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A COMPARISON SURVEY ON BIOMEDICAL BODY AREA NETWORKS AND WIRELESS SENSOR NETWORKS

Dr. Rajesh S L
Department of Computer Science and Engineering
Professor and Head of Department, M S Engineering College, Bangalore, India, +919008029810
hod.cse@msec.ac.in

ABSTRACT
The sudden advance in biomedical sensors, low-power circuits and wireless communications has allowed a novel creation of wireless sensor networks: the body area networks. These networks are poised of minute, low-priced and low-power biomedical nodes, primarily devoted for healthcare supervising application. The purpose of these applications is to guarantee a continuous monitoring of vital parameter of patients, whereas providing them the liberty of movement and in so doing better quality of healthcare. This paper demonstrates a assessment of wireless sensor networks to the body area networks. In meticulous, it demonstrates how body area networks make use of and improve ideas from wireless sensor networks. An amendment of energy consumption and heat assimilation troubles is developed for illustration.

I. INTRODUCTION

At the present time, biomedical sensors are used exclusively in health monitoring application, as with the ECG (electrocardiography). In supplementary terms, they are not yet incorporated into communicating networks. on the other hand, with the enhance of the vital body signs need to be observed concurrently, numerous biomedical sensors require to work together to bring together measurements at the same time. Furthermore, it is frequently significant to communicate the calculated data from a sensing device to others. Thus, it becomes essential to comprise a network of communicating biomedical sensors. This would have a drastic impact on the quality of life of patients and on their treatment success rates. It could have a broad range of prospect applications in addition, such as monitoring of cardiovascular diseases, diabetes and asthma, consulting cases through telemedicine or healthcare systems, etc.

In recent times Body Area Networks (BANs) have come out as a by-product to do so. A novel Wireless Sensor Networks (WSNs), appropriate to monitor human bodies. This BAN is poised of a set of small nodes, outfitted with biomedical sensors, wire-less communication devices and motion detectors. These nodes gather vital body signs and then broadcast them in a wireless manner to a central unit where all composed information is processed. Owing to their wireless nature, BAN nodes have numerous advantages, such as inter-operability, mobility and omnipresence connectivity. A few nodes may also be outfitted with actuators, such as pacemakers or device to store and inject medicines.

This is a review paper, with several problems in BANs. We illustrate how BAN makes use of and improves ideas from the WSN literature. In particular, we revise the energy consumption and the heat assimilation troubles, both problems being strongly correlated.

II. WSN TO BAN SCENARIO

2.1 Preamble to WSN

Current advances in miniaturization and wireless communication have allowed a novel set of miniature powerful computers: Wireless Sensor

Networks (WSNs). WSNs consist of vast range, greatly dispersed and self controlled networks, mainly developed for surveillance and monitoring. They are composed of a large number of minute and inexpensive nodes capable of sensing, computing and communication. WSNs were primarily intended for military applications such as big battlefield supervision. In such applications, WSNs were implicit to have cubic-millimetre computers, called smart dust, where the smart dust concept has not been realized as per the best of our knowledge. However, the issues and challenges of WSNs overlay the way to numerous novel prospects. It is thus projected to use WSNs in a wide range of applications, including ecological monitoring, animal migration monitoring, security surveillance, industrial control, as well as personal healthcare monitoring, etc.

2.2 Depiction of Body Area Networks

The WSNs technology is still under growth. Though, the research on WSNs does not deal with the challenges associated with human body supervision. Due to this reason, a new generation of WSNs has emerged: the Body Area Networks BANs offer a new prototype for the WSNs technology in the physiological biosensor, the MAC layer, the network layer, the routing strategy, etc. While WSNs and BANs share a lot of difficulty, such as tininess, they look diverse challenges, as shown in Table 1. A BAN is a network of wearable on-body computing de-vices. It consists of in vivo entrenched biosensor devices. According to the IEEE 802.15 (Task Group 6), a BAN consists of "low power devices operating on, in or around the human body (but not limited to humans) to provide a range of applications collectively with medical, consumer electronics / personal entertainment and other". BANs have a wide variety of applications, as, for illustration, in gaming or virtual reality. Nevertheless, the main challenges in terms of research or engineering remain in the biomedical and healthcare monitoring applications. Indeed, evolution of BANs should follow the rising development in the medical domain; its key objective being to make sure continuous vigilant and pervasive monitoring of patients at home or at work.

