDahapute, Mr. AmitWelekar, "Improved K-Means Clustering with Colour Classification for Segmentation of Fruit Images", International Journal of Research, Volume 03 Issue 05, March 2015, p-ISSN: 2348-6848, e-ISSN: 2348-795X.

[4] Shital V. Chavan S. S. Sambare, "Study and Analysis of Image Segmentation Techniques for Food Images", International Journal of Computer Applications (0975 – 8887) Volume 136 – No.4, February 2016.

[5] Zalak R. Barot, NarendrasinhLimbad, "An Approach for Detection and Classification of Fruit Disease: A Survey", International Journal of Science and Research (IJSR), Volume 4 Issue 12, December 2015, ISSN (Online): 2319–7064.

[6] PradeepkumarChoudhary, Rahul Khandekar, AakashBorkar, PunitChotaliya, "IMAGE PROCESSING ALGORITHM FOR FRUIT IDENTIFICATION", International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 03 | Mar - 2017, p-ISSN: 2395–0072, e-ISSN: 2395 -0056.

[7] Prabira Kumar Sethy, Shwetapadma Panda, SantiKumariBehera, Amiya Kumar Rath, "On Tree Detection, Counting & Post-Harvest grading of fruits Based on Image Processing and Machine Learning Approach-A Review", International Journal of Engineering and Technology (IJET), Vol 9 No 2 Apr-May 2017, DOI: 10.21817/ijet/2017/v9i2/170902058.

[8] P. Lakshmi Devi, S. Varadarajan, "Defect Fruit Image Analysis using Advanced Bacterial Foraging Optimizing Algorithm", IOSR Journal of Computer Engineering (IOSR-JCE), e-ISSN: 2278–0661, p-ISSN: 2278–8727Volume 14, Issue 1 (Sep. - Oct. 2013), PP 22–26.

[9] Shital V. Chavan S. S. Sambare, "Segmentation of Food Images using Morphological Operations with Watershed Segmentation Technique", International Journal of Computer Applications (0975 – 8887), Volume 151 – No.1, October 2016.

[10] Miss Monali R. Dahapute, Mr. Amitwelekar, "K-mean Clustering for Segmentation of Irregular Shape Fruit Images under Various Illumination", International Conference on Modern Trends in Engineering Science and Technology (ICMTEST 2016), ISSN: 2454–4248, Volume: 2 Issue: 5.

[11] B. Sowmya and B. Sheelarani, "Colour image segmentation using soft computing techniques," International Journal of Soft Computing pplications, vol. 4, pp. 69–80, 2009.

[12] P. M. Birgani, M. Ashtiyani, and S. Asadi, "MRI segmentation using fuzzy c-means clustering algorithm basis neural network," in Proceedings of the 3rd International Conference on Information and Communication. Technologies: From Theory to Applications, 2008, pp.1–5.

[13] S. R. Dubey and A. S. Jalal, "Robust approach for Fruit and Vegetable classification", Procedia Engineering, vol. 38, pp. 3449 – 3453, 2012.

[14] Blasco J, Aleixos N, Cubero S, Gomez SJ, Molto E (2009) "Automatic sorting of Satsuma (Citrus unshiu) segments using computer vision and morphological features". Comput Electron Agr 66:1–8.

[15] Kamalakannan, A., Rajamanickam, G., (2012) "Surface defect detection and classification in mandarin fruits using fuzzy image thresholding, binary wavelet transform and linear classifier model". Fourth International Conference on Advanced Computing (ICoAC) 1–6.

[16] Nanaa, K., Rizon, M., Abd Rahman, M.N., Ibrahim, Y., Abd Aziz, A.Z. (2014) "Detecting Mango Fruits by Using Randomized Hough Transform and Backpropagation Neural Network." 18th International Conference on Information Visualisation (IV), 388–391.

[17] Xu L., Zhao Y. (2010). "Automated strawberry grading system based on image processing." Science Direct -Computers and Electronics in Agriculture 71, 32–39.

[18] S.M. Bhandarkar, X. Luo, R.F. Daniels, E.W. Tollner, "Automated planning and optimization of lumber production using machine vision and computed tomography."IEEE Trans. Autom. Sci. Eng. 5(4), 677–695 (2008).

Radio Frequency Identification [RFID] Technology: A StudyonDawning Issues, Challenges and Future Modifications

Sheenam Naaz[1], Mir Saqlain Sajad [2]
sheenamnaaz96@gmail.com [1], saqlainsajad95@gmail.com [2]
Department of CSE, Jamia Hamdard University, New Delhi

Abstract
Presently everyone is working for automation in every field so, to aid the tedious work we can use radio frequency identification system that works on current issues faced while data organising or tagging in supply chain management. This paper provides a study on radio frequency identification (RFID) technology. RFID tags were originally designed to basically replace the barcodes in supply chains. Their advantages are that they can be read wirelessly and with no line of sight, contain more information than barcodes and are more robust. The paper describes current technology, including the ranges of frequencies and specifications used. However, privacy became a problem with increasingly omnipresent RFID tags. This paper discusses potential attacks that could infringe your privacy and also explains countermeasures. The RFID technology did not stop at item-level tagging. This paper also provides up-to-date research to find and track objects. Due to such widespread use of RFID tags, a significant reduction in the cost of producing them is of considerable interest. It turns out that printing tags can be a viable option to conventional production.

Keywords
RFID, OCR, ISO, IEC, POS, EPCIS, tags, supply chains, tracking, IR sensons

1. Introduction

Radio Frequency Identification (RFID) is a generic term for technologies which use radio waves to automatically identify individuals or objects from a distance of several inches to hundred feet. This is an Automatic Identification (Auto-ID) technology which is used to automatically identify any object. Barcode, magnetic strip, IC card, OCR, voice recognition, fingerprint Identification technologies, and Optical Strip etc. RFID technology uses automatic data capture system that helps increase the efficiency of the system. For identification purposes the combination of tag and reader is used. A code is stored in the RFID tag, and a physical object is attached to it. Now that object is easily recognizable. Then, object will transmit tag code. In this way the reader gets information about object. RFID is not a new technology in fact, but it is being applied in new ways. RFID is technology which is growing rapidly. RFID offers much advantage over traditional devices such as barcode identification. The barcode scanner must be in line of sight with the label to read the barcode. This means the items or detectors need to be manually relocated [3]. RFID, however, will read tag data without a line of sight. The RFID system also needs no alignment. RFID has a high read speed and in the presence of a barrier this may work. This technology is more effective when longer reading range, fast scanning and flexible data carrying capabilities are required. RFID system has received increasing attention in many areas, such as manufacturing companies, agriculture, transportation and industries [5] etc. 13.56 MHz and 860-930 MHz for passive RFID; 433 MHz for active RFID and 2.45 GHz. A significant issue is global standardization of the RFID system. Different manufacturers implemented the RFID in different ways. There is no universal norm that can be used everywhere. For different RFID applications various standards or protocols are proposed. Those standards include physics of hardware Specification, specification of the tag-reader air interface,

and specification of the reader host command. A number of organisations, including the International Organization for Standardization (ISO), the International Electro Technical Commission (IEC), and global, have set standards for RFID. The following is a short list of RFID standards [2]: ISO 10374, ISO 10536, ISO 11784, ISO 14443, ISO 15693, IS0 18000, EPC globally Both standards manage communication between the tag and the RFID reader. These standards operate on specified frequency bands (e.g. 860 – 915 MHz for UHF or 13.56 MHz for HF). Different aspects of RFID technology will be provided here.

1.1. Motivation for the paper

Given the breath of the fields contributing to RFID technology and the rapidly changing nature of the technology, finding a comprehensive survey of the entire landscape is difficult for students and others who wish to start research in this area. There are some good survey papers on certain particular aspects of the technology as outlined in the next section, but there is no source where a new researcher exists Can get an overview of the major research efforts in the field as a whole to help determine where one might want to concentrate one's research.

1.2. Our Contributions

In this paper we look at ongoing research activities in the RFID field as a whole and begin by discussing the major challenges facing RFID technology today and next, we discuss the ongoing research efforts to try and address these challenges. We also draw attention to three areas that we believe need more research, so that this technology is widely adoptedin this work we aim to illustrate the interdisciplinary nature of the contributions to this technology in the research.

2. Current RFID Technology

This section describes which parts consist of RFID tags, how they work in principle, and what types of tags do exist. It focuses on how tags are powered and what ranges of frequencies are used. The section concludes by covering some key standards.

Figure 1: Parts of an RFID system

The chip size also depends on the Antenna. The size and shape depend on the frequency of use of the tag. The size of a tag depends also on the area of use. For implants, it can vary from less than a millimetre to the size of a container logistic paper. Some tags also have rewritable memory attached in addition to the microchip, where the tag can store updates between reading cycles or new data such as serial numbers [6].

Figure 2 shows a RFID tag. The antenna is visible quite clearly. As said before the tag's size has the greatest impact on the antenna. The microchip is visible in the middle of the tag and there is no internal power source since this is a passive tag.

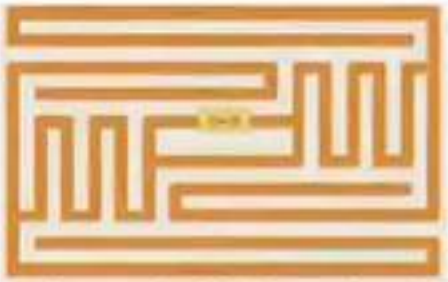


Figure 2: A passive RFID tag (from [Wiki-RFID], used under the GNU Free Documentation License)

An RFID tag works as follows in principle: the reading unit generates an electro-magnetic field which induces a current into the antenna of the tag. Uses the current to power the chip. The current also charges a condenser in passive tags which guarantees the chip uninterrupted power. In active tags the condenser is

replaced by the battery Shortly explaining the difference between the active and passive tags. Once the tag is activated, it receives commands from the read unit and answers by sending its serial number or the information requested. The tag generally does not have enough energy to create its own electro-magnetic field, but instead uses back-scattering to modulate (reflect / absorb) the field sent by the read unit. Because most fluids absorb electro-magnetic fields, and most metal represents those fields, it is difficult to read tags in the presence of those materials.

The reader has to keep on powering the tag during a reading cycle. The field created is called continuous wave, and because the strength of the field decreases with the distance square, the readers must use a rather large power That field overpowers any response a tag could give, so tags respond directly below and above the continuous wave frequency on side channels.

We distinguish 3 types of RFID tags in relation to power or energy:

2.1. Role of RFID in IT Infrastructure and DataManagement

To get maximum benefits from RFID technology, applications will need to be fully integrated into the IT infrastructure of the enterprise. The RFID systems serve as data sources (or inputs) in this infrastructure; however, when tags are inserted into sensors and other tools, the tagged object will act as a network node with data flowing between the node and backend in both directions [7][8]. The amount of data generated by an RFID system depends on the number of items tagged, the number of readers in the supply chain and if any, the security protocol used. To deal with issues such as multiple reads of an item at a given location, this data must be sent to backend systems where its is' scrubbed.' Several security protocols have been proposed that rely on the tag identifier being stored in a central database, while the tag stores a key or PIN that is linked to the tag identifier by some mathematical function [9][10]. The key stored on the tags changes ' randomly,' typically after each reader's response to a query, giving the tag anonymity. In these security schemes the central database must be available at all times, hence these schemes are also referred to as online security protocols. This latter condition will further strain network resources for systems that adopt these protocols online. These safety protocols will need to be studied from the perspective of network scalability and availability.

EPCglobal's Electronic Product Code Information Services (EPCIS) standard allows seamless interchange of RFID information across organizations and within them (EPCglobal 2007). Further study is also needed to address issues such as: Occasional missed reads of a tagged item in a multi-tracking location supply chain, resulting in a partially complete tracking record for the tagged item.

Assessing the potential of current networking protocols to accommodate RFID systems ' mass-market adoption. This standard, however, is based on sharing data from Class 1 tags and as Oren and Shamir (2006) have already shown this process is not secure. In an environment with secure RFID systems, the exchange of RFID information between business partners is an area that still requires some research once the secure RFID systems are developed. More analysis is also needed to address issues such as: Occasional missed readings of a tagged object in a multi-tracking location supply chain, resulting in a partially full tracking record for the tagged item.

Assessing the potential of current networking protocols to accommodate RFID systems ' mass-market adoption.

2.2. Analytics and Enterprise Use of RFIDData

Data from RFID systems provides at a minimum a three-dimensional view (product, spatial and temporal) of an item; the product is identified by the tag ID, the reader provides the location where the tag was read and the time when it was read. Each data dimension may be used to track items individually or in aggregate. Additional data measurements may be given by adding more memory to the tag to allow monitoring of additional states, such as date of manufacture or date of expiry. To explore ways:

- use this data to improve business functions such as supply chain management and product pricing; more research is needed.
- Utilize this data to improve business functions, such as supply chain management and productpricing.
- Combine and present these data dimensions in meaningful ways to potential users, in order to facilitate better businessdecisions.

2.3. RFID based Consumer Post-PurchaseUses

Mass-market RFID adoption must be driven by consumer demand. There is a delivered value versus acceptable risk (in terms of privacy, cost, safety and other concerns) equation for the consumer and any successful RFID application will have to consider this equation from the point of view of the consumer (Eckeldt 2005). Research into post-purchase uses of tagged products and RFID systems at home will be an ongoing process, and the more consumers can directly benefit from RFID technology the more suppliers will demand RFID-enabled products. Some of the reputed post-purchase uses are (Günther, and Spiekermann 2005: 75):

3. Attacks against RFID Systems

We describe different kinds of attacks and exploits that an RFID system may suffer from several attacks which are as follows:

Figure 3: Types of RFID Tags and their working respectively.

Figure 3: Types of RFID Tags and their working respectively.

Figure 4: RFID based Post Purchases Uses.

It is becoming increasingly apparent that technology alone is not enough to solve all of the above-mentioned problems; it needs support from the legislature. Some US states have already introduced laws such as the 2005 "Identity Data Protection Act" in California. Even if a sophisticated tag could be built with strong encryption etc. it would raise the price of tags and thus make it uninteresting for most applications.

Many important issues are addressed in this section. Next, possible vulnerabilities have been discussed and ideas have been put forward that try to fix such problems. Those proposals range from simple measures like destroying the tag with the kill command to more sophisticated approaches like the guardian Attachment. Then it described authentication in RFID systems. This is a difficult issue, mainly due to the limited resources on the chip. Last but not least, there were talk of several attacks against the RFID system. Although the RFID tags are simple, many exploits are possible.

4. CHALLENGES OF RFID

Today, many supply chain inefficiencies originate from inaccurate data about where products are in the supply chain. Retailers may provide point of sale (POS) data to the manufacturer, but without the knowledge of existing inventory levels and stock in transit, these data points are not sufficient for accurate demandplanning.

While there is increasing pressure on manufacturers, distributors, and retailers to maximize efficiency, minimize cost and provide the best value to the endcustomer

- Buffer stocks, out-of-stocks and late shipments impact on margins ofproducts.
- Inaccurate data causes expensive manual interventions 30 per cent of supplier transactions containerrors.
- Discontinuous data flow across the supply chain leads to redundant data entry/duplication ofeffort.
- Inability to trace products and ingredients to suppliers and customers makes information sharing and product recalls complex andexpensive.
- Cost effectiveness of RFID technology
- Lack of standardisation in RFID becomes the challenge for selecting the besttechnology.

5. DRAWBACKS OF RFIDTECHNOLOGY

- **Dead areas and orientation problems**
  RFID functions close to cell phone or wireless network technologies. Like these systems, some places may have weaker signals and lower read rates are sometimes a concern when the tag is rotated into a direction that is not well suited to the reader.
- **Security concerns**
  Since RFID is not a bar-coding line-of-sight system, new security issues may arise. For example, a competitor could set up a high-gain directional antenna for scanning tags in trucks that go to a warehouse. This competitor could determine flow rates of different materials based on received information. Furthermore, hacking is always a risk when using RFID for high-security operations, such as payment methods.
- **Ghost tags**
  In rare cases, if multiple tags are read simultaneously, the reader will sometimes read a tag that is not present. Therefore, some type of read check, there are CRCs, should be implemented either in the tag, reader, or tag read data.
- **Prone/vulnerable to damage**
  The tags may be damaged by water, static discharge or high-powered magnetic surges (such as lightning strike).
- **Unread tags**
  When reading several tags at the same step, certain tags may not be read and when the items are not in sight there is no sure method to establish this. The issue does not happen for barcodes, for this when the barcode is scanned, it is automatically checked when the scanner is read by a beep and the data can then be entered manually if it is not scanned.
- **High costing**

The parts and tags are more expensive compared to barcodes, because this technology is still new. Like software and support

Figure 5: Types of Security Threats

staff needed to install and operate the RFID read systems (for example in a warehouse) may be more expensive to use.

- **Collision with RFID Reader**
  Reader collision happens when two or more reader signals overlap. The simultaneous queries tag is unable to respond, and to avoid this question, systems must be carefully set up; other devices use an anti-collision protocol (also known as a simulation protocol. Anti-collision protocols require tags to turn over when they are sent to a reader.
- **RFID tags are problematic to remove**
  RFID tags are difficult for customers to remove; some are very small (less than half a millimetre square and as thin as a sheet of paper); others can be covered or inserted inside a product where they can be removed. Where customers are unable to see these. New technologies allow RFID tags to be "printed" directly on a product, and may not be removable at all. When consumers barred documents with RFID tags, they are apprehensive about their privacy

5.1. Perquisites of RFID technology

- **Library mission**
  Some libraries view RFID as an opportunity to improve other parts of their mission, possibly neglected, by automating elements of their circulation activities and redeploying staff. Library outreach programs such as language training, children's programming and new Canadian services can take advantage of the energies of qualified and interested staff redeployed from a more automated circulation system.
- **Speed of circulation**
  RFID has been shown to reduce circulation congestion at both self-checking stations and at the circulation desk, allowing for the simultaneous check-out of stacks of items. Most librarians agree that that waits for delivery translates into better customer satisfaction.
- **Best Usage of Money**
  Return on investment calculation for RFID, depending on some variables, shows a three to seven-year investment payback period. Libraries that have completed a full ROI calculation believe they can enjoy significant hard and soft future savings.
- **Future growth**
  RFID productivity gains may not be a current necessity, but in rapidly growing populations, library directors and boards are worried about being able to offer the current level of services in the future. Rising populations means increasing circulation, increasing demands and stretching library services. Some libraries see the implementation of a staged RFID as a solution to future library resourcing problems.
- **New library**
  The best time to discuss RFID is when designing and constructing a new library or renovating an existing building. The architect can accommodate siltation and other measures more easily Planning equipment and RFID investment appear to be less significant when rolled into a capital building or budget for renovation

6. Expectations fromRFID leading to Future modifications

RFID technology will only be used more commonly in libraries as the cost of tags continues to decline and the security issues are resolved. Because there is greater demand for the product, basic economic rules will apply, there will be greater supply and lower costs. The same applies to the information security provided by RFID, as there is a greater demand for increased security, the technology must evolve and become usable. The industry will respond to its customers ' will,

commercial as well as public, just as these will respond to the public's will.

Figure 6: RFID based SMART approaches

Security analysis of RFID based devices can be used for which many smart applications are integrated with educative environments. One or more of following smart approaches may be integrated with educative environments as shown in the figure above.

7. APPLICATIONS OF RFID

- **Tracking system for student'ssafety**

Tracking system for the safety of students Safety and security of students is a challenging task for the management of the school as well as for the responsibility of parents or guardians. With regard to the behaviour and safety of the students, school management and teachers face major challenges in introducing security within the educational environment. It is easy to trace the children and the school bus location. The bus speed can also be controlled while the activities inside the school bus are continuously monitored. Through the new communication technology such as RFID systems [26], the happiness of parents, teachers and school staff can be achieved so far, monitoring and recognition.

- **CampusManagement**

One of the issues in educational environments is the protection in campus management. Managing large amounts of data is still a complicated issue because security is not effective. There are many vulnerabilities in current campus management systems when the data is handled manually or using conventional methods. Thus, all these flaws can be perfectly solved by introducing RFID devices integrated with security in campus management system. Here the level of security according to the applications should be considered.

- **LibraryManagement**

The library system now uses online approach for most of the day-to-day operations that include e-book collection and storage and administration. Short range of RFID devices can be used within library environment with reasonable security. Library uses Internet facilities with existing network infrastructure to provide fast information. Internet security is used to prevent unwanted data from accessing the library management system. The new RFID network management for next generation network is being built with versatile protection to improve security in educational environment. For example, the anti-theft gate RFID EAS (Electronic Article Surveillance) can be used for library management system that is easy to integrate with next-generation network.

- **Employee's access andmanagement**

The education system should provide a secure solution for all workers to access and confidentially handle their personal information. In keeping with security, the access and management system of the employees may be concerned after two problems. Security-rich password management Integrates with enterprise identity management system Single sign-on approach is used in above cases to enhance the security [28]. Available protection algorithms can be applied to increase efficiency in order to improve security in educational environments via

RFID devices [24]. Authentication variables, access agent, identity wallet etc are some of the security solutions that can be studied to improve access and management for the employees. There are plenty of other choices that can be examined in educational environments through the RFID tools or systems used [27].

Password self-service and Strong RFID authentication are also exampling for improving security in selected educational environment fields. Efficient safety according to the field should be implemented in the access system of the employees. RFID-based security system can be introduced as a new device to handle these problems, which will solve a number of potential problems in educational environments [24, 25].

The e-reader, which is integrated with most wireless devices, is available for those interested in reading academic books and relevant academic support books. Wireless tools are merged with wireless networks and RFID devices. The wireless networks employ a number of security algorithms. Using RFID devices, the e-reader can be interacted which will provide instance output of reading ability for students. Wireless network security provides a number of benefits for those who use RFID devices within the educational environment[24]. There are many RFID-based devices that are used around or in educational environments where safety is one of the potential challenges. In this paper, specific RFID-based devices needing some form of low and high complexity security will be considered as a basic understanding and illustration of the potential issues. This device will detect what students have done for the last 12 hours, because to understand the lessons, physical and mental conditions should be relaxed. This system will not only support the learning and listing attitude of students but also provide full enhancement of the appropriate security for academic curriculum used in educational environment[25].

8. Literaturereview

- **RFID technology intracking**

RFID technology tracking consists of two primary components-tags and readersAn RFID tag comes with a microchip and antenna. The microchip stores information about objects (such as the serial number), while the antenna allows the microchip to forward information about objects to the reader. The reader creates a magnetic field with the tag antenna, and the tag uses this magnetic field to send the reader information about the objects. There is also a third component in an RFID system–a computer used to interpret and store data and perform required actions (Attaran, 2007).

An RFID tag may be used for the same purposes as a barcode but an RFID tag has some additional features that traditional barcodes do not have:

(I) Reading RFID does not require visual contact.

(II) The RFID tag information may be changed while reading, which also allows the reuse of RFID tags

(III) Several RFID tags may be read at the same time

(IV) The RFID tag information capacity is greater than that of traditional barcodes

(V) RFID tags are much more durable than barcodes (Wyld, 2006). RFID is mainly used for tracking and tracing pur-poses in supply chain management. Tracking systems are based on checkpoints which record monitored item movements (Loebbecke and Powell, 1998).

Tracking systems have the main function of connecting the physical material flow with information systems (Stefansson and Tilanus, 2001). The benefits of monitoring are: real-time

synchronization of material flows and individual tracked objects, such as merging-in-transit; providing an efficient link between physical reality and information systems, such as improved inventory count and product receipt transactions; improved logistics management metrics and analyzes (Ala-Risku et al., 2003; Ka¨rkka¨inen&Holmstro¨m, 2002; Ka¨rkka¨inen et al.2004) Implementation of RFID tracking system challenges Although articles on RFID tracking in the supply chain field usually focus on explaining the solutions and opportunities of supply chain management technology, most articles also mention the challenges and obstacles to RFID technology being adopted for this purpose. There are even posts that concentrate on posing certain difficulties and different points of view around the subject or providing a list of potential problems or even obstacles. The remainder of this subchapter addresses the difficulties of following the RFID monitoring contained in the literature. Different standards and insufficient technology Deficient standards are commonly mentioned as an issue, because globally agreed RFID standards are a relatively new phenomenon (e.g., Ngai & Gunasekaran, 2009; Attaran, 2007). A somewhat standard-related issue is the different frequency cies used around the world (e.g. Wu et al., 2006; Moon & Ngai, 2008). Another technological challenge often mentioned is a tag reading problem. Poor reading can be caused by materials which absorb radio waves (e.g. metal or water) around or under the tags (e.g. Li et al., 2006). The other reasons for poor reading may be the wrong position of antennas relative to the direction of the reader, or collisions with radio transmission caused by too many RFID tags, or just the different quality of tags (e.g. Asif & Mandiviwalla, 2005).

- **Challenges for RFID tracking system implementation**

While articles on RFID tracking in the supply chain sector typically concentrate on describing the technology's solutions and opportunities for supply chain management, most articles often address the challenges and barriers to RFID technology being implemented for this purpose. There are even articles that focus on presenting some challenges and different points of view around the topic, or presenting a list of possible challenges or even obstacles. The remainder of this subchapter discusses the challenges of adopting the RFID tracking found in the literature.

- **Different standards and the in sufficient technology**

Deficient standards are commonly mentioned as a problem, because RFID standards agreed on globally are a relatively new phenomenon (e.g. Ngai & Gunasekaran, 2009; Attaran, 2007). The various frequencies used around the world are somewhat related to norms (e.g. Wu et al., 2006; Moon & Ngai, 2008). Another technological challenge frequently mentioned is the problem of reading tags. Bad reading can be caused by materials which absorb radio waves (e.g. metal or water) around or under the tags (e.g. Li et al., 2006). The other reasons for poor reading can be the incorrect position of antennas relative to the direction of the reader, or collisions caused by too many radio transmissions

- **Ethics and privacy**

Many articles focus on the ethics and privacy issues related to the RFID technology (Visich et al., 2009). By applying RFID technology for tracking purposes, some businesses are afraid of the negative reaction of customers and public organisations. Benetton's 2003 RFID trial is one example of the power of public opinion. The company ordered 15

million RFID tags for item-level pullover monitoring, but the company never implemented the pilot because the consumers began to boycott Benetton's shops, with customers worried about privacy loss (Blanchard, 2003; McGinty, 2004).

- **Security and data sharing problems**
  A slightly related issue with privacy is security concerns. If the tags contain considerable information about the history of product handling, the other supply chain partners may obtain confidential information about the supply chain practices of competitors, such as shares of various suppliers and the product delivery time (Santos & Smith, 2007). In theory, some outsiders may be able to break the code and read the tag information by using their own RFID reader, and without physical access to the item (Asif & Mandiviwalla, 2005). Another more serious fear is that somebody could change the RFID tag information using their own RFID reader (Li et al., 2006).To work effectively, a supply chain-wide RFID tracking system requires information sharing, which creates an indirect security concern when companies may hesitate to share with other companies all the information necessary to obtain the full benefits of visibility of the supply chains. However, even if companies are willing to share all the information obtained by RFID readers, Asif & Mandiviwalla (2005) also points out the reverse issue that too much information causes problems for the handling and storage capacity of the information systems, especially if the companies have not agreed on common procedures to restrict the amount of data.
- **Dual tracking systems**
  RFID tracking is estimated to replace ancient long-term tracking systems. However, RFID can not replace the barcode, which is currently the most common tracking technology used at the moment. Numerous articles describe this problem of dual tracking system situations (e.g., Ngai & Gunasekaran, 2009; Ross et al., 2009).
- **Lack of the information about existing RFID tracking implementations**
  Visich et al., (2009) pointed out that the information about the existing RFID tracking implementations is confusing. Technology providers usually have signed non-disclosure agreements with their customers, thereby preventing them from discussing these implementations. Lee & O¨ zer (2007) highlight the fact that the best- known papers and reports about the benefits of RFID tracking have been written by technology consultants and other experts representing organizations which gain when RFID technology adoption increases. Consequently, the knowledge about unrealistically high standards of RFID tracking capacity, combined with the lack of quantitative data from actual cases, frustrates the executives responsible for implementing RFID tracking decisions (Lee & O¨ zer, 2007; Visich et al., 2009).

8.1. Summary of the RFID tracking implementation challenges

In the reviewed articles, the journal's viewpoint and target group appear to affect the topics considered challenges or obstacles and how they are classified. There are also various obstacles and challenges which are interrelated. For example, most of the technological problems can be solved by buying more expensive technology and using the assistance of external experts.Also the need to reorganize business processes in order to better exploit the possibilities of RFID tracking can be seen either as a cost problem or as a matter of the capacity of the management to understand the strategic opportunities of improved tracking.

9. Conclusion

The crux of this paper lies in the blooming scope of work lined up for RFID technology. it is quite easy to implement

which would help in easing our work load. The past is gone which used manual working now it is the 21st century which needs such technology to solve real world problems by making everything efficient. RFID technology has some drawbacks but now we could put few innovative minds behind it to clear the path for smooth workflow. few more amendments can be done is the security areas leading to more reliable system by use of IOT and Artificial intelligence which can enhance the performance.

References

[1] Dr. R. Seethalakshmi1, Ms. Annapoorani. N2, Ms.Priyanka.S3, Professor1, Department of Computer Engineering, Vel Tech High Tech Dr.RangaranjanDr.Sakunthala Engineering College, Avadi, Tamil Nadu. UG Scholar2, 3, Department of Computer Engineering2, 3, toll E-Ticketing System using RFID Technology, International Journal of Advanced Research in Basic Engineering Sciences and Technology (IJARBEST) Vol.3, Special Issue.25, February 2017

[2] Anagha S Ranjit1, Dona David2, Aathira Ravindran3, Sreetha E S4 1,2,3 B. TechStudent, Dept. of Computer Science Engineering, Sahrdaya College of Engineering & Technology, Kerala, India, Unmanned Toll E-Ticketing System,international research journal of engineering and technology [irjet], volume: 05 issue:03, march 2018. [online] Available: https://www.irjet.net/archives/V5/i3/IRJET-V5I3814.pdf

[3] Hrudya K.P.*1,Alisha Nelson #2, Diana P.A.#3,Emilda Jojo#4,Sheril Johnson#5, *Assistant Professor, University Of Calicut, Computer Science Department, IES College of Engineering, Chittilappilly P.O,Thrissur,Kerala-680 551,India ,#University Of Calicut, Computer Science Department ,IES College of Engineering Chittilappilly P.O.,Thrissur,Kerala-680 551, India Automated toll collection using RFID, International journal of computer trends and technology, volume 47 number 3 May 2017

[4] Mr.Abhijeet Suryatali and Mr.V.B.Dharmadhikari," Computer Vision Based Vehicle Detection for Toll Collection System Using Embedded Linux" International Conference on Circuit, Power and Computing Technologies [ICCPCT] 2015.

[5] By guest writer,Smart cold chain: how IOT and RFID save products from spoilage October 7, 2019 [online] Available: https://www.iotforall.com/rfid-iot/

[6] Mr. D. Baskaran, Mr. M. Puttumuthu. Ms. B. Priyadarshini , Mr. P. Shabab Akram , Ms. S. Sripriya, international journal of engineering research and technology [ijert], RFID based smart bus using embedded system. Special issue -2016 [online] Available: https://www.ijert.org/research/rfid-based-smart-bus-using-embedded-system-IJERTCONV4IS11005.pdf

[7] Abu Md. Numan-Al-Mobin, Jeevan M. Meruga, William M. Cross, Jon J. Kellar, Dimitris E. Anagnostou, "QR code antenna for Wireless and Security applications", IEEE Antenna and Prop. Society (APSURSI), pp. 1728-1729, July 2013.

[8] Abu Md. Numan-Al-Mobin, William M. Cross, Jon J. Kellar, Dimitris E. Anagnostou, "RFID integrated QR Code Tag antenna" in, IEEE, 2015.

[9] Sagar Yadav, "RFID Implemented Parking System", International Journal of Information and Computation Technology, vol. 4, ISSN 0974-2239. Umar Farooq, Mahmood ul Hasan, Muhammad Amar, Athar Hanif, Muhammad Usman Asad, "RFID Based Security and Access Control System", IACSIT International Journal

of Engineering and Technology, vol. 6, no. 4, August 2014.

[10] Priyanka Chhoriya, Govinda Paliwal, Poonam Badhan, Sir M. Visvesvaraya Image Processing Based Automatic Toll Booth in Indian Conditions. Engineering 2013 Maria Grazia GNONI, Alessandra ROLLO, Piergiuseppe TUNDO, "A smart model for urban ticketing based on RFID applications," IEEM09-P-0572, 2009 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM).

[11] VenugopalPrasanth, Hari Prasad R., K.P. Soman, "Ticketing Solutions for Indian Railways Using RFID Technology," act, 2009 International Conference on Advances in Computing, Control, and Telecommunication Technologies, pp.217-219, 2009.

[12] Wei-Hsun Lee a, b, *, Shian-Shyong Tseng a, c, Ching-Hung Wang baDepartment of Computer Science, National Chiao Tung University, No. 1001, University Road, Hshinchu 300, Taiwan, ROCTelecommunication Labs. Chunghwa Telecom Co., Ltd., No. 12, Lane 551, Min-Tsu Road, Sec. 5, Taoyuan 326, Taiwan c Department of Information Science & Applications, Asia University, Taichung 41354, Taiwan, Design and implementation of electronic toll collection system based on vehicle positioning system techniques.

[13] Claire Swedberg"Moscow Metro Tries RFID-Enabled Ticketing", RFID Journal, 15 February, 2007 [online] Available: http://www.rfidjournal.com/article/view/3049/.

[14] Wei-Hsun Lee, Bor-Shenn Jeng, Shian-Shyong Tseng, Ching-Hung Wang, Iee International Conference On Networking Sensing and Control, Electronic toll collection based on vehicle-positioning system techniques. Publisher: IEEE, March 2004 [online] Available: https://ieeexplore.ieee.org/document/1297515

[15] Amrita Singh Jadoun, RFID based automated railway ticketing system. April 7, 2017. [online] Available: https://www.youtube.com/watch?v=nGedyrw9aX0

[16] Rajesh H. Chaudhary, Chapter 1 introduction to toll collection system in India – shodhganga, Nov 14 ,2003.

[17] Md. Foisal Mahedi Hasan, Golam Tangim, Md.Kafiul Islam, Md.RezwanulHaqueKhandokar, ArifUlAlam Junior Lecturer, SECS, Independent University, Bangladesh, email: tangimiut@gmail.com, kafiiut@gmail.com,udyc1087@yahoo.com, Core Network Planning, Robi (Axiata), Dhaka, Bangladesh,email: foisal02@yahoo.com Lecturer, Dept. of ETE, University of Liberal Arts Bangladesh, email: apueee@yahoo.com, RFID-based Ticketing for Public Transport System: Perspective Megacity Dhaka , [online] Available: https://www.scribd.com/document/228622353/F6-Hasan-RFID-Ticketing.

[18] Chakshu Agarwal,Electronic road pricing. Publisher [online] Available: https://www.scribd.com/document/84805063/Electronic-Road-Pricing

[19] Eckeldt, B. (2005) "What does RFID do for the consumer." Communications of the ACM 48, (9) 77-79

[20] Engels, D.W., and Sarma, S.E. (2002) "The Reader Collision Problem." In Proceedings of the IEEE International Conference on Systems, Man and Cybernetics 3, (10)

[21] Ohkubo, M., Suzuki, K., and Kinoshita, S. (2004) "Efficient hash-chain based RFID privacy protection scheme." In Proceedings of the International Conference on Ubiquitous Computing, 'Workshop on

Privacy: Current Status and Future Directions'

[22] Engels, D.W., and Sarma, S.E. (2002) "The Reader Collision Problem." In Proceedings of the IEEE International Conference on Systems, Man and Cybernetics 3, (10) EPCglobal (2007) EPC Information Services (EPCIS) Specification Version 1.0 [online] available from <http://www.epcglobalinc.org/standards/epcis/EPCIS_1_0- StandardRatified-20070412.pdf> [10 August 2007]

[23] Günther, O., and Spiekermann, S. (2005) "RFID and the perception of control: The consumer's view." Communications of the ACM 48, (9) 73-76

[24] [Rieback06a] M. R. Rieback, B. Crispo, and A. S. Tanenbaum, "The Evolution of RFID Security"; Pervasive Computing, IEEE Volume 5, Issue 1, Jan.- Mar. 2006. [Rieback06b] Melanie R. Rieback, Bruno Crispo, Andrew S. Tanenbaum, "Is Your Cat Infected with a Computer Virus?", http://www.rfidvirus.org/papers/percom.06.pdf

[25] [ColoradoLaw] Colorado State Legislature: Colorado state legislature makes aluminum underwear a misdemeanor, http://www.state.co.us/gov_dir/leg_dir/olls/sl2001/sl.162.htm [EZ-Pass] Electronic toll collection for toll roads and bridges: http://www.e-zpassiag.com

[26] Visich,J.,Li,S.,Khumawala,B.&Reyes, P.(2009), Empiricalevidence of RFID impactsonsupplychain performance, International Journal of Operations & Production Management, 29(12),1290–1315.