TABLE 1. KEY DIFFERENCE RELATING BANS AND WSNS

	Body Area Networks	Wireless Sensor Networks
Node number	Limited number of pervasive nodes	Huge number of nodes for coverage
Degree	Limited by the human body (in centimetres)	Wide area coverage (up to several kilometres)
Energy scavenging	Motion or body heat	Solar or wind power
Correctness	Accurate measurements are required by each node	Compensated by the redundancy
Malfunction	Difficult replacement of implanted nodes	Nodes often disposable

2.3 Body Area Networks Necessities

Even though BANs are fundamentally WSNs, they take the WSNs to their wonderful in many directions. Certainly, BANs for example are inadequate to the human body where very few nodes are deployed. Having few sensing devices, data loss in BANs could be significant, as opposed to WSNs, where nodes yield redundant information. Consequently, every node wants to afford accurate measurements, particularly for nodes giving vital information, such as electrocardiogram (ECG) measurements. This may need supplementary measurements to make sure QoS (quality-of-service) and real-time information delivery, while reliability of measurements is a must in the medical region. Moreover, BANs frequently consist of networks with devices performing divergent tasks. illustrations of these devices include ECG, blood pressure, pulse oximetry, temperature, respiratory, etc. Such diverse characteristics require dissimilar frequency acquisition rates as well as different transmission rates.

Alternatively, a few devices of the BAN need to be enclosed, in vivo, inside the human body. entrenched biosensors must be biocompatible, robust, as substitute is difficult and with low energy requirements, since energy is hard

to supply. Additionally, in BAN, nodes are in close proximity to or inside the human body. This may direct to elevated assimilation of the electromagnetic radio-frequency waves, and thus to an raise of the body temperature. According to the safety restrictions for coverage to radio-frequency energy, communications should be evenly circulated along with all the nodes. Furthermore, as the human body is not rigid, regular changes in nodes positions should be measured in the network topology. For these reasons, a special attention should be paid to the devise of the BAN, including the routing approach.

III. FORAGEING OF ENERGY

The energy consumption in BANs is vital, principally in entrenched biosensors, since they are inaccessible and difficult to reinstate. For instance, a pacemaker battery usually lasts for 5 to 10 years. Since the battery is preserved within the pacemaker, reinstating the battery directs to the substitution of the total system. In order to increase the life span of battery-powered devices, supplementary amount of energy can be delivered by energy harvesting, i.e., energy scavenging. As contrasting to WSNs, where a large consideration is paid to solar energy, BANs introduced a new nature of energy scavenging. Devices can scavenge power from the human body using body heat and body vibrations. Even though heat and motion of the human body bring new projection, they also bring in new confronts, as shown in the following

3.1 Motion of Body

Electrical power can be generated from motion and vibration, with the so-called inertial-power scavenging. Natural human body movement may be easily transformed into electrical power. This is illustrating by electronic self-winding watches based on moving mechanics, such as the ETA Autoquartz and the Seiko Automatic Generating System. More promising approaches are based on piezoelectric or capacitive generators. An illustration of electric power generators is the electric shoes. For example, authors of propose electric shoes to provide self-sufficiency to artificial organs.

Whereas movement may provide power to BANs, it initiates fresh challenges. In fact, as the human body is not stiff, hence the devices can shift, at slightest moderately to each others. Thus, usual alteration in the network topology should be measured in the design of the network architecture. BANs should be strong to these changes, for example by adapting the routing plan, and the self-organization of the nodes.