[27] Attaran, M. (2007). RFID: An enabler of supply chain operations, Supply Chain Management: Aninternational Journal, 12(4), 249–257.

[28] Loebbecke, C. & Powell, P. (1998). Competitive advantage from IT in logistics: The integrated transport tracking system, International Journal of Information Management, 18(1), 17–27.

[29] Wyld, D. (2006). RFID 101: The next big thing for management, Management Research News, 29(4), 154–173.

[30] Ala-Risku, T., Kärkkäinen, M.&Holmström, J.(2003). Evaluating the applicability of merge-in-transit, International Journal of Logistics Management, 14(2), 67–81.

[31] Kärkkäinen, M., Ala-Risku, T.&Främling, K.(2004). Efficienttracking for short-termmulti-company networks, International Journal of Physical Distribution and Logistics Management, 34(7), 545–564.

[32] Ngai, E. & Gunasekaran, A. (2009). RFID adoption: issues and challenges, International Journal of Enterprise Information Systems, 5(1), 1–8.

[33] Ngai, E., To, C., Moon, K., Chan, L., Yeung, P. & Lee, M. (2010), RFID systems implementation: A comprehensive framework and a case study, International Journal Of Production Research, 48(9), 2583–2612.

[34] Wu,N., Nystrom, M., Lin, T.&Yu,H.(2006). Challengestoglobal RFIDadoption, Technovation, 26(12), 1317–1323.

[35] Asif, Z. & Mandiviwalla, M. (2005). Integrating the supply chain with RFID: A technical and business analysis, Communications of the Association for Information Systems, 2005(15), 393–427.

[36] Vijayaraman, B. & Osyk, B. (2006). An empirical study of RFID implementation in the warehousing industry, The International Journal of Logistics Management, 17(1), 6–20.

[37] Bottani, E. & Rizzi, A.(2008). Economical assessment of the impact of RFID technology and EPC system on the fast-moving consumer goods

supply chain, International Journal of Production Economics, 112(2)548–569.

[38] Pedroso, M., Zwicker, R.&deSouza, C.(2009), RFIDadoption: Framework and survey in large Brazilian companies, Industrial Management and Data Systems, 109(7),877–897.

[39] Blanchard, D. (2003). Fearsof 'BigBrother'sidetrack Benetton'ssmarttaginitiative,Transportationand Distribution, 44(7),20.

[40] Brown, I.&Russel, J.(2007). Radio frequency identification technology: An exploratory study on adoption in the South African retail sector, International Journal of Information Management, 27(4), 250–265.

[41] Matalka, M, Visich, J. & Suhong, L. (2010). Reviewing the drivers and challenges in RFID implementation in the pharmaceutical supply chain, International Journal of Electronic Business, 7(5), 473–490.

[42] Rutner, S., Waller, M. &Menzer J. (2004). A practical look at RFID, Supply Chain Management Review, 8(1), 36–41.

[43] Dutta, A., Lee, H. & Whang, S. (2007). RFID and Operations Management: Technology, Value and Incentives, Production and Operations Management, 16(5), 646–655.

[44] Lee, H. & Özer, Ö.(2007). Unlocking the Value of RFID, Production and Operations Management, 16(1), 40–64.

[45] http://www.webopedia.com/TERM/R/RFID.html

[46] http://oxforddictionaries.com/definition/english/RFID

[47] http://www.inlogic.com/rfid/rfid_vs_barcode.aspx

[48] http://www.technovelgy.com/ct/Technology-Article.asp?ArtNum=20

[49] http://www.community.psion.com/cfs-file.../4300.History-of-RFID-008.pdf

[50] http://terpconnect.umd.edu/~seglof f/RFIDTest3/FutureofRFID.html

VIRTUAL LEARNING ENVIRONMENT: ISSUES AND SUGGESTIONS

Dr. Megha Sharma
Associate Professor, Faculty of Engineering & Computing Sciences,
Teerthanker Mahaveer University, Moradabad(U.P.),

Abstract:
In the era of ICT and Internet it is important to keep pace with rapid changes in the technology that are taking place in the world, especially for developing countries with strong emphasis on the Education sector. For this, changes ought to be introduced in the teaching-learning process. The Use of Internet is becoming an engine of innovation in education. The Internet or indeed ICT and all its interactive elements are able to have an extremely positive impact to the learning potential of students as well as teachers. Virtual Learning Environment (VLE) is a web-based toolkit that facilitates learning through the provision and integration of online teaching and learning materials. This paper shows the concept of virtual learning environment, virtual community, characteristics of present virtual learning environment/classrooms; differentiate with traditional learning environment, demerits and suggestions of VLE, proposed model and some innovative initiatives by the government of India.

Keywords:
ICT, VLE, Collaborative Learning, Virtual community, Video Conferencing, e-Library, Virtual Classroom.

Introduction:

We know the field of Information and Communication Technology is a challenging field. The rapid growth and uses of Internet made in the field of ICT have led to a revolutionary shift in the field of education and training and the Open library plays a vital role. More and more learners/students are taking education via these open sources to relish their dreams. To cater to this large segment of learners, a number of institutions including the virtual institutions have started offering a wide range of courses on the web called web-based education tutorials or online courses or virtual courses. They can access these tutorials any time anywhere from the web. Thus, it acts as collaborator between the creators and learners

of knowledge and formed a global knowledge network. Again the availability of free Open Source Software like ELMS[1] has also brought a drastic change the way how information is delivered and accessible freely. There are a number of universities in India which are working for creating such type of open learning system which can be freely accessed by anyone.

Such advancements in ICTs have enabled to provide education by adopting maximum technologies in a Virtual Learning Environment (VLE). Modern library systems are also coming up to deliver their services in such an environment.

Virtual Learning Environment (VLE)

A VLE is a virtual classroom that allows teachers and students to communicate with each other online. Class information, learning materials, and assignments are typically provided via the Web. Students can log in to the class website to view this information and may also download assignments and required reading materials to their computers. In a virtual classroom, the teacher may communicate with the students in real-time using video or Web conferencing. This type of communication is typically used for giving

lectures and for question and answer sessions. If the teacher only needs to send out a homework assignment, he or she can simply post a bulletin on the class website. The students may also receive an e-mail notification letting them know a new assignment has been posted. If class members have questions about the homework, they can participate in online forums or submit individual questions to the teacher. Virtual learning environments are a popular method of e-learning, which refers to learning through electronic means. While a VLE cannot fully replace the traditional classroom, it can be a useful way of teaching students who reside in many different locations. VLE contains the online learning services. This is a learning platform that organizes and provides access to online learning services for the students, teachers and administrators. In VLE, the learner is at a far off place from the tutor or teacher or instructor. He/She uses some form of technology (obviously internet connected computer) to access the learning resource materials which are web- based and also interacts with the teacher/tutor or instructor and other learners.

Characteristics Of Virtual Learning Classrooms

Virtual classroom also needs equivalent equipment and tools in the form of network-based software application to allow a group of instructors and students to carry out the learning process. It facilitates self learning at the learner's convenient time and place. Electronic publication is cheaper and faster. It facilitates faster and cheaper delivery of the material. No physical boundary is required for getting access to virtual learning. Entire universe is the classroom. It enables to update learning materials speedily. The output of virtual teaching-learning process depends upon the factors like students' motivation for self-learning, subject expertise and communication skills of the teacher, on-line problem-solving facility, connectivity to e-library, and use of technology based lightly interactive multimedia, etc.

Proposed Virtual Learning Environment Model

To boost the ICT based Virtual Learning Environment Education it is essential to adopt:

- Intensive and rigorous short term training courses.
- Continuing education programme.
- Workshops/conference/seminars.
- In-service training.
- Project based learning.
- Computer assisted instruction.
- Creation, storage and access the learning resources.
- Lesson planning and assessment.
- Manage access to learner's information and resources and also tracking of progress and achievement.
- Communication with learners via emails, notices, chat, blogs.
- Self assessment quizzes.
- Formal assessment functions such as examination, presentation of projects etc.
- Provision for necessary hyperlinks to create a unified presentation to the students.
- Interaction in vernacular language
- Integrate heterogeneous technologies and multiple pedagogical approaches.
- Upgradation of teachers' skills in developing and delivering the course content through networks.
- Developing intelligence learning technology by having self teaching guides or do it yourself series.

Some Initiatives In Vle By Ignou In India

E-GYANKOSH

It is a digital repository initiated by IGNOU to enhance the accessibility of knowledge to share its valuable resources with educational institutions and learners internationally. This national Digital Repository acts as a podium to store, index, preserve and share the digital learning resources developed by the Open and Distance Learning Institutions in the country [7].

Gyan Darshan

A satellite based TV channel devoted to educational and developmental needs of the society [8].

Nodlinet (National Open And Distance Learners' Library And Information Network)

The Library and Documentation Division of IGNOU has started giving efforts to take higher education to the doorsteps of the hitherto un-reached through its various modes of Information and Document Delivery Services

IUC-TEFED

Inter University Consortium for Technology-Enabled Flexible Education and Development (IUC-TEFED) is the latest initiative of IGNOU which works as a nodal point to undertake all types of collaborative activities involving Open and Distance Learning, e-learning new knowledge creation, appropriate technology, etc.

Conclusion

As an impact of the globalization and ICT revolution as well, there is generally an agreed implication that education and training should go in the tune of the same. Virtual Learning schools all over the world, as such, are accepting the new technologies. In this regard, India is lagging behind in comparison with other advanced counties like, US, UK, etc. The establishment of the Indian Training and Education Network for Development (INTEND) by the Ministry of Human Resource Development, Government of India is a good approach of the government. The initiatives taken up by IGNOU and other Universities are a good signal in the country. The future of virtual learning environments has many innovative and exciting possibilities. At the same time adventures in learning call for creative and potent environments where individuals share meaningful knowledge and experiences in constructing new information and ideas. These adventures foster mutual collaboration that allows learners to apply newly acquired learning in the design of insightful, cognitive processing without detachment/ obscurity from real-life situations. A judicious blend of both traditional and virtual learning environment with special attention to students' needs and satisfaction can create constructive and creative learners, teaching community and learned society. The use of new ICT by the Indian Schools/Universities should be encouraged to produce professionals to manage knowledge resources in the VLE.

References

1. Bruffee K. A. (1984), Background and History to Collaboration Learning in American Colleges, College English 46, 7, 635-652
2. Chesbrough, H.W.and D.J.Teece (1996). When is virtual virtuous? Harvard Business Review.1; 65-7 3.
3. Hagel, J., & Armstrong, A. (1997). Net gain: Expanding markets through virtual communities. Boston, MA: Harvard Business School Press.
4. http://www.egyankosh.ac.in, accessed on 09/04/2013.

5. http://www.ignou.ac.in/ignou/aboutignou/icc/iuc/introduction, accessed on 09/04/2013
6. http://www.ignou.ac.in/NODLINET/aboutnodlinet, accessed on 09/04/2013
7. http://www.ignouonline.ac.in/Broadcast, accessed on 09/04/2013.
8. http://www.openelms.org/ accessed on 09/04/2013.
9. Russell, G. (2001) Virtual schools and educational futures. Educational Technology November-December.

RFID BASED HIGHWAY TOLL TAX SYSTEM

1. ANAMIKA DUBEY 2.SHANU RAJPUT3.KUSUM

4. PRASHANT KUMAR 5. RAHUL VISHNOI

1,2, 3 UG Student, Department of ece, FOECS , Teerthanker Mahaveer University, Moradabad, UP, India.

4 & 5 Assistant Professor, Department of Electrical Engineering, FOECS, Teerthanker Mahaveer University, Moradabad, UP, India.

ABSTRACT: RFID based Toll Collection System Using Arduino used for collecting tax automatically. In this we do the identification with the help of radio frequency. A vehicle will hold an RFID tag. This tag is nothing but unique identification number assigned. This will be assigned by RTO or traffic governing authority. In accordance with this number we will store, all basic information as well as the amount he has paid in advance for the toll collection. Reader will be strategically placed at toll collection centre. Whenever the vehicle passes the toll booth, the tax amount will be deducted from his prepaid balance. New balance will be updated. In case if one has insufficient balance, his updated balance will be negative one. To tackle this problem, we have camera on the way to capture the image of respective vehicle. As vehicles don't have to stop in a queue, this translates to reduced Traffic congestion at toll plazas and helps in lower fuel consumption. This is very important advantage of this system.

KEYWORDS: GSM module, Arduino Uno, RFID, TOLL.

1. INTRODUCTION

The need for manual toll-based systems is completely reduced in this method and the tolling system works through RFID. A complete RFID system consists of a transponder (tag), reader/writer, antenna, and computer host. The transponder, better known as the tag, is a microchip combined with an antenna system in a compact package. The microchip contains memory and logic circuits to receive and send data back to the reader. These tags are classified as either active or passive tags. Active tags have internal batteries that allow a longer reading range, while passive tags are powered by the signal from its reader and thus have shorter reading range. Passive RFID have no internal power source and use external power to operate. These tags are powered by the electromagnetic

signal received from a reader. The received electromagnetic signal charges an internal capacitor on the tags, which in turn, acts as a power source and supplies the power to the chip. Though these passive tags have both UHF and LF, the low frequency tags are best because UHF tags have high read range and hence capable of reading multiple tags simultaneously which in turn may lead to collision. The obvious advantage of the transponder in our project is that it reads only one target a time and hence it is very advantageous compared to all the other previously existing system. The RFID tag is used as a unique identity for account of a particular user. When a vehicle drives through the toll plaza, its driver is prompted to scan his RFID tag. If the identity (serial number of the tag) is matched with the one already stored in the system, the toll amount is deducted from his account. After this, the vehicle gets immediate access to drive through. This RFID based toll system also has some additional features. A new user can register him with the system. Also, an old user can recharge his account balance. The amount for recharge can be entered in the system. In beginning, the user is prompted to scan his tag or ID. The serial code of the tag is identified by the reader module and is sent for comparison with stored data. If the ID is matched by the microcontroller, the toll amount is deducted from user's balance and user gets to drive through the plaza. On the contrary, if the tag is not identified then image of car is captured by camera. A new user needs to register himself after which his identity is verified with RFID tag. The new record is then stored by the microcontroller to grant future access.

2.1 Why Toll is Collected?

Any structure, building or system needs maintenance and rehabilitation which are of course costly. Highways and roads are also not an exception. From the very past, the construction, extension, maintenance and operating costs of highways, roads, bridges and tunnels were collected directly or indirectly. In the older indirect method, the expenses are compensated either by tax payment on fuel or by budget allocation from the national income. The shortcoming of this method is that a number of tax payers, who do not use some of the roads and carriageways, have to pay extra money.

However, in the other system, called direct method, the tolls are taken directly from the drivers passing that road or street. The other three main reasons why tolling, or road pricing, is implemented are listed below.

a) **Finance/Revenue Generation:** To recoup the costs of building, operating and maintaining the facility. Road pricing is becoming a more appealing means of funding transportation. Moreover, toll financing allows projects to be built sooner instead of waiting for tax revenues to accumulate.

b) **Demand Management:** To moderate the growth in demand on the transportation system, and to encourage more use of public transportation and carpooling. For example, vehicles are charged to enter inner London, England, as a way of regulating the demand in the region

c) **Congestion Management:** To place a price on limited roadway space in proportion to demand. In this application the toll increases with the level of congestion. In the absence of such pricing, drivers do not appreciate the costs they impose on others as a result of the congestion they cause.

2.2 Different Types of Toll Collection Systems

Three systems of toll roads exist: open (with mainline barrier toll plazas); closed (with entry/exit tolls) and all-electronic toll collection (no toll booths, only electronic toll collection gantries at entrances and exits or at strategic locations on the mainline of the road).On an open toll system, all vehicles stop at various locations along the highway to pay a toll. While this may save money from the lack of need to construct tolls at every exit, it can cause traffic congestion, and drivers may be able to avoid tolls by exiting and re-entering the highway. With a closed system, vehicles collect a ticket when entering the highway. In some cases, the ticket displays the toll to be paid on exit. Upon exit, the driver must pay the amount listed for the given exit. Should the ticket be lost, a driver must typically pay the maximum amount possible for travel on that highway. Short toll roads with no intermediate entries or exits may have only one toll plaza at one end, with motorists traveling in either direction paying a flat fee either when they enter or when they exit the toll road. In a variant of the closed toll system, mainline barriers are present at the two endpoints of the toll road, and each interchange has a ramp toll that is paid upon exit or entry. In this case, a motorist pays a flat fee at the ramp toll and another flat fee at the end of the toll road; no ticket is necessary. In an all-electronic system no cash toll collection takes place, tolls are usually collected with the use of a transponder placed before the Gate as soon as the vehicle reaches near the Transponder the amount is deducted and the gate will be opened customer account which is debited for each use of the toll road. On some road's automobiles and light trucks without transponders are permitted to use the road a bill for the toll due is then sent to the registered owner of the vehicle by mail; by contrast, some toll ways require all vehicles to be equipped with a transponder. Modern toll roads often use a combination of the three, with various entry and exit tolls supplemented by occasional mainline tolls. Open Road Tolling (ORT), with all-electronic toll collection, is now the preferred practice, being more efficient, environmentally friendly, and safer than manual toll collection.

2.3 Drawbacks of Existing System

The above-mentioned method for collecting toll tax is time consuming method. Chances of escaping the payment of toll tax are there. It leads to queuing up of following vehicles. Suppose the manual toll collection system is very efficient then for one vehicle to stop and pay taxes total time taken is 50 seconds. And suppose 200 vehicles cross the toll plaza. Then, time taken by 1 vehicle with 60 second average stop in a month is: 50x30= 1500 seconds

Yearly total time taken = 1500x12 = 18000seconds = 5.0 hours

On average each vehicle that passes through the toll plaza has to wait 5.0 hours in engine start condition yearly. The figure is staggering if on an average we take 200 vehicles pass through the toll plaza each day, then yearly 72000 vehicles pass through the toll plaza. And each year 72000 vehicles just stand still for 5.0 hours in engine start condition thereby aiding pollution and wasting fuel and money. This study is if the system is very efficient but what if the vehicle has to wait for 5 minutes? This is a figure considering one toll plaza. If considering 50 toll systems the above figure will drastically increase and the wastage of fuel, money will increase and pollution will also increase.

2.4 Proposed System

Each vehicle will be provided by an RF Transmission tag containing a unique ID. This unique ID can be assigned to the vehicle by authority body of country like we can have this ID as the vehicle's number. This tag will continuously emit RF signals. When the vehicle will reach at the toll booth the RF receiver will detect these RF signals. The signals are amplified and are passed to microcontroller. This microcontroller will display the id on LCD. Now, with the help of PC interface unit the data collected is passed to PC through serial port. Software developed will show all the details about the vehicle on the screen. Details like date, time, address and id will be stored in the access database. Based on these details a report will be prepared. Message of payment deduction, less balance or prepaid the account, etc. will be sent to vehicle owner by using GSM module present at toll booth.

Figure 1: Proposed System Model

This project was proposed considering the fact that, these days 'transportation is a major part of human day to day life. Since, time and money are two major components of the transportation so, even if it possible to save a small amount of both entities at same time it would be a boon to the society and environment. The idea ATCS is ready being used in a lot of countries worldwide. India being a country with 2nd largest population in the world. This project is a working model of the highly efficient and cheap system which can be used on toll plazas. ATCS uses RFID technology for identification of vehicles passing through toll plazas and an ATmega328 microcontroller embedded in Arduino board for further processing.The RFID technique used to find which vehicle has reached the toll and using its pre fed information to carry out further function like allowing the vehicle to pass or not. ATCS is mostly dependent of its microcontroller i.e. ATmega328 embedded on Arduino board. The owner of the vehicle has the RFID tag, which is read by the low frequency RFID reader to read even tags of 125 kHz frequency. On reading the tag, the tag ID obtained is send to microcontroller after which it analysis the tag, the tag ID matches it with ID saved in database, if the vehicle`s tag ID matches with one of them it deducts a certain fixed amount of money from the prepaid card and gives a command to DC motor to open the gate and allow the vehicle to pass.If in case the card is not valid the microcontroller commands the owner to move the vehicle to the manual tax payment lane. In case card is valid but money in the card is insufficient same command is given to the owner. On successful processing or transection of money the owner receives an automated SMS through GSM module SIM900 on registered mobile number regarding the amount of money deducted, the available balance and the name of toll plaza vehicle recently crossed. This feature helps the owner to keep a track on his vehicle all the time preventing the theft of vehicles.

Basic hardware required in this project:

1. Arduino uno
2. EM-18 RFID reader
3. RFID card
4. LED`s
5. Buzzer
6. DC motor
7. 5V DC power supply

8. SIM900 GSM Module
9. Jump wires
10. Bread board

The basic block diagram in Fig.2 outlines the concept RFID based highway toll tax system. A dedicated GSM module is interfaced to the main server which will send the SMS to car owner for deduction in balance or less balance or deposited balance amounts. Camera is there which will take image of car.

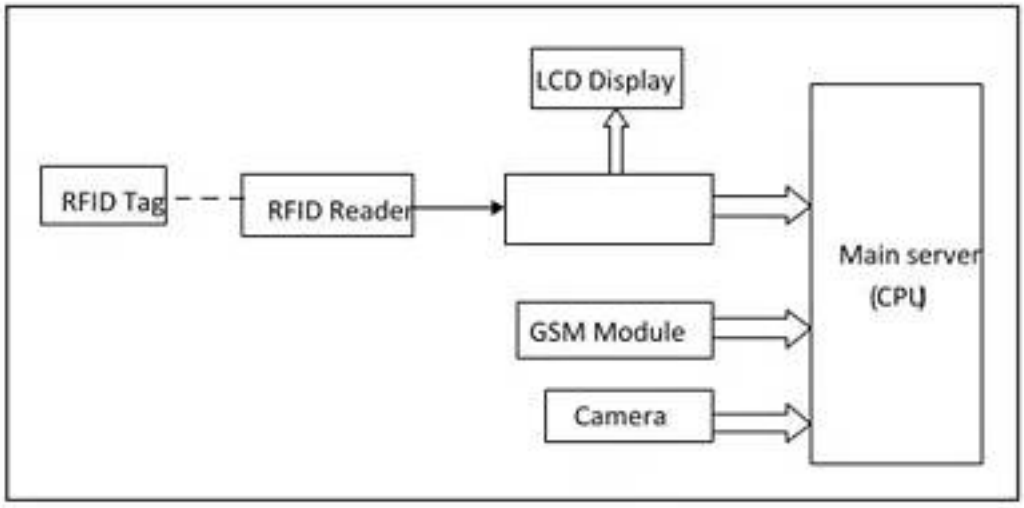


Figure2: Block Diagram

RFID is an automated data-capture technology that can be used to electronically identify, track, and store instruction involve on a tag. A radio frequency reader scans the tag for data and sends the information to a database, which stores the data contained on the tag. The main technology components of a Radio Frequency Identification system are the tag and Reader.

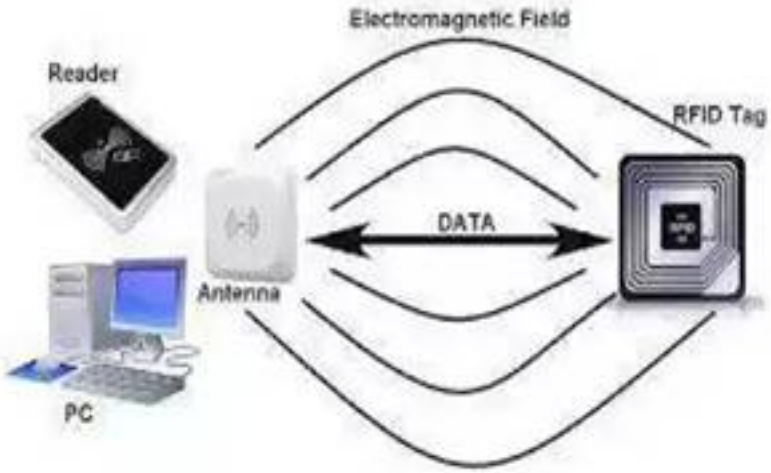


Figure 3: RFID

CONCLUSION

In order to implement contemporary system of **"RFID based Toll Tax system using Arduino"** the embedded systems plat form has utilized. For this purpose, a new RFID technology based on micro-controller was implemented and tested in this study. The verification system presented has the following advantages: The verification system consists of data base about the user of RFID multipurpose card.

The state of art of microcontroller AT89S52 used as a mediator in between PC and RFID; it acts as user interface whenever user shows RFID card it will read out by MCU using RFID card reader then it transfers those things to PC interfacing front end software. The RFID security system is major role of this project. A kind of radio frequency chip was adopted to design electronic toll collection system of expressway.

REFERENCES

1. Basic Electronics and Circuit W/Cd, 6th edition by Theodore F. Bogart, Publisher- Pearson Education India (2011).
2. Digital Electronics, 5th edition by R. P. Jain, Publisher- Pearson (2002).
3. Kenneth J. Ayala, (1996), The 8051 Micro-Controller Architecture, Programming and Applications, India.
4. Muhammad Ali Mazidi, Janice GillispieMazidi, (1999), The 8051 Micro-Controller and Embedded Systems, Prentice Hall, USA.
5. Sensor Configuration for The Advanced Line", Department of Electrical Engineering, Department of Mechanical Engineering, University Telangana National, Km7, 43009, Malaysia.
6. M. Hushangabade, S.V. Dhopte, "Dynamic Approach Towards Toll Tax Collection and Vehicle Tracking with the Help of RFID", International Journal of Engineering and Innovative Technology (Ijeit), Volume 3, Issue 1, July 2013.

HI_TECH HOME

1. CHINMAY JAIN 2. PALLAV JAIN 3. MUKESH KUMAR (LET.)

4. DR. PANKAJ KUMAR GOSWAMI 5. RAHUL VISHNOI

1,2, 3 UG Student, Department of ece, FOECS , Teerthanker Mahaveer University, Moradabad, UP, India.

4 & 5 Assistant Professor, Department of Electrical Engineering, FOECS, Teerthanker Mahaveer University, Moradabad, UP, India.

ABSTRACT: "**Hi-Tech Home** is becoming popular due to its numerous benefits. Home automation refers to the control of home appliances and domestic features by local networking or by remote control. Artificial Intelligence provides us the framework to go real-time decision and automation for Internet of Things (IoT).The work deals with discussion about different intelligent home automation systems and technologies from a various features standpoint. The work focuses on concept of home automation where the monitoring and control operations are facilitating through smart devices installed in residential buildings. Home automation systems and technologies considered in review with central controller based (Arduino or Raspberry pi), web based, email based, Bluetooth-based, mobile-based, SMS based, cloud-based and the Internet with performance The work is concluded by giving future directions home automation Security Research."

KEYWORDS: Home-Automation, Intelligence, Microcontroller, Sensor System, User-friendly Interface

1. INTRODUCTION

The concept of HI-TECH home is basically automation. Automation is a technique, method, or system of operating or controlling a process by electronic devices with reducing human involvement to a minimum. The fundamental of building an automation system for an office or home is increasing day-by-day with numerous benefits. Industrialist and researchers are working to build efficient and affordability automatic systems to monitor and control different machines like lights, fans, AC based on the requirement. Automation makes not only an efficient but also an economical use of the electricity and water and reduces much of the wastage. IOT grant to people and things to be connected Any-time, anyplace, with anyone, ideally using any network and any service. Automation is another important application of IOT technologies. It is the monitoring of the energy consumption and the Controlling the environment in buildings, schools,

offices and museums by using different types of sensors and actuators that control lights, temperature, and humidity.

2 HOME AUTOMATION

2.1 User interface - As a monitor, computer, or Phone, for example that can give orders to control System.

2.2 Mode of Transmission- Wired connections (example Ethernet) or Wireless (radio waves, infrared, Bluetooth, GSM) etc.

2.3 Central Controller- A central controller based The HI-TECH Home known as Home automation, with the use of new technology, to make the domestic activities more convenient, comfortable, secure and economical. The home automation system includes main components which are:

Home security system can be implemented by combining many homes into a security network with a control node dedicated to each locality depending on the number of users. There are few central or chief control nodes with high processing power which controls these nodes.

2.4 Electronic devices- A light, an AC or a heater, which is compatible with the transmission mode, and connected to the Central control system.

3 FEATURES OF HOME AUTOMATION SYSTEM

In recent years, wireless systems like Remote Control have become more popular in home networking. Also in automation systems, the use of Wireless technologies provide several advantages that could not be achieved with the use of a wired network only.

3.1 Reduced Installation costs

Installation costs are significantly reduced since no cabling is necessary.

3.2 Internet Connectivity

Control devices from anywhere in the world with use mobile phones to control HI-TECH Home.

3.3 Scalable and Expandable

With the Compare of Wireless network is especially useful when, due to New or changed requirements, an extension of the network is necessary.

3.4 Security

Easily add devices to create an integrated smart home security system and built-in security ensures integrity of smart home.

4 CHALLENGES OF HI-TECH HOME

These include high manufacturing costs, high development costs, high installation costs, additional service and support costs, lack of home automation standards, consumer unfamiliarity with technology, and complex user interfaces. With the advancement of time, rapid development

in technology and processing power which leads to a considerable reduction in device cost and size. All of these factors have contributed to the popularity of electronic devices today, so people are no longer confused or unsure about the use of the computer, mobiles, or tablets. Moreover, a lot of home automation protocols, communication and interface standards.

4.1 From a Homeowner's Point of View

1. There is a huge difference between what user thinks is the implementation of access control and the access control and security measures that are actually implemented.

2. Along with home security system, there can be more devices connected to a home network like mobile phones which go with other user and connects to external other networks.

3. An attacker can compromise home automation system by using these devices as a gateway to home network when these devices get connected to home network because user are careless in this case.

4. Most of the times people are unaware, misinformed or careless about various security risks while choosing home automation system due to the money issue.

4.2 From a Security Engineer's Point of View

1. Unlike in companies, one can't enforce policies or security procedures that affect the convenience of people at home or their guests.

2. People are careless about even simple security policies.

3. Home may consist of people of different age groups e.g. Senior citizens which are not cable of understanding the technical aspect of the security system is more vulnerable to social engineering. 4. An attacker who hacks a home automation network can cause a wide range of damage, including theft, vandalism, emotional harm, permanent damage to electronic devices, loss of reputation, financial damages, blackmail, environmental damages, physical harm to a home's inhabitants, granting unauthorized access to anyone.

5. The mixed ownership of devices at home and guests with varying technical knowledge and different intentions compounds security issues at home.

5 FEATURES

5.1 Bluetooth-based Home Automation System

We are talks about providing an electronics user manual on the phone using Bluetooth and Internet. Issues of using Bluetooth

1. Bluetooth has a maximum communication range of 100m in ideal conditions. More may be needed in a home environment.

2. Bluetooth communication has comparatively high power consumption, so the batteries of devices need to be frequently recharged or replaced.

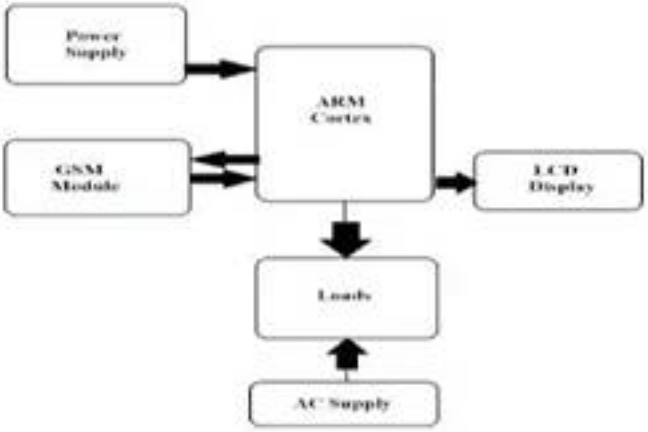
3. Bluetooth technology has advanced and improved to Bluetooth Low Energy (BTLE), which provides the same range of communication. However, it has serious security concerns such as eavesdropping and weak encryption as discussed by M. Ryan .

4. Bluetooth communication should only be used on occasions where there is a need for quick short-lived network communication with little concern for security.

Bluetooth looks like an attractive communication technology for creating smart homes. Bluetooth is cheap, easy, and quick to set up. People are already familiar with the technology. The hardware required for establishing Bluetooth communication is readily available and the technology also provides the necessary bandwidth for the operation.

5.2 GSM or Mobile-based Home Automation System

Mobile based home automation is attractive to researchers because of the popularity of mobile phones and GSM technology. We mainly consider three options for communication in GSM, namely SMS-based home automation; GPRS based HI- HOME automation, and Dual Tone Multi Frequency (DTMF)-based home automation.[2].



Security concerns about SMS-based HI-TECH Home security systems:

1. The 4 digit security passkey n then itself, proposes a security. An attacker could wait outside the home and peep through the window to learn the passkey. One can't expect the owner to be careful every time he or she enters the passkey. The user punches in the passkey routinely, so the probability of the user being careless is high.

2. The passkey used in the work and it's different for each individual at home, which improves the odds of hacking the keypad.

3. Informing the homeowner about an intrusion at home through an SMS message is never a good practice. Users may not frequently check their phones for SMS messages, or may not be near enough to the phone to hear a message received tone, so they could easily miss the intrusion alert.

5.3 Internet-based Home Automation System

Internet or IP protocol-based communication in home automation systems is always a popular choice among researchers. The Internet is easily scalable, flexible when it comes to access and use, and very popular as a communication method in today's world, so the hardware and the network required for access is readily available, offers high bandwidth and very low communication cost, and devices can connect to and disconnect from the network easily.

These are some of the features that make the Internet such an attractive choice for researchers. Utilizing the Internet as a means to access and control the home seems to be the next logical step forward for home automation systems. From an end user's point of view, using the Internet to access their home is easy, convenient, cheap, flexible, and offers no complication of an added technology to learn. User interface devices like laptops, smart phones, PCs, and tablets are easily available in the market, and these devices are already a part of people's daily lives. So, incorporating home automation into these already-popular user devices seems to be the natural progression. In most Internet-based automation systems, a username and password seem to be the only authentication method used.

CONCLUSION

Based on surveyed study the comparison of HI-TECH Home automation systems is presented. Microcontroller, user interface, a communication interface and their performance factor are compared. There are a number of do-it-yourself (DIY) platforms available that allow to create Home Automation system quickly and easily with low cost and high performance e.g. Raspberry pi, Arduino, other microcontrollers, etc. In this review explained different home automation system e.g. Web based, email based, Bluetooth-based, mobile-based, SMS based,. In future home automation will more smart and fast. It would be extended to the large-scale environment such as colleges, offices and factories etc.

REFERENCES

1. M. Danaher, D. Nguyen, "Mobile Home Security with GPRS," in proceedings of the 8th International Symposium for Information Science, Oct. 2002.
2. Kenneth J. Ayala, (1996), The 8051 Micro-Controller Architecture, Programming and Applications, India.
3. Muhammad Ali Mazidi, Janice Gillispie Mazidi, (1999), The 8051 Micro-Controller and Embedded Systems, Prentice Hall, USA.
4. A. Alheraish, "Design and Implementation of Home Automation System," IEEE Transactions on Consumer Electronics.
5. A. ElShafee, K. A. Hamed, "Design and Implementation of a WiFi Based home automation System," World Academy of Science, Engineering and Technology, vol. 6, 2012.

SMART TRAFFIC LIGHT

1. AYUSHI JAIN 2.AJAY SETHI3.RAHUL VISHNOI

1,2 UG Student, Department of ECE, FOECS , Teerthanker Mahaveer University, Moradabad, UP, India.

3.Assistant Professor, Department of Electrical Engineering, FOECS, Teerthanker Mahaveer University, Moradabad, UP, India.

ABSTRACT:In many metropolitan cities we face the most common problem particularly at peek time of business hour. Everyday struggle and efforts to dozing traffic, pollution and rush driver the biggest cause of frustration, stress and psychological problem. At certain junctions, sometimes even if there is no traffic, people have to wait. Because the traffic light remains red for the preset time period, the road users should wait until the light turns green.To solve such serious problem most of the urban communities are providing ideas and planning to implement updates in our traffic control system as in every field old version are replaced by smart version.