3.2 Heat of Body

Temperature difference can be directly converted into electrical power, as given by the Peltier-Seebeck effect. As any heat engine, the effectiveness of thermoelectric energy is restricted by the Carnot's theorem. In practice, large thermal gradients are necessary to create acceptable levels of voltage and power. This limits the application of thermoelectric energy in BANs, offered by body heat over ambient temperature. Never the-less, current works are very hopeful, as illustrated by the Seiko Thermic watch.

While atmospheric temperature cannot be controlled, human body temperature is essentially 37 $^{\circ}$C (98.6 $^{\circ}$F). In BANs, the temperature is likely to be different than this general value. Actually, radio-frequency transmission of wireless nodes situated on-body or entrenched contribute to radiation absorption, which may result into thermal effects. For safety reasons, the radiation absorption should be reduced; by controlling the Specific Absorption Rate (SAR) and using an suitable routing protocol.

IV. ROUTING INFORMATION: FROM WSN TO BAN

Here, the routing crisis in BANs is dealt with methods from the WSNs literature. Our aim is to show how BANs borrow and improve ideas from WSNs. Three directions are accessible here, with essentially the same goal: dropping the assimilation of power in the human body, which is dissipated as heat. Such a problem is addressed by a cluster based routing, a temperature-aware routing, and using an on body node for entrenched networks.

4.1. Routing by clustering

In WSNs, several properties for routing strategies are enviable: maximize system lifetime by consistent battery usage of nodes, and application

to large scale networks. Such properties are not satisfied by traditional network protocols, together with the direct transmission, multi-hop, and clustering.

The Low Energy Adaptive Clustering Hierarchy (LEACH) approach fulfils the desired properties by combining, on the one hand a hierarchical protocol with cluster head nodes to aggregate and compress the data, and on the other hand a randomized rotation of the cluster head nodes. In fact, a cluster-based hierarchy allows little communication distances for most nodes, the non cluster head nodes. As contrasting to conventional clustering strategies, LEACH uses revolving election of cluster head nodes and adapting the corresponding clusters, which allows the energy requirements to be uniformly distributed among all the sensors. Moreover, data is compressed at each cluster head node, accomplishing an added decrease in the energy dissipation.

Numerous algorithms were derived for BAN based on LEACH, using a node clustering construction. For example, the authors of [11] focus on the self-organization of nodes, as opposed to the randomness election in LEACH which may lead to some remote nodes. In [12], the authors combine, on the one hand clustering to reduce the number of long direct communications, and on the other hand equivalent, multi-hop indirect transmissions, the so called chains. Such grouping has notably better energy efficiency than LEACH, as illustrated in [13] for inbody biomedical sensor networks. It is worth noting that LEACH is optimized for large scale networks, which is not the case for BAN.

4.2. Temperature-aware routing

The Specific Absorption Rate (SAR) is defined as power absorbed per unit mass of the tissue, a measure in determining the amount of power lost due to heat dissipation. In BAN, the SAR should be taken into account, either locally or globally using its standard over the entire mass of tissue between the transmitter and the receiver. Because of the SAR consideration, the thermal effects of BAN should be considered in the routing protocol. This can be done by balancing the communication over the nodes, as illustrated above with the LEACH algorithm. Moreover, one may also consider the temperature to select appropriate routing paths.

Temperature-aware routing was initially investigated in [14], by rotating cluster head nodes based on leadership history and node location. In [15], an (adaptive) least temperature routing is proposed by routing data away from high temperature spots and region. To this end, multi-hop routing is applied, where each node selects its neighboring node with the lowest temperature as its next hop. By selecting the next hop, such approach is not optimized globally. To overcome this drawback, one may consider the least total temperature route, by including the shortest path routing. In [16], node temperature is converted into graph weights and minimum temperature route is obtained using Dijkstra's algorithm.