Conventional system does not handle variable flows approaching the junction in addition the mutual interference between adjacent traffic light system, the accidents, the passage of emergency vehicle this all leads to traffic jam and congestion There are Information and Communication technologies that can be used to develop smart traffic control system using sensor devices and other system that sense data.

KEYWORDS: GSM module, Arduino Uno, RFID, traffic light.

1. INTRODUCTION

Road transport is one of the leading/ancient modes of transport in many parts of the world today. The number of vehicles using the road is increase rapidly every day. Due to this reason traffic congestion major problem increase daily in many developed countries so to control this problem Traffic light system was introduced. The world's first traffic light was a manually operated gas-lit signal installed in London in December 1868. It exploded less than a month after it was implemented, injuring its policeman operator. Earnest Sirrine from Chicago patented the first automated traffic control system in 1910. It used the words "STOP" and "PROCEED", although neither word was illuminated. Nowadays, Traffic light placed at road intersections, pedestrian crossings, rail trains, and other

locations. Traffic lights consist of three universal colored lights: the green light allows traffic to proceed in the indicated direction, the yellow light warns vehicles to prepare for short stop, and the red signal prohibits any traffic from proceeding. Secondly, the current traffic light system is implemented with hard coded delays where the lights transition time slots are fixed regularly and do not depend on real time traffic flow. The third point is concerned with the state of one light at an intersection that influences the flow of traffic at adjacent intersections First, the traffic flow depends on the time of the day where the traffic peak hours are generally in the morning and in the afternoon; on the days of the week where weekends reveal minimum load while Mondays and Fridays generally show dense traffic oriented from cities to their outskirts and in reverse direction respectively; and time of the year as holidays and summer. As we see traffic signal are most convenient method of controlling traffic in a congestion road, but in the today's world these signal fail to control the traffic when a particular lane got more traffic than the other lanes. This situation makes that particular lane more congested than the other lane, thus due to this the commuters around the world have to face traffic congestion every day costing enormous amounts of time and money.From New York, to Paris, to manila, commuters spend hundreds of hours sitting in traffic. Most severe is the struggle of the morning commute, when everything goes planned it can take two or three hour to reach destination at rush hour, Traffic congestion can lead to drivers becoming frustrated and engaging in road rage. Inefficient management of traffic causes wastage of invaluable time, pollution, wastage of fuel, cost of transportation and stress to drivers, etc. but more importantly emergency vehicles like ambulance get stuck in traffic. In the financial capital of India, journey during rush-hour taken 65 percent longer. In Delhi it is 58 per cent longer, Road traffic jams continue to remain a major problem in most cities around the world, especially in developing regions resulting in massive delays, increased fuel wastage and monetary losses. Partial solution was offered by constructing new roads implementing flyover and bypass roads. Presently various system is providing a cost effective solution, but the rate of successful operation is bad. Inductive loop detectors installed under surface, this fails in case of poor road condition Traffic is one of most significant challenge for many cities that are experiencing rapid growth of vehicles on the road that are strain on the environment. The common reason for traffic congestion is due to poor traffic prioritization. This is happening because of today's traffic light is not operating with real time data. Traffic is a critical issue of transportation system in most of all the cities of Countries. This is especially true for countries where population is increasing at higher rate. As a result, many of the arterial roads and intersections are operating over the capacity and average journey speeds on some of the key roads in the central areas are lower than 10 Km/h at the peak hour. In some of the main challenges are management of more than 36,00,000

vehicles, annual growth of 7–10% in traffic, roads operating at higher capacity ranging from 1 to 4, travel speed less than 10 Km/h at some central areas in peak hours, insufficient or no parking space for vehicles, limited number of policemen. Currently a video traffic surveillance and monitoring system commissioned in Bangalore city. It involves a manual analysis of data by the traffic management team to determine the traffic light duration in each of the junction. It will communicate the same to the local police officers for the necessary actions. The design of intelligent traffic control system is an active research topic. Researchers around the world are inventing newer approaches and innovative systems to solve this stressful problem.

2.1 Why Toll is Collected?

Any structure, building or system needs maintenance and rehabilitation which are of course costly. Highways and roads are also not an exception. From the very past, the construction, extension, maintenance and operating costs of highways, roads, bridges and tunnels were collected directly or indirectly. In the older indirect method, the expenses are compensated either by tax payment on fuel or by budget allocation from the national income. The shortcoming of this method is that a number of tax payers, who do not use some of the roads and carriageways, have to pay extra money.

However, in the other system, called direct method, the tolls are taken directly from the drivers passing that road or street. The other three main reasons why tolling, or road pricing, is implemented are listed below.

a) **Finance/Revenue Generation:** To recoup the costs of building, operating and maintaining the facility. Road pricing is becoming a more appealing means of funding transportation. Moreover, toll financing allows projects to be built sooner instead of waiting for tax revenues to accumulate.

b) **Demand Management:** To moderate the growth in demand on the transportation system, and to encourage more use of public transportation and carpooling. For example, vehicles are charged to enter inner London, England, as a way of regulating the demand in the region

c) **Congestion Management:** To place a price on limited roadway space in proportion to demand. In this application the toll increases with the level of congestion. In the absence of such pricing, drivers do not appreciate the costs they impose on others as a result of the congestion they cause.

2.2 Different Types of Toll Collection Systems

Three systems of toll roads exist: open (with mainline barrier toll plazas); closed (with entry/exit tolls) and all-electronic toll collection (no toll booths, only electronic toll collection gantries at entrances and exits or at strategic locations on the mainline of the road).On an open toll system, all vehicles stop at various locations along the highway to pay a toll. While this may save money from the lack of need to construct tolls at every exit, it can cause traffic congestion, and drivers may be able to avoid tolls by exiting and re-entering the highway. With a closed system, vehicles collect a ticket when entering the highway. In some cases, the ticket displays the toll to be paid on exit. Upon exit, the driver must pay the amount listed for the given exit. Should the ticket be lost, a driver must typically pay the maximum amount possible for travel on that highway. Short toll roads with no intermediate entries or exits may have only one toll plaza at one end, with motorists traveling in either direction paying a flat fee either when they enter or when they exit the toll road. In a variant of the closed toll system, mainline barriers are present at the two endpoints of the toll road, and each interchange has a ramp toll that is paid upon exit or entry. In this case, a motorist pays a flat fee at the ramp toll and another flat fee at the end of the toll road; no ticket is necessary. In an all-electronic system no cash toll collection takes place, tolls are usually collected with the use of a transponder placed before the Gate as soon as the vehicle reaches near the Transponder the amount is deducted and the gate will be opened customer account which is debited for each use of the toll road. On some road's automobiles and light trucks without transponders are permitted to use the road a bill for the toll due is then sent to the registered owner of the vehicle by mail; by contrast, some toll ways require all vehicles to be equipped with a transponder. Modern toll roads often use a combination of the three, with various entry and exit tolls supplemented by occasional mainline tolls. Open Road Tolling (ORT), with all-electronic toll collection, is now the preferred practice, being more efficient, environmentally friendly, and safer than manual toll collection.

2.3 Drawbacks of Existing System

The above-mentioned method for collecting toll tax is time consuming method. Chances of escaping the payment of toll tax are there. It leads to queuing up of following vehicles. Suppose the manual toll collection system is very efficient then for one vehicle to stop and pay taxes total time taken is 50 seconds. And suppose 200 vehicles cross the toll plaza. Then, time taken by 1 vehicle with 60 second average stop in a month is: 50x30= 1500 seconds

Yearly total time taken = 1500x12 = 18000seconds = 5.0 hours

On average each vehicle that passes through the toll plaza has to wait 5.0 hours in engine start condition yearly. The figure is staggering if on an average we take 200 vehicles pass through the toll plaza each day, then yearly 72000 vehicles pass through the toll plaza. And each year 72000 vehicles

just stand still for 5.0 hours in engine start condition thereby aiding pollution and wasting fuel and money. This study is if the system is very efficient but what if the vehicle has to wait for 5 minutes? This is a figure considering one toll plaza. If considering 50 toll systems the above figure will drastically increase and the wastage of fuel, money will increase and pollution will also increase.

2.4 Proposed System

To control traffic more efficiently, System need to be upgraded and to solve the severe traffic congestion, alleviate transportation troubles, reduce traffic volume and waiting time so we have to introduce the Smart Traffic Control System To minimize overall travel time, optimize cars safety and efficiency, and many more expanded benefits in health, economic, and environmental sectors. Smart Traffic Management is a system where centrally-controlled traffic signals and sensors regulate the flow of traffic through the city in response to demand. A system which operate with real time information, operators can adjust traffic flows and reduce congestion across the road network. This system based on PIC microcontroller that controls the various operations, monitors the traffic volume and density flow via infrared sensors (IR), and changes the lighting transition slots accordingly

In this System design, a density based traffic light control system was developed for traffic control at four -way road intersection to reduce unnecessary time wastage and minimize road traffic casualties which the existing conventional traffic light control system has failed to achieve. This system will add gain to this sector with efficient operation replacing the current primitive timer traffic control system. This helps the emergency casualties to be attended quickly without panic of traffic congestion. Successful implementation of our research will result in faster clearance of traffic and improvement in the transportation of emergency vehicles.

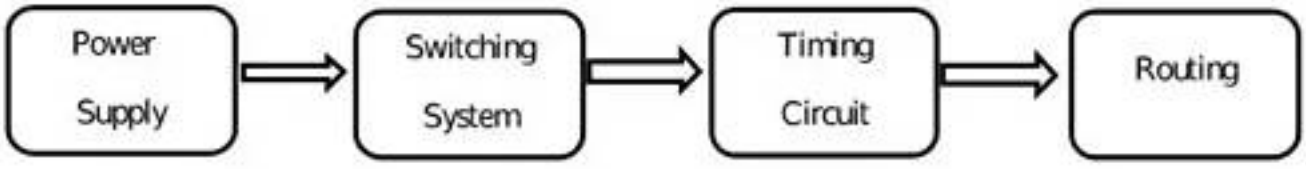


Figure 1: Proposed System Model

Design of Smart traffic control system: -The input subsystem is made of sensors, programmed and implemented using some already existing principles to achieve optimum performance. The control unit is realized by a microcontroller-based control program, which interprets the input and qualifies it to produce a desired output.

In choosing the sensors, the following features were taken into consideration: accuracy, range, calibration, resolution and affordability. Although the infrared (IR) sensors are usually disturbed by noise in the surrounding such as radiations, ambient light etc., they were used for this design because they are cheap and readily available in the market and are easy to interface.

Just like the conventional traffic light indicator in this design controls traffic using three light emitting diodes, 'GREEN', 'YELLOW' and 'RED', each having their usual meaning of 'GO', 'READY' and 'STOP' respectively. They are controlled by the control buses of the microcontroller depending on the logical decisions taken by the controller to control the lanes of traffic according to their densities.

Mode of Operation

Once the traffic control commences operation, the states of all the sensor arrays on each lane of traffic is read and given as input to the microcontroller for logical operations. The system assigns serial number to each lane based on their density, where the lane with the most density is assigned lane one. Accordingly, the system sets the ready flag for lane one where the YELLOW light shows; in preparation for the passing of traffic in that lane and delays for a certain time before giving the go signal with the GREEN light.

The Infrared Sensor is used to senses the amount of density of a particular road. IR sensor consists of IR transmitter and receiver sensing the density of the road and produces an output signal. The output IR signal is provided as an input to the microcontroller.

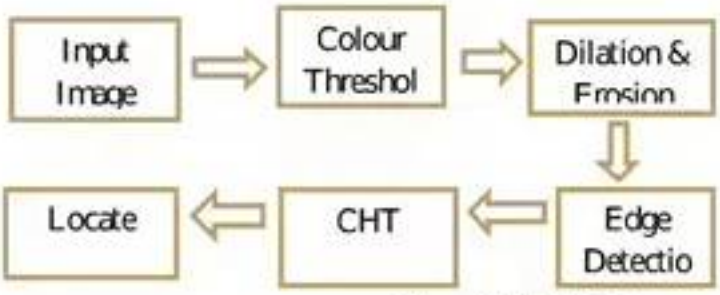


Figure2: Block Diagram

Figure 3: MODEL

CONCLUSION

Once the traffic control commences operation, the states of all the sensor arrays on each lane of traffic is read and given as input to the microcontroller for logical operations. The system assigns serial number to each lane based on their density, where the lane with the most density is assigned lane one. Accordingly, the system sets the ready flag for lane one where the YELLOW light shows; in preparation for the passing of traffic in that lane and delays for a certain time before giving the go signal with the GREEN light.
The Infrared Sensor is used to senses the amount of density of a particular road. IR sensor consists of IR transmitter and receiver sensing the density of the road and produces an output signal. The output IR signal is provided as an input to the microcontroller.

REFERENCES

1. Optimal Traffic Control (Urban Intersection) By Slobodan Guberinic,GordanaSenborn,BratslavLazic
2. Kirushnacumar. A 1 ,Arun. M2 ,Kirubanand. A 3 Mukesh. S 4, Aravindan@Sivakumar. A 5 Traffic Light Using Image Processing
3. Abdul Mateen1*, Sabeen Sher1 ,Amjad Rehman2 , Zahid Hanif1 , Tooba Akhtar1 , Mahmood Ashraf Dynamic Traffic Control And Management System For Smart Cities
4. T. Rajesh Kumar* ,G. RemmiyaDevi, K. Abinaya, N.N. Deepika, S. Priyadharshini AN INTEGRATED DENSITY BASED TRAFFIC LOAD BALANCING SYSTEM IN A CLOUD ENVIRONMENT
5. NinadLankeSheetal Koul Smart Traffic Management System
6. Y. N. Udoakah1,* And I. G. Okure2 DESIGN AND IMPLEMENTATION OF A DENSITY-BASED TRAFFIC LIGHT CONTROL WITH SURVEILLANCE SYSTEM

Smart Home Based On IOT

Hansika, Megha jain Kanmee Devi
CCSIT, TMU Moradabad
hansikachauhan12@gmail.com
meghaj409@gmail.com

dkanmee@gmail.com

Abstract— **This paper present the design of "Smart Home Based On IOT". The world 'Smart' has been used in various areas and is widely accepted to intelligence. Smart home services one of the represent technologies in IOT field. Smart home systems are controlled by smart phones. Smart home is an application of computing in which the home environment is monitored by intelligence to provide aware services and facilities, safety from fire alarm.**

Keywords— **Smart Home, Privacy and Security, Home automation.**

INTRODUCTION

Smart home technology and intelligently gives you ultimate control over your home by automating the lighting system and security system. Smart home connect all the devices and application in your home, so they can communicate with each other. A smart home is one of the automation systems to provide the monitoring. Smart home may have controls for lighting, temperature, multi-media, and door operations. Smart homes comprise of devices that provide comfort, convenience, energy efficiency and enhance intelligent. This devices communicate and internet with each other and from connected ecosystem. Smart home ecosystem comprises of a set of connected gadgets with intelligence that help them executing the task. A Smart home, then, may be defined as a residence or a building with equipment which can be remotely controlled and operated from any location in the world by means of Smart Devices. Smart Homes comprise of Devices that provide comfort, security, convenience, energy efficiency and enhance intelligent living. The Devices communicate and interact with each other and form a connected ecosystem. Smart Home is usually understood as automated home but the actual capabilities are beyond automation. Smart Home ecosystem comprises of a set of connected gadgets with Intelligence that help them in executing the task and take necessary decisions.

- Comfort or ease of control
- Entertainment
- Security
- Lifestyle personalisation

LITERATURE SURVEY

This paper present a smart home technology has created a need for a comprehensive literature survey. This article review and goals of a smart home energy management systems, applications, and information about the manufacturing and its components in computer programming, home automation refers to the control of home applications and features by local networking by remote control. Smart home have been conducted over the last several decades they convey different ideas and function. Smart home are extending into different branches of focusing on the interest of researchers and users expectations.

Bluetooth based home automation system using cell phones : In Bluetooth based home automation system the home appliances are connected to devices. The connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between board and phone for wireless communication. In this system the python script is used and it can install on any of the OS

environment, it is portable. One circuit is designed and implemented for receiving the feedback from the phone, which indicate the status of the device.

Cloud Based home automation system: Home Automation using cloud based system focuses on design and implementation of home gateway to collect data about data from home appliances. It is process using Map Reduce and use to implement tasks to Remote home Automation System is persistently developing its resilience by assimilating the current characteristics which gratify the rising interest of the people. This paper presents the design and development of home automation system that use the cloud computing as service.

PRIVACY AND SECURITY

- Controlled motion sensitive cameras.
- Capture and record video surveillance.

WORKING

Central Control is one Home-Automation system that controls everything in your home. It allows you, from a single source, to control your lights, thermostat, sprinklers, phone, washer, dryer and more.

Smart home automation used to be something we only dreamed about. Sci-fi movies have conjured up houses with built in AI- some being advanced enough to play a supporting character or even the hero. Home automation is a network of hardware, communication, and electronic interfaces that work to integrate everyday devices with one another via the Internet. Each device has sensors and is connected through WiFi, so you can manage them from your smartphone or tablet whether you're at home, or miles away.

There are three main elements of a home automation system: sensors, controllers, and actuators:

- ✓ Sensors can monitor changes in daylight, temperature, or motion detection. Home automation systems can then adjust those settings (and more) to your preferences.
- ✓ Controllers refer to the devices — personal computers, tablets or smartphones — used to send and receive messages about the status of automated features in your home.
- ✓ Actuators may be light switches, motors, or motorized valves that control the actual mechanism or function, of a home automation system. They are programmed to be activated by a remote command from a controller.
- Smart homes work with fairly simple systems.
- Receivers detect a contain signal from the transmitter, that issues a command.
- As a smart security system.
- As a smart home automation system.

FEATURES

- Fire and carbon monoxide monitoring
- Remote lighting control
- Appliance control
- Home automation security systems and cameras
- Alarm systems
- Real-time text and email alerts

ADVANTAGES

- Easier to Lock & Unlock Doors
- Save Energy
- Know About Maintenance &Service
- Customize as per your Convenience
- Ease
- It's Smart
- Increase Property Value

DISADVANTAGES

- Cost
- Dependency on Internet
- Dependency on Professionals
- Electromagnetic Radiation
- Technology Learning Curve

CONCLUSIONS

IOT based "Smart home" a new age for technologies and can change our life and job to a more intelligent and modern stage. The research and application of components of IOT technologies and application mode of IOT such as sea computing facilities and to more widely fields. Smart home, intelligent residential and more other application will appear in future.

ACKNOWLEDGEMENT

I take this opportunity to express my profound gratitude and deep regards to my guide Ms. Megha Jain for his exemplary guidance, monitoring and constant encouragement throughout the course of this thesis. The blessing, help and guidance given by him time to time shall carry me a long way in the journey of life on which I am about to embark.

REFERENCE

1. EPCglobal.EPC information services (EPCIS) version 1.0.1 specification. Lawrenceville: EP-Cglobal.2007.
2. W. K. Edwards and R. E. Grinter, "At home with ubiquitous computing: seven challenges," in *Ubicomp 2001: Ubiquitous Computing*, pp. 256–272, Springer, Berlin, Heidelberg, 2001.

3. V. Ricquebourg, D. Menga, D. Durand, B. Marhic, L. Delahoche, and C. Loge, "The smart home concept: our immediate future," in *2006 1ST IEEE International Conference on E-Learning in Industrial Electronics*, pp. 23–28, Hammamet, Tunisia, 2006, IEEE.
4. Y. Nakamura, Y. Arakawa, T. Kanehira, M. Fujiwara, and K. Yasumoto, "SenStick: comprehensive sensing platform with an ultra tiny all-in-one sensor board for IoT research," *Journal of Sensors*, vol. 2017, Article ID 6308302, 16 pages, 2017.
5. H. Andoh, K. Watanabe, T. Nakamura, and I. Takasu, "Network health monitoring system in the sleep," in *SICE 2004 Annual Conference*, vol. 2, pp. 1421–1424, Sapporo, Japan, 2004, IEEE.
6. A. M. Adami, T. L. Hayes, and M. Pavel, "Unobtrusive monitoring of sleep patterns," in *Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (IEEE Cat. No.03CH37439)*, vol. 2, pp. 1360–1363, Cancun, Mexico, 2003, IEEE.
7. H. Ghayvat, S. Mukhopadhyay, X. Gui, and N. Suryadevara, "WSN- and IOT-based smart homes and their extension to smart buildings," *Sensors*, vol. 15, no. 5, pp. 10350–10379, 2015.
8. C. Reinisch, M. J. Kofler, and W. Kastner, "ThinkHome: a smart home as digital ecosystem," in *4th IEEE International Conference on Digital Ecosystems and Technologies*, pp. 256–261, Dubai, UAE, 2010, IEEE.
9. SmartHomeUSA.com "What is a Smart Home" http://www.smarthomeusa.com/info/smarthome/
10. [2] Vendela Redriksson (2005) "What is a Smart Home or Building" http://searchcio-
11. midmarket.techtarget.com/sDefinition/0,,sid183_gci540 859,00.htm

Unsupervised human activity analysis for intelligent mobile robots

Ms. HINA HASHMI
Assistant Professor, TMU,
hina.computers@tmu.ac.in

Mr. SIDHARTH JAIN
BCA, TMU, Moradabad
siddharthj@tmu.ac.in

Abstract— **Research & Development in Artificial intelligence is growing day by day on a very large scale. Artificial Neural Network is a process of representation human mind that try to simulate its learning process. This paper shows the surveys on artificial intelligence that 1. What is Artificial Intelligence? 2. Comparison between human mind and Artificial intelligence. 3. How beneficial it can in long run or can also bring destruction in Human workforce.**

Keywords— **Artificial intelligence, Artificial, Neural, Network, Machine**

I. INTRODUCTION

Advancements in the reliability of autonomous mobile robot platforms means they are well suited to continuously update their own knowledge of the world based upon their many observations and interactions [4,5]. Unsupervised learning frame- works over such long durations of time have the potential to allow mobile robots to become more helpful, especially when cohabiting human populated environments. By removing humans from the learning process, e.g. with no time-consuming data annotation, such robots can cheaply learn from greater quantities of available data (observations), allowing them to adapt to their surroundings and save time/effort hard-coding specific information. Maintaining an understanding of dy-namic human environments, i.e. what human activities are occurring, in which regions at what times, allow a robot to adjust its own behaviour, or assist in a task being observed.

Our contributions are as follows: *i*) a qualitative spatial-temporal vector space framework for encoding observed human activities by an autonomous mobile robot; *ii*) methods for learning low dimensional representations of common and repeated patterns from multiple encoded visual observations using unsupervised probabilistic methods; *iii*) solutions to practical considerations when operating with long-term, autonomous mobile robots capturing continuous, unsegmented video sequences in a life-long learning setting.

Our methodology relies on first detecting and tracking human body movements from a single mobile robot's embedded sensors, along with learning the location of key objects in the environment using off-the-shelf techniques. Each human observation, originally recorded as a sequence of quantitative poses, is encoded using multiple qualitative calculi to abstract the exact spatial and temporal details of the observation, and finally represented as a vector of the occurrences of discrete qualitative descriptors (a vocabulary of which is learned from the data). We analyse the collection of encoded feature

vectors analogously to a corpus of text documents containing multiple topics of interest. Multiple latent topics are recovered from the observations and considered as human activity classes, each defined as a multinomial distribution over an auto-generated vocabulary. Two techniques are presented to learn low-dimensional human activity representations. First, a non-probabilistic low-rank approximation approach is shown to work well with pre-segmented video sequences of observed human activity. Secondly, a more sophisticated probabilistic Latent Dirichlet Allocation (LDA) [6] technique is shown to somewhat remove the requirement for manual temporal segmentation of the recorded observations, allowing the robot to access large quantities of data which otherwise would need human annotation. LDA is a hierarchical Bayesian model where each observation is modelled as a mixture over an underlying set of topics, and each topic is, in turn, modelled as a mixture over the discrete vocabulary

II. Related work

There is a common distinction in the literature between vision-based human activity analysis, which extracts information from video (and depth) cameras using computer vision techniques, and sensor or wearable computing-based systems [10, 11]. Sensor-based systems often rely on the availability of small sensors, namely wearable sensors, smart phones, or radio frequency identification (RFID) tagged objects, that can be attached to a human under observation in order to obtain a representation of that person's movements. We focus on representing human activity from visual data, where the notion of *being observed* is restricted to a single camera's field of view. This is a mature sub-field of artificial intelligence and the reader is pointed to survey papers which cover the topic in detail using, largely static RGB cameras [12–14] or 3D depth cameras [15,16]. However, many of the common techniques in these surveys perform supervised learning, where each training sample requires manual segmentation and annotating with a ground truth label. This is not a feasible solution for a long-term autonomous mobile robot which ideally, has minimal supervision whilst deployed in the real-world.

Unsupervised learning techniques are considered more appropriate for this task since they do not require time- consuming, offline manual annotations. Previous works have used Latent Semantic Analysis (LSA) [17], probabilistic LSA [18] and LDA [6] for learning low-dimensional human activity categories in an unsupervised setting: authors have combined these techniques with low-level Spatial Temporal Interest Point (STIP) features to learn action categories [19]; local shape context descriptors on silhouette images [20]; a combination of semantic and structural features to learn actions, faces and hand gestures [21]; and by fusing a vocabulary of local spatio-temporal volumes (cuboids) with a vocabulary of spin-images to capture the shape deformation of the actor [22];

However, a major problem cited in these works is the lack of spatial information about the human body captured by low-level image features, and the lack of more long-term temporal infor- mation encoded into the features restricts learning more complex actions. Descriptive spatial-temporal correlogram features have been used previously to address this issue [23], however, the approach still suffers from low-level image processing frailties, and the requirement for a single person to be modelled in the scene during a controlled training period. Another approach has been to learn the temporal relations between atomic actions in an unsupervised setting in order to accurately represent "composite" human activities [24]. However, the input videos for this technique require manual temporal segmen- tation into sequences of "overlapping fixed-length temporal clips", making it prohibitively expensive for life-long learning on an autonomous mobile robot. Further, each of these works have been performed without the variability of a mobile robot's frame of reference, and restricted to learning on temporally segmented video data during an offline training phase, unlike our work

III. Quantitative Representation

The goal is to understand human activities taking place from long-term observation of a human populated environment by a mobile robot. In this section we describe the quantitative input data captured by the robot. This section is organised as follows: first we define what we consider as a human activity and the specific activity domains the robot is required to operate in; then we present details of how the robot encodes each human observation as a quantitative *human body pose* sequence. Finally, we describe how the robot interprets its environment and learns key object locations which provide some human functionality.

Human activities

We introduce the term *activity* to relate to a temporally dynamic configuration of some *agents*, where the agents can be grounded in the real-world, or could be online agents, etc. In this research we aim to *i*) understand human activities as patterns performed by humans in real environments, and *ii*) for the system to scale to allow continual learning. We focus only on single human activities. To do this we explore the interaction between the human agent and environment, namely between a human and key objects which provide functionalities [43]. We therefore define a *human activity* to be a temporally dynamic configuration of a human agent relative to close-by *key objects* in the environment. We make the following assumptions and definitions related to human activities:

A *key object* is a semantic entity with a fixed location in an environment which provides some functionality that may be required for the execution of certain activities of interest in

that environment [44].

A *human activity* is considered as a partially ordered sequence of sub-activities (or repeated patterns) between positions of a person's body joints relative to key objects. In turn, these patterns (or sub-sequences) can be thought of as one or more simple qualitative relations holding between a person's body joints and/or a number of objects in the environment. For example, a person "picking up a cup" might comprise of the sequence: "reaching", "grasping" and "lifting" performed by the person's hand with respect to a cup.

A major challenge is the resolution of human activities that can be learned is somewhat limited by the available per- ception or sensory inputs. This paper provides a framework for a mobile robot, and therefore the perception is limited by its sensors and field of view capabilities. This is a key limitation to our system; since the performance of state-of-the-art robot perception is still far from human level perception. This affects the robot's ability to detect objects (static or moving) within its environment and only learn activity patterns at a particular level of granularity. Recent work in activity plan un- derstanding has used detected hand movements and their contact points with objects in the environment [48,49] to learn from video data, or unconstrained video from the web [50]. However, these works rely on a much closer view point than afforded to our autonomous mobile robot, and often use pre-trained hand or object neural networks for classification.

Human pose estimates

The mobile robot detects humans and infers their 3D pose (15 body joint locations) as they pass within the field of view of its RGBD sensor. A common approach is to use the OpenNI tracker [51] to detect multiple persons and infer their 3D pose in real-time from the sensors' depth stream. It is especially important to obtain reliable pose estimates in cases of human-object interaction from difficult viewpoints. Unfortunately, these interactions cause most pose estimation errors from OpenNI, where the object is inadvertently considered part of the person/foreground and/or the person is backward facing during an observation, see Fig. 1(a). To mitigate this problem, we leverage RGB colour data to help distinguish between object and person and resolve backward facing poses. Our pose estimation system operates in a two phase approach, firstly, the efficiency of OpenNI is utilized to produce person bounding boxes per frame. Secondly, person bounding boxes and the RGB frame are fed as input into a state-of-the-art

convolutional network (ConvNet) 2D human pose estimator [52]. Subsequently, the *(x, y)* coordinates of OpenNI body joint positions are replaced with the superior 2D body joint coordinates provided by the ConvNet.

We represent the human pose estimates as ROS messages, where a single detected body joint location is represented by 3D Cartesian coordinates in a camera frame of reference along with the corresponding position transformed into the global

IV. UNSUPERVISED LEARNING FOR HUMAN ACTIVITIES

Encoding a corpus of human observations into such a term-frequency matrix allows latent structure can be recovered in an unsupervised setting. The aim is to learn low-dimensional representations of repeated structure encoded as qualitative descriptors (graph paths) across multiple similar observations. To do this, information retrieval techniques are used. We focus on Latent Semantic Analysis (LSA) [17] and a more sophisticated, probabilistic method, Latent Dirichlet Allocation [6]. Both were developed for understanding large corpora of encoded text documents and used to recover distributions of latent topics or themes present in data. In this section we first introduce both methods and how each is applied to the encoded term-frequency matrix. Secondly, we introduce, and propose solutions to, some often-ignored practical considerations of autonomous mobile robots, namely, *i*) the unavailability of temporal segmentation applied to video sequences and *ii*) the challenges of life-long or incremental learning.

Low rank approximations for human activities

The aim is to learn a low-dimensional representation of an encoded term-frequency matrix by finding redundancy within the set of qualitative descriptors observed. The most discriminative descriptors are those that contain the most variation. The assumption is that by reducing the dimensionality of the matrix, but maintaining as much variance within the columns as possible, it is possible to represent the corpus of observations with a relatively small number of human activity classes. The process is performed using Latent Semantic Analysis (LSA) which computes linear combinations of columns to create new composite features containing as much variation as possible. Sorting the new features by their ability to discriminate the observations, the most redundant are removed to leave a low-dimensional representation and latent classes encoded in the data are recovered.

(a) Inaccurate OpenNI pose estimates

(b) Improved pose estimates

Fig. 1. improved human pose estima

(a) Generating a 3D representation of the environment. (left:) The robot moves its pan-tilt multiple times capturing an RGB image and a point cloud at each angle. (right:) The robot fuses together the registered point clouds to create a single 3D representation.

(b) Segmenting candidate object locations. (left:) Surfel representation of the robot's 3D environment. (right:) Candidate object locations automati- cally segmented as clusters.

map frame of reference using the estimated location of the robot, i.e. j (id, x, y, z, xmap , ymap , zmap). A human pose then robot, we obtain a sequence of human poses over a time series of detections (camera frames). We define a human pose sequence, S p1, p2, ..., pi , .. . , where each pi is the detected human pose at timepoint i, and no restrictions are

The aim is to recover a small number of latent concepts from the

comprises of a collection of body joint locations, i.e. p j1, j2, , using the OpenNI/ConvNet implementation. For each human detected by the

placed upon the length of the recorded sequences. This variation in length is a major difficulty when using real-world data to learn activities on a mobile robot.

encoded data. The assumption is that common human activities relate

to repeated patterns of discriminative qualitative descriptors encoded within the observations. Ex- amining the decomposition, the non-zero eigenvalues in the diagonal matrix Σ represent the r most discriminative new compositional features, known as concepts. These latent concepts can be thought of as the activity classes encoded in the original term-frequency matrix. The columns of the left singular (M M) matrix U contain the eigenvectors of CC T , since CCT UΣΣT U T , and provides information, as a linear combination, about the weighting of each concept to each ob-servation, specifying its latent activity class (concept). The columns of the right singular (N N) matrix V contain the eigenvectors of CT C , since CT C V ΣT ΣV T , and specify a linear combination of weights for each qualitative descriptor (codeword) used to describe each latent concept.

V. Limitations

In Section 6.3 we show that LSA provides a relatively good method to recover discriminative latent concepts in an un- supervised setting that are embedded in a term-frequency matrix; along with a code book of descriptors used to describe them. However, there are limitations to this non-probabilistic technique. Given the matrix decomposition, i.e. the left/right singular matrices describe the linear combinations of observations to concepts U , and codewords to concepts V ; one limita- tion is that both U and V are orthogonal matrices. The implication of the orthogonal matrices is that any concepts extracted cannot share columns, e.g. a specific codeword cannot be significant in two separate concepts.

A second limitation is that LSA is a batch learning algorithm, which requires the entire term-frequency matrix C to be encoded before the training process occurs. New observations can be represented by their similarity to already learned concepts, but they cannot contribute to the model and affect the concepts, unless the SVD decomposition is re-performed, which is inefficient for a life-long learning setting. Finally, selecting the most appropriate number of eigenvalues (i.e. rank) to best represent the low-rank approximate matrix Cr is often challenging. One technique for selecting a good value of r is to plot the variation of each eigenvalue, in a non-increasing scree plot that ideally shows a steep curve followed by a bend, often called the "elbow point", followed by a more flat line indicating any further features add little variance. This technique allows a good value of r to be ascertained, however, the exact number can often depend upon the task. Solutions to each of these limitations are proposed in the following section by using a generative probabilistic model.

VI Conclusion

In summary, we have introduced a

novel framework whereby low-dimensional representations of human observations from a mobile robot are learned. We demonstrate that by first abstracting observations using qualitative spatial relations between tracked entities in a visual scene and secondly performing probabilistic unsupervised learning techniques, efficient topic distributions can be learned representing human activities. As a key contribution, we have provided a formal repre- sentation of human observations as acquired by a mobile robot, qualitative abstractions to generalise these, and methods to extract discrete features as sequences of observed qualitative relationships. Multiple unsupervised methods to learn low-dimensional representations of human activities have been compared, along with experiments and results to validate our approach. Lastly, the framework has been shown to work well given real-world practical challenges of mobile robotics less often reported on.

We have shown that from multiple human observations in real-world environments, it is possible to learn consistent and meaningful patterns of detailed 3D human body pose sequences using unsupervised learning methods applied to our novel qualitative representation of human observations. Models of human activities are learned with the presence of dy- namic objects in a staged static camera set-up dataset (CAD120), as well as a more challenging, real-world, environment with object locations automatically learned. We presented a comparison between our proposed unsupervised methods to a standard supervised method in order to add a perspective to the learning performance. It was shown that the performance of LSA and LDA in these settings is comparable to the supervised technique, without requiring ground truth training labels. Finally, we proposed solutions to interesting and as yet unsolved practical problems in the field of human activity analysis from a mobile robot deployed in real-world environments. We have shown that by using more sophisticated learning meth- ods, it is possible to address some of the practical limitations surrounding life-long human activity learning from a mobile robot. Namely, that manual temporal segmentation is not required and that Variational Bayes inference can be applied for incremental and life-long learning settings.

A possible future direction of research could be to extend this to many months of observational data. This would allow for totally new topics to be discovered, possibly from the robot entering entirely new environments. Also, a "learning-rate" parameter could be updated online given new environments explored by the robot in order to more quickly converge on new human activities

being observed. Any topics removed, or not updated, could be considered as the robot "forgetting" a particular human activity.

Open source software has been developed (DOI: qsrlib.readthedocs.org), and a mobile robot dataset has been made openly accessible, (DOI: http://doi.org/10.5518/86). It is our hope that the work presented in this paper will help human activity analysis researchers move away from standard offline approaches applied to static, pre-processed visual datasets. In favour of solutions, such as ours, developed to generalise to real-world environments that mobile robots actually inhabit. These solutions are more practical for the evolution of mobile robotics research in the long-term.

References

[1] P. Duckworth, M. Alomari, Y. Gatsoulis, D.C. Hogg, A.G. Cohn, Unsupervised activity recognition using latent semantic analysis on a mobile robot, in: 22nd European Conference on Artificial Intelligence, ECAI, 2016.

[2] P. Duckworth, M. Alomari, J. Charles, D.C. Hogg, A.G. Cohn, Latent Dirichlet allocation for unsupervised activity analysis on an autonomous mobile robot, in: Proc. of Association for the Advancement of Artificial Intelligence, AAAI, 2017.

[3] P. Duckworth, M. Alomari, N. Bore, M. Hawasly, D.C. Hogg, A.G. Cohn, Grounding of human environments and activities for autonomous robots, in: 26th International Joint Conference on Artificial Intelligence, IJCAI, 2017.

[4] E. Marder-Eppstein, E. Berger, T. Foote, B. Gerkey, K. Konolige, The office marathon, in: IEEE Conference on Robotics and Automation, ICRA, 2010.

[5] N. Hawes, P. Duckworth, C. Burbridge, F. Jovan, L. Kunze, B. Lacerda, L. Mudrova, J. Young, J. Wyatt, et al., The strands project: long-term autonomy in everyday environments, IEEE Robot. Autom. Mag. 24 (3) (2017) 146–156.

[6] D.M. Blei, A.Y. Ng, M.I. Jordan, Latent Dirichlet allocation, J. Mach. Learn. Res. 3 (2003) 993–1022.
[7] S. Thrun, W. Burgard, D. Fox, Probabilistic Robotics, MIT Press, 2005.
[8] **PR2 Robot Platform,** http://wiki.ros.org/Robots/PR2.
[9] **MetraLabs,** www.metralabs.com/en.
[10] L. Chen, J. Hoey, C.D. Nugent, D.J. Cook, Z. Yu, Sensor-based activity recognition, IEEE Trans. Syst. Man Cybern., Part C, Appl. Rev. 42 (6) (2012) 790–808.
[11] O.D. Lara, M.A. Labrador, A survey on human activity recognition using wearable sensors, IEEE Commun. Surv. Tutor. 15 (3) (2013) 1192–1209.
[12] P. Turaga, R. Chellappa, V.S. Subrahmanian, O. Udrea, Machine recognition of human activities: a survey, IEEE Trans. Circuits Syst. Video Technol. 18 (11) (2008) 1473–1488.
[13] G. Lavee, E. Rivlin, M. Rudzsky, Understanding video events: a survey of methods for automatic interpretation of semantic occurrences in video, IEEE Trans. Syst. Man Cybern., Part C, Appl. Rev. 39 (5) (2009) 489–504.
[14] D. Weinland, R. Ronfard, E. Boyer, A survey of vision-based methods for action representation, segmentation and recognition, Comput. Vis. Image Underst. 115 (2) (2011) 224–241.
[15] M. Yu, Q. Zhang, L. Wang, J. Zhu, R. Yang, J. Gall, A survey on human motion analysis from depth data, in: Time-of-Flight and Depth Imaging: Sensors, Algorithms, and Applications, Springer, 2013, pp. 149–187.
[16] J. Aggarwal, L. Xia, Human activity recognition from 3D data: a review, Pattern Recognit. Lett. 48 (2014) 70–80.
[17] S. Deerwester, S.T. Dumais, G.W. Furnas, T.K. Landauer, R. Harshman, Indexing by latent semantic analysis, J. Am. Soc. Inf. Sci. 41 (6) (1990) 391.
[18] T. Hofmann, Unsupervised learning by probabilistic latent semantic analysis, Mach. Learn. 42 (1-2) (2001) 177–196.
[19] J.C. Niebles, H. Wang, L. Fei-Fei, Unsupervised learning of human action categories using spatial-temporal words, Int. J. Comput. Vis. 79 (3) (2008) 299–318.
[20] J. Zhang, S. Gong, Action categorization by structural probabilistic latent semantic analysis, Comput. Vis. Image Underst. 114 (8) (2010) 857–864.
[21] S. Wong, T.K. Kim, R. Cipolla, Learning motion categories using both semantic and structural information, in: IEEE Conference on Computer Vision and Pattern Recognition, CVPR, 2007.
[22] J. Liu, S. Ali, M. Shah, Recognizing human actions using multiple features, in: IEEE Conference on Computer Vision and Pattern Recognition, CVPR, 2008.
[23] S. Savarese, A. DelPozo, J.C. Niebles, L. Fei-Fei, Spatial-temporal correlatons for unsupervised action classification, in: IEEE Workshop on Motion and Video Computing, WMVC, 2008.
[24] C. Wu, J. Zhang, S. Savarese, A. Saxena, Watch-n-patch: unsupervised understanding of actions and relations, in: The IEEE Conference on Computer Vision and Pattern Recognition, CVPR, 2015.
[25] P.X. Anezoganidis, P. Wolick, A. Chatterjee, The neural basis for spatial relations, J. Cogn. Neurosci. 22 (8) (2010) 1739–1753.
[26] J. Chen, A. Cohn, D. Liu, S. Wang, J. Ouyang, Q. Yu, A survey of qualitative spatial representations, Knowl. Eng. Rev. 30 (2015) 106–136.
[27] K.S. Dubba, M.R.d. Oliveira, G.H. Lim, H. Kasaei, L.S. Lopes, A. Tome, Grounding language in perception for scene conceptualization in autonomous robots, in: AAAI Spring Symposium Series, 2014.
[28] I. Tayyub, A. Tavanai, Y. Gatsoulis, A.G. Cohn, D.C. Hogg, Qualitative and quantitative spatio-temporal relations in daily living activity recognition, in: 12th Asian Conference on Computer Vision, ACCV, 2015.
[29] L. Kunze, C. Burbridge, M. Alberti, A. Thippur, J. Folkesson, P. Jensfelt, N. Hawes, Combining top-down spatial reasoning and bottom-up object class recognition for scene understanding, in: IEEE International Conference on Intelligent Robots and Systems, IROS, 2014.
[30] J. Fernyhough, A.G. Cohn, D.C. Hogg, Building qualitative event models automatically from visual input, in: IEEE International Conference on Computer Vision, ICCV, 1998, pp. 350–355.
[31] K. Dubba, M. Bhatt, F. Dylla, D.C. Hogg, A.G. Cohn, Interleaved inductive-abductive reasoning for learning complex event models, in: International Conference on Inductive Logic Programming, Springer, 2011, pp. 113–129.
[32] A.G. Cohn, S. Li, W. Liu, J. Renz, Reasoning about topological and cardinal direction relations between 2-dimensional spatial objects, J. Artif. Intell. Res. 51 (2014) 493–532.
[33] M. Crouse, K.D. Forbus, Elementary school science as a cognitive system domain: how much qualitative reasoning is required? in: Proceedings of Fourth Annual Conference on Advances in Cognitive Systems, 2016.
[34] M. Michael, N. Bernd, Understanding object motion: recognition, learning and spatiotemporal reasoning, in: Special Issue: Toward Learning Robots, Robot. Auton. Syst. 8 (1) (1991) 65–91.
[35] A. Behera, A. Cohn, D. Hogg, Workflow activity monitoring using dynamics of pair-wise qualitative spatial relations, in: Advances in Multimedia Modeling, 2012, pp. 196–209.
[36] M. Alomari, P. Duckworth, D.C. Hogg, A.G. Cohn, Some supervised natural language acquisition and grounding for robotic systems, in: Proc. Association for the Advancement of Artificial Intelligence, AAAI, 2017.
[37] M. Alomari, P. Duckworth, D.C. Hogg, A.G. Cohn, Semi-supervised natural language acquisition and grounding for robotic systems, in: AAAI Spring Symposium, 2017.
[38] J.C. Niebles, L. Fei-Fei, A hierarchical model of shape and appearance for human action classification, in: Conference on Computer Vision and Pattern Recognition, CVPR, IEEE, 2007, pp. 1–8.

Social Aspects of Friend Identification and Profile Ranking in Internet ofThings Era

Tushar Mehrotra[1], Gaurav Kumar Rajput[2], Shakti Kundu[3], Sandeep Saxena[4]

[1]*FOECS,Teerthanker Mahaveer University, Moradabad*

[2]*FOECS,Teerthanker Mahaveer University, Moradabad*

[3]*FOECS,Teerthanker Mahaveer University, Moradabad*

[4]*Galgotias College of Engineering and Technology, Greater Noida*

[1]tushar.cs17@nitp.ac.in

[2]gauravrajput31@gmail.com

[3]shaktikundu@gmail.com

[4]sandeep.research29@gmail.com

Abstract— **In this paper a model is proposed to emphasis the use and advantages of profile ranking based upon social contacts or friends' group. The basic idea behind the model is grouping the people socially on the basis of sharing common behaviour, usage patterns of social media or other applications. This model can be easily incorporated with existing technology and prove beneficial from ample of aspects as discussed throughout the literature.**

Keywords— **Social contacts, Internet of Things, K-mean, K-nearest neighbour, Profile Ranking**

I. INTRODUCTION

In the present scenario, social contacts [1] are playing a major role in the life of the people. The users create their own groups by managing the contacts on the social networks. The behavioural patterns of individual can also be perceived from the way of using these social media websites.

A larger impact can be analysed from the fact that social relationship is having a great impact on the friendship, purchasing behaviour [11][12], lifestyle and travelling pattern of the individuals. This resulted in increased popularity of social networking sites among individuals in recent years.

In this paper a discussion has been made upon identification of common friends according to similar behaviour.Various metrics have been presented to study and ranking of the profile.

II. RELATED WORK

In this paper (Behavioural biometrics: a survey and classification) [2] has discussed the behavioural Biometrics[8]which is based on skills,style,preferences[17],knowledge used by people and used a generalized algorithm which classify the user prolife based on behavioural biometrics[9].

A driver behaviour reorganization method based on a Driver Model Framework [4]has made a technique for detecting drivers intentions is essential to facilitate operating mode transitions between driver and driver assistant systems using Hidden MarKov Models(HMMs) which has been used to characterize and detect driving maneuvers and place it in the framework of cognitive model of human behaviour.

The Internet of Things [1]:A surveyhas discussed about IOT application and their specific area, technologies, security and privacy of data in IOT infrastructure.

In the propose model k-mean clustering is used in making the cluster of user profile of various social platform on basis of different parameters[14][16][18] like common field

ofinterest, usage timing of social platforms, commonbuying behaviour pattern.

After making the cluster of user profile, k-nearest neighbouralgorithm is used to find strength between two common friends in cluster of various user profile on the basis of their similar properties and match.

III. PROPOSED MODEL

In this paper we have proposed a model that co-relates the idea for social friendship of individual based on the behaviour of the usage of various application. The module is divided into two parts, the first part deals with classification of common friends. These friends share similar features. The second module works to group their friendship on the likelihood of attaining ranking for a particular friend. This generates the strength of friendship asthey both share in accordance to the usage features.

The friends [6] can easily access the features shared by their mates [5]. These features can be either product(s) they wish to buy, books they need to purchase, movies they would like to watch, or places they would like to visit. Each friend will have its own ranking of friends [15]. Thus, generating combinations in a personalised [19] way for each individual.

Introduction for the algorithms to be used for efficient performance have been proposed in the upcoming subsections. Furthermore, the proposed architectures consisting of two modules have been depicted in the figure 1. As depicted, it presents an era of impact to the user based on social profile ranking of the individual. In the work, a common profiling mechanism has been formulated based on the discussed features. These helps to group the interested individual into one community. This community has been trained and analysed based on elaborated parameters and further the strength of contact is measured. The algorithms used have been discussed below.

A. K-MEAN –

The k-mean clustering algorithm has been best suite according to this problem domain. Its procedure follows a simple and easy way to classify a given data set which consists of the relevant features. These features could be the likeness towards a particular website, platform, product, learning tool which forms a certain number of clusters (assume k clusters). The cluster defines a relationship in common towards a particular feature or asset of interest [10] [13].To make a relation with common interest on social networks [3][7], it is easy to identify by common area of interest and social activity rate of users on different socialnetwork platform. After applying this algorithm, we form a cluster of common social friends based on their area of interest and usages of social activity rate of users.

B. *K-nearest neighbours (for interest)*

According to their behaviour, k-nearest neighbours is suitable for classification and regression. To identify the relation between two entities or group of entitiesaccording to their common behaviour and other similar properties. Entities in our work depicts the relationship between two or more user profiles.Thisalgorithm can give the good result. To identify the relation between two friends on social network,it takes the properties area of common interest and social activity rate (duration) of different platforms as input and classify the friends which have social connection based on common area of interest.

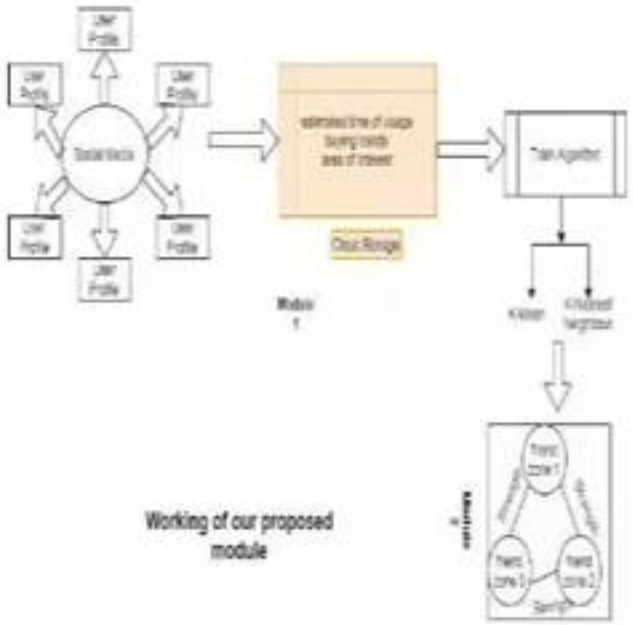


Figure 1: Social Media Impact in an era of IOT

The proposed model consists of two parts or modules as illustrated to formulate a proper working of the design. Module 1 computes the clusters of friends sharing similar features based upon the common characteristics of the users. This provides a medium to group people on the basis of similar area of interest[20][21].Module 2 works on finding the strength of friends. This strength denotes the ranking which further influences the buying behaviour, visiting trend or other features as desired by the user. This trend can be useful to save the time of the user. Time can be saved as only the crucial reviews can be seen. Profile ranking helps to depict the reviews. These reviews can be most beneficial, as according to strengthen these matters at the most.

IV. CONCLUSION

Participatory and opportunistic sensing[7] have been the two most relevant areas of research in this decade. Smart user devices and applications have been of utmost importance in these types of sensing. Paving a way towards smart IoT era. In the paper we have enabled an architecture to floor a way toward saving time and effort in profiling the important aspects of our need.The application of two techniques as discussed can be further used to enhance the profile and its ranking, which is perceived by other users. Social internet of things isplaying a crucial role in todays era. The use of social applications and its aspects has been found to be of a great use. Behaviour pattern analysis has been made in our work which helps us to gain an insight about the behaviour of the users. For this work the two most popular algorithms have been used. Both the algorithms have their own impact over the data and efficiently

V. REFERENCES

[1] Atzori, L., Iera, A., & Morabito, G. (2010). The internet of things: A survey. Computer networks, 54(15), 2787-2805.

[2] Yampolskiy, R. V., &Govindaraju, V. (2008). Behavioural biometrics: a survey and classification. International Journal of Biometrics, 1(1), 81-113.

[3] Dimitrov, D. V. (2016). Medical internet of things and big data in healthcare. Healthcare informatics research, 22(3), 156-163.

[4] Rathore, M. M., Ahmad, A., Paul, A., & Rho, S. (2016). Urban planning and building smart cities based on the internet of things using big data analytics. Computer Networks, 101, 63-80.

[5] Mesch, G. S., & Talmud, I. (2006). Online friendship formation, communication channels, and social closeness. International Journal of Internet Science, 1(1), 29-44.

[6] Parks, M. R., & Floyd, K. (1996). Meanings for closeness and intimacy in friendship. Journal of Social and Personal Relationships, 13(1), 85-107.

[7] R. K. Ganti, F. Ye, and H. Lei, "Mobile crowdsensing: current state andfuture challenges," IEEE Communications Magazine, vol. 49, no. 11, 2011

[8] Lydon, J. E., Jamieson, D. W., & Holmes, J. G. (1997). The meaning of social interactions in the transition from acquaintanceship to friendship. Journal of Personality and Social Psychology, 73(3), 536.

[9] Morrison, D. M., Casey, E. A., Beadnell, B. A., Hoppe, M. J., Gillmore, M. R., Wilsdon, A., ... & Wells, E. A. (2007). Effects of friendship closeness in an adolescent group HIV prevention intervention. Prevention Science, 8(4), 274-284.

[10] D.-J. Kim, K.-W. Chung, and K.-S. Hong, "Person authentication usingface, teeth and voice modalities for mobile device security," IEEE Transactions on Consumer Electronics, vol. 56, no. 4, pp. 2678–2685, 2010

[11] Nguyen, A. W., Chatters, L. M., Taylor, R. J., &Mouzon, D. M. (2016). Social support from family and friends and subjective well-being of older African Americans. Journal of happiness studies, 17(3), 959-979.

[12] Laursen, B. (1998). Closeness and conflict in adolescent peer relationships: Interdependence with friends and romantic partners.

[13] Ledbetter, A. M., Mazer, J. P., DeGroot, J. M., Meyer, K. R., Mao, Y., & Swafford, B. (2011). Attitudes toward online social connection and self-disclosure as predictors of Facebook communication and relational closeness. Communication Research, 38(1), 27-53.

[14] Berry, D. S., Willingham, J. K., & Thayer, C. A. (2000). Affect and personality as predictors of conflict and closeness in young adults' friendships. Journal of Research in Personality, 34(1), 84-107.

[15] Chow, C. M., Ruhl, H., &Buhrmester, D. (2015). Romantic relationships and psychological distress among adolescents: Moderating role of friendship closeness. International journal of social psychiatry, 61(7), 711-720.

[16] Binder, J. F., Roberts, S. G., & Sutcliffe, A. G. (2012). Closeness, loneliness, support: Core ties and significant ties in personal communities. Social Networks, 34(2), 206-214.

[17] Salazar, L. R. (2015). Exploring the relationship between compassion, closeness, trust, and social support in same-sex friendships. The Journal of Happiness & Well-Being, 3(1), 15-29.

[18] Rose, A. J., Smith, R. L., Glick, G. C., & Schwartz-Mette, R. A. (2016). Girls' and boys' problem talk: Implications for emotional closeness in friendships. Developmental psychology, 52(4), 629.

[19] Sun, Z., Yearwood, J., & Firmin, S. (2013). A technique for ranking friendship closeness in social networking services. In 24th Australasian Conference on Information Systems (ACIS) (pp. 1-11). RMIT University

[20] Ledbetter, A. M., Griffin, E. M., & Sparks, G. G. (2007). Forecasting "friends forever": A longitudinal investigation of sustained closeness between best friends. Personal Relationships, 14(2), 343-350.

[21] Way, N., Cowal, K., Gingold, R., Pahl, K., & Bissessar, N. (2001). Friendship patterns among African American, Asian American, and Latino adolescents from low-income families. Journal of Social and Personal Relationships, 18(1), 29-53.

[22] Wiese, J., Kelley, P. G., Cranor, L. F., Dabbish, L., Hong, J. I., & Zimmerman, J. (2011, September). Are you close with me? Are you nearby? Investigating social groups, closeness, and willingness to share. In Proceedings of the 13th international conference on Ubiquitous computing (pp. 197-206).

An overview of virtualization and clustering

Gauri Goel, Anjali Singh Gailakoti, Hardik Tripathi
gauri10goel@gmail.com, anjalisgailakoti33@gmail.com, tripathihardik98@gmail.com
Students- B.Tech final year, Arya Group of colleges

Abstract

Virtualization is a strategy that consolidates or split processing assets that give at least one execution condition utilizing systems that is equipment and programming division or, halfway or in general machine reproduction, reflecting and others. Distributed computing is known as a remarkable and most recent subject in data innovation. Distributed computing depends on other research fields of registering like HPC, administration processing, virtualization, and network figuring. Today clouds with virtualization are transforming IT. Apart from its popularity, it has some concerns which are becoming hurdles for its wider adoption. In this paper, a study has been made on virtualization concerns.

Introduction

Virtualization is the "formation of a virtual (as opposed to genuine) adaptation of something, for example, a server, a work area, a capacity gadget, a working framework or system assets". The cloud's virtualization primarily manages the server virtualization and how it functions and why it is named so?

In other words, Virtualization is a strategy, which permits to share a solitary physical occurrence of an asset or an application among various clients and associations. It does by allocating a coherent name to a physical stockpiling and giving a pointer to that physical asset when requested.

What is the idea of driving the Virtualization?

Formation of a virtual machine over an existing working framework and equipment is known as Hardware Virtualization. A Virtual machine gives a situation that is intelligently isolated from the hidden equipment.

The machine on which the virtual machine is made is known as Host Machine and that virtual machine alludes as a Guest Machine.

How virtualization works in the cloud

Virtualization assumes a huge job in cloud innovation and its working system. For the most part, what occurs in the cloud - the clients not just offer the information that is situated in the cloud-like application yet additionally share their frameworks with the assistance of virtualization.

Virtualization is utilized predominantly to furnish applications with standard forms for the cloud clients and with the arrival of the most recent variant of an application the suppliers can productively give that application to the cloud and its clients and it is conceivable utilizing virtualization as it were. By the utilization of this virtualization idea, all servers and programming other cloud suppliers require those are kept up by an outsider, and the cloud supplier pays them on a month to month or yearly premise.

As a general rule, the greater part of the present hypervisors utilizes a mix of various kinds of equipment virtualization. Predominantly virtualization implies running various frameworks on a solitary machine however sharing all assets (equipment) and it assists with sharing IT assets to get benefits in the business field.

Difference between virtualization and cloud

1. There is a hole between these two terms, however, cloud innovation requires the idea of virtualization. Virtualization is innovation - it can likewise be treated as programming that can control equipment. While distributed computing is a help that is the consequence of the control.
2. Virtualization is the establishment component of distributed computing through Cloud innovation is the conveyance of shared assets as an assistance on-request through the web.
3. Cloud is comprised of the idea of virtualization.

Focal points of virtualization

- The quantity of servers gets diminished by the utilization of the virtualization idea
- Improve the capacity of innovation
- The business congruity likewise raised because of the utilization of virtualization
- It makes a blended virtual condition
- Increment proficiency for advancement and test condition
- Brings down Total Cost of Ownership (TCO)

Features of virtualization

1. Dividing: Multiple virtual servers can run on a physical server simultaneously
2. Exemplification of information: All information on the virtual server including boot plates is epitomized in a document group
3. Confinement: The Virtual server running on the physical server are securely isolated and don't influence one another

4. Equipment Independence: When the virtual server runs, it can move to the distinctive equipment stage.

Types of virtualization

There are various types of virtualization which are used are givenbelow

Hardware virtualization

It is the deliberation of figuring assets from the product that utilizations cloud assets. It includes installing virtual machine programming into the server's equipment segments. That product is known as the hypervisor. The hypervisor deals with the common physical equipment assets between the visitor OS and the host OS. The preoccupied equipment is spoken to as genuine equipment. Virtualization implies reflection and equipment virtualization is accomplished by abstracting the physical equipment part utilizing Virtual Machine Monitor (VMM) or hypervisor. Hypervisors depend on order set expansions in the processors to quicken regular virtualization exercises for boosting the exhibition. The term equipment virtualization is utilized when VMM or virtual machine programming or any hypervisor gets straightforwardly introduced on the equipment framework. The essential undertaking of the hypervisor is to process observing, memory and equipment controlling. After equipment virtualization is done, distinctive working frameworks can be introduced, and different applications can run on it. Equipment virtualization, when accomplished for server stages, is additionally called server virtualization.

Types of hardware virtualization

1. Full Virtualization: Here the hardware architecture is completely simulated. Guest software doesn't need any modification to run any applications.
2. Emulation Virtualization: Here the virtual machine simulates the hardware & is independent. Furthermore, the guest OS doesn't require any modification.
3. Para-Virtualization: Here, the hardware is not simulated; instead the guest software runs its isolated system.

Software virtualization

It is likewise called application virtualization is the act of running programming from a remote server. Programming virtualization is like that of virtualization except that it can digest the product establishment method and make virtual programming establishment. Numerous applications and their circulations became normal assignments for IT firms and offices. The component for introducing an application varies. So virtualized programming is presented which

is an application that will be introduced into its independent unit and give programming virtualization. A portion of the models is Virtual Box, VMware, and so forth.

The DLL (Data Link Layer) divert the whole virtualized program's calls to the document arrangement of the server. At the point when the product is run from the server right now, changes are required to be made on the neighbourhood framework.

Operating system virtualization

It is also called OS-level virtualization is a type of virtualization technology which work on the OS layer. Here the kernel of an OS allows more than one isolated user-space instances to exist. Such instances are called containers/software containers or virtualization engines. In other words, OS kernel will run a single operating system & provide that operating system's functionality to replicate on each of the isolated partitions.

Server virtualization

It is the division of a physical server into a few virtual servers and this division is for the most part done to extemporize the utility of server assets. In other words, it is the covering of assets that are situated in a server that incorporates the number and personality of processors, physical servers and the working framework. This division of one physical server into numerous segregated virtual servers is finished by server overseer utilizing programming. The virtual condition

Right now, server assets are kept escaped by the client. This apportioning of a physical server into a few virtual conditions; brings about the commitment of one server to play out a solitary application or task. This is once in a while called virtual private servers.

Storage virtualization

It pools the physical stockpiling from various system stockpiling gadgets and causes it to seem, by all accounts, to be a solitary stockpiling unit that is taken care of from solitary support. As we as a whole know there has been a solid bond between physical host and privately introduced capacity gadgets; and with the adjustment in worldview, nearby capacity is never again required. Further developed stockpiling has gone to the market with an expansion in usefulness. Capacity virtualization is a huge segment of capacity servers and encourages the executives and checking of capacity in a virtualized domain.

Capacity virtualization encourages the capacity overseer to reinforce, chronicle and recuperation information all the more proficiently, in less measure of time by covering the real multifaceted

nature of SAN (Storage Area Network). Using programming mixture apparatuses, the capacity executive can actualize virtualization.

Virtualization and clustering

Virtualization and clustering can be two countenances of a similar coin.

Processing virtualization is an extremely hotly debated issue for data center managers. Regardless of whether the inspiration is higher use, decreased administration, or business readiness, figuring virtualization offers convincing prospects.

Clustering, on the other hand, is a system for elite figuring and burden adjusting. Clustering lets your total assets, conveying virtual "big iron" execution.

Clustering presents a progressively exclusive picture - much of the time clustering is done at the application level and is explicit to one application - as observed with Oracle's RAC or Microsoft's bunching innovation for Exchange and SQL Server. Datacenter supervisors must devote servers to such a cluster, and can't blend and match the virtualization and clustering innovations.

Cloud Virtualization Cluster

The Cloud Virtualization Cluster is RCC's cloud computing platform. Based on the powerful oVirt system, it is designed to provide users with a framework for quick deployment and management of virtual systems for web, database, and other self-managed applications associated with RCC resources.

What is the Virtualization Cluster?

The Virtualization Cluster (aka "SKY" System) is a system that hosts virtual machines for research computing purposes. Users can provision, destroy, snapshot, start, stop, and administer virtual machines via a web panel or through SSH.

Data analysis workflows and pipelines increasingly rely on web-based applications and databases to facilitate job submission and to share results with a broad user community. With the Sky System, RCC users can deploy an appropriately sized Virtual Machine (VM) within minutes, avoiding the delays often associated with purchasing and installing new hardware. Users have administrative access to their VMs, so it is also useful for custom software deployments.

What is it used for?

Servers in the Virtualization Cluster can be applied to research in many different contexts. Since it connects directly to our storage systems, VMs can host websites to expose large datasets to researchers. Likewise, research groups can create and host collaborative tools, such as wikis,

blogs, or custom sites to facilitate their work. Systems can also be used for testing, prototyping, and other activities where purchasing dedicated hardware resources may not be appropriate.

The Virtualization Cluster is also used for providing compute resources to those research projects that need less compute-intensive resources, such as web servers, small database servers, or custom data collection tools.

Who has access?

Access to the Virtualization Cluster is available for purchase on a monthly or pre-paid five-year basis. Keep in mind that this system is provided to support grant-funded research activities. Other departments within ITS offer VMs for a departmental website or other non-research related purposes.

Virtual Machine clustering

Virtual Machine (VM) technologies, such as VMWare, Microsoft Hyper-V are becoming increasingly popular. They provide great flexibility in deploying servers within an organization. VM implementations can also provide high-availability through the use of VM clusters. When a VM is running in a highly available VM cluster, any failure of the physical hardware does not affect the running VM as it is seamlessly transferred to another node in the cluster.

Implementing high-availability using VM infrastructure is much simpler to install and manage than using the built-in operating system and application clustering support. You set up your VM instances and the VM infrastructure ensures they continue to run uninterrupted.

This allows you to set up PaperCut NG/MF in the same way as on a physical server, but allow the VM infrastructure to provide the high availability.

This section discusses a generic clustered Virtual Machine setup.

PaperCut NG/MF offers great flexibility and allows you to easily structure your installation into physical multi-tiered clustered components.

Clustering at Virtual Machine level offers these advantages over other traditional clustering setups:

- Your software, drivers, settings, etc. are installed and configured once, in a single VM
- Depending on your VM infrastructure, when a physical node fails the VM can be shifted to another node with marginal or no downtime
- Dramatically simplified backup processes
- Disaster recovery capabilities are inherently available

Virtual Machine hosts can automatically detect when a VM crashes or becomes unresponsive. You should consider whether you will augment this with application-level monitoring. Although the VM might be running normally, the underlying application can have problems and application-level monitoring can detect this. Ways to perform application-level monitoring include (but not limited to):

- Loading an Application Server URL to test server is running
- IP pings
- Checking that PaperCut NG/MF services are running

Conclusion

This paper takes a glimpse at parts of virtualization. Virtualization advancements offer various significant utilities which make it a solid instrument that can be utilized in an enormous number of utilizations. These are not restricted to server union, application sandboxing, access to various sorts of equipment and working frameworks, investigating. There are various strategies that Virtual Machine product is following to improve the presentation of virtualization after some time. Cloud figuring is getting increasingly liked and it is presently at the underlying level. Renowned partnerships are serving all types of distributed computing. In this way, these regions required profound further research.

References

1. Peter Mell, Timothy Grance, "The NIST Definition of Cloud Computing", Jan, 2011. http://docs.ismgcorp.com/files/external/Draft-SP-800-145 Cloud Definition.pdf
2. "Secure virtualization for cloud computing".Flavio Lombardi, Roberto Di Pietro, June 2010 www.fobes.com/cloud computing.
3. Lizhe Wang, Jie Tao, Kunze M., Castellanos A.C., Kramer D., Karl W., "Scientific Cloud Computing: Early Definition and Experience", 10th IEEE Int. Conference on High Performance Computing and Communications, pp.825-830, Dalian, China, Sep.2008, ISBN: 978-0-7695-3352-0.
4. R. L. Grossman, "The Case for Cloud Computing", IT Professional, vol. 11(2), pp. 23-27, Mar-April, 2009 ISSN:1520-9202, INSPEC Accession Number: 10518970, DOI: 10.1109/MITP.2009.40.

5. Lizhe Wang, Jie Tao, Kunze M., Castellanos A.C., Kramer D., Karl W., "Scientific Cloud Computing: Early Definition and Experience", 10th IEEE Int. Conference on High Performance Computing and Communications, pp. 825-830, Dalian, China, Sep.2008, ISBN: 978-0-7695-3352-0.
6. T.Swathi et al, International Journal of Computer Science and Mobile Computing, Vol.3 Issue.5, May- 2014, pg. 540-546© 2014, IJCSMC All Rights Reserved 546
7. Wayne Jansen, Timothy Grance, "NIST Guidelines on Security and Privacy in Public Cloud Computing", Draft Special Publication 800-144,2011. http://csrc.nist.gov/publications/drafts/800-144/Draft-SP-800-144_cloudcomputing.pdf.
8. Michael Kretzschmar, S Hanigk, "Security management interoperability challenges for collaborative clouds", Systems and Virtualization Management (SVM), 2010, Proceedings of the 4th International DMTF Academic Alliance Workshop on Systems and Virtualization Management: Standards and the Cloud, pp. 43-49, October 25-29, 2010. ISBN:978-1-4244-9181-0,DOI: 10.1109/SVM.2010.5674744.
9. Farzad Sabahi, "Secure Virtualization for Cloud Environment Using Hypervisor-based Technology", Int. Journal of Machine Learning and Computing, pp.39-45, vol. 2, no. 1, February, 2012.
10. K. Hwang, S Kulkarni and Y. Hu, "Cloud security with virtualized defence and Reputation-based Trust management", Proceedings of 2009 Eighth IEEE International Conference on Dependable, Autonomic and Secure Computing (security in cloud computing), pp. 621-628, Chengdu, China, December, 2009. ISBN:978-0-7695-3929-4.
11. "Amazon Web Services: Overview of Security Processes", Whitepaper, May, 2011. http://d36cz9buwru1tt.cloudfront.net/pdf/AWS_Securi ty_Whitepaper.pdf
12. Security for Virtual Machines in Cloud Computing",5th Int'l Conference on Computer Sciences and Convergence Information Technology, pp. 18-21, Seoul, Nov. 30-Dec. 2, 2010. ISBN: 978-1-4244-8567-3.

Sunday Open

ADMISSION OPEN: 2020-21

TEERTHANKER MAHAVEER UNIVERSITY

Moradabad

19 Years of Excellence

iNURTURE Education Solutions

MHRD'S INNOVATION CELL (GOVERNMENT OF INDIA)

Faculty of Engineering & Computing Sciences (FOECS)

MAY APPLY ONLINE www.tmu.ac.in

Programmes Offered in CCSIT

AICTE Approved

- **B.Tech.** Computer Science and Engineering
- **B.Tech.** (CSE) Specialization in Artificial Intelligence Machine Learning & Deep Learning
- **B.Tech.** 2nd Year Lateral Entry (CSE)

Collaboration with IBM

- **B.Tech.** (CSE) Application Development using Cloud and Analytics Platforms

Collaboration with i-Nurture

- **B.Tech** Cloud Technology & Information Security
- **B.Tech.** (CSE) Artificial Intelligence
- **BCA** Data Science
- **BCA** Mobile Applications & Web Technologies,
- **BCA** Cloud Technology & Information Security

- **M.Tech.** Computer Science and Engineering
- **BCA** Bachelor of Computer Applications
- **BCA** For Visually Challenged
- **B.Sc.** (Hons.) Computer Science
- **B.Sc.** Animation
- **MCA** Master of Computer Applications
- **MCA** For Visually Challenged
- **MCA** 2nd Year Lateral Entry
- **Ph.D.** Computer Science Engg. & Computer Applications

Programmes Offered in FOE

AICTE Approved

- **B.Tech.** Mechanical Engineering
- **B.Tech.** Civil Engineering
- **B.Tech.** Electronics & Communication Engineering
- **B.Tech.** Electrical Engineering
- **B.Tech.** (2nd Year Lateral Entry)

- **B.Sc.** (Hons.) – Mathematics
- **B.Sc.** (Hons.) – Physics
- **B.Sc.** (Hons.) – Chemistry
- **M.Sc.** Mathematics
- **M.Sc.** Physics
- **M.Sc.** Chemistry

SALIENT FEATURES

Placement: More than 1200 students placed in highly reputed & recognised MNCs of the country with INR 12 Lac as the highest package.

CTLD Classes: To enhance the personality of each student in the areas of English Communication, Aptitude and Self Confidence.

Principal Excellency Award: Given to all meritorious students in each semester.

Best Project Award: Given to improve the quality of project submission to students in each program under various categories.

Virtual Lab: An effective means of learning, done in collaboration with IIT Kanpur and MHRD Innovation Cell.

Industrial Summer Training: Various short term and industry oriented trainings are organized in collaboration with CISCO, GOOGLE, IBM, Red Hat, Android, i-Nurture etc.

Internships with reputed and top level MNC's.

E-Journals and E-Books: High end resource available through EBSCO & DELNET Database.

Library: Highly equipped and well stocked up library with over 20,000 books and Journals.

Scholarship

For **Jain Community** 50% exemption in Tuition fee and 40% in Hostel fee.

For others up to 50% (UG students) and up to 90% (PG-students) exemption in Tuition fee for **meritorious students**.

Contact: 9568516000, 9568517000, 7351418000
9568316000, 9568317000

VISIT FOECS http://tmu.ac.in/college-of-computing-sciences-and-it/