4.3. Routing: IN VIVO implanted networks

Further restrictions are forced by in vivo entrenched sensor net-works, including limitations due to absorption of communication power in the tissue (SAR), which is dissipated as heat. For this reason, classical air-as-medium propagation models, where losses are due to free space wave propagation and multipath fading, are no longer appropriate.

In the human body, the saline-water nature of the human tissues contributes significantly to the absorption of the electromagnetic waves in communication. There has been substantial research going on in the field of measurement of calculation of SAR in human tissues, and specification of safe absorption rates.

It is renowned that the in-body dissemination loss is a great deal more than that of on-body dissemination. Thus, routing data among implanted nodes may be improper for long range communications. New network architecture is proposed for the entrenched networks by introducing an on-body coordinator. The coordinator plays the role of a beacon, by forwarding the data from one entrenched node to another over long distance more safely and

competently. Since a coordinator is on-body, it may include other functionalities, such as monitoring and more power resources.

V. CONCLUSION

Our aim in this paper was to demonstrate how BAN and WSN are closely associated, borrowing and enhancing ideas from every other. This was exemplified on the routing problem, where BAN integrates supplementary limitations including energy utilization, SAR and temperature considerations. All these limitations are closely connected. It is apparent that this paper throws light on BAN. For example, the physio-logical biosensors and the MAC layer were not considered, nor security issues. We pass on the interested reader to more all-inclusive surveys [9, 25]. It is merit noting that most of these surveys were published in 2011, subsequent to the initial submission of this work.

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AUTHOR PHOTOS AND BIOGRAPHY

Dr. RAJESH SL working as a Professor and Head, Department of Computer Science and Engineering, M S Engineering College, Bangalore, India, since 24 years serving as a teacher and taught various subjects of Computer Science and Engineering. Areas of Research interest in Nature inspired Algorithms, Sensor Networking, Security and Software Engineering.

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A GPS-GSM PREDICATED VEHICLE TRACKING SYSTEM, MONITORED IN A MOBILE APP BASED ON GOOGLE MAPS

Sivananda G[#1], Aishwarya Kashyap[#2], Vinutha[#3], Neha Mangla[#4]
[#]Department of Information Science and Engineering
Atria Institute of Technology, Visvesvaraya Technological University
Machhe, Belgaum, Karnataka, India – 590018
[1]*gorugantu.sivananda@gmail.com*, [2]*aishwarya.kashyap27@gmail.com*,
[3]*vinutha.g1995@gmail.com*,[4]*apj.neha@gmail.com*

ABSTRACT
"Internet of things"– is a subject of great interest for many in today's world. IoT is the future that scholars and researchers anticipated and worked for. IoT tries to bring everything under one umbrella with cross disciplinary collaboration. The unification of everything in the world, making use of a common infrastructure that can not only provide the users with the control but also helps them understand the state of it, is the zenith of IoT. Vehicle tracking is one such application of IoT. This system comprises of a GPS antenna, a GSM modem, Atmega microcontroller and a mobile application that locates the vehicle on a map and also helps the user navigate to it. This system is developed keeping in mind, the trouble of finding one's vehicle when lost.

Introduction

The Internet of Things (IoT) is a framework in which all things have a representation and a presence in the Internet [1]. It is the interconnection over the Internet of computing devices embedded in everyday objects, enabling them to send and receive data. IOT broadly refers to the extension of network connectivity and computing capability to objects, devices, sensors, and items not ordinarily considered to be computers. As the father of IoT, Kevin Ashton once said, "Information is a great way to reduce waste and increase efficiency, and that's really what Internet of Things provides". These "smart objects" require minimal human arbitration to generate, exchange, and consume data; they often feature connectivity to remote data collection, analysis, and management capabilities. The fields of application for IoT technologies are as numerous as they are diverse, as IoT solutions are increasingly extending to virtually all areas of everyday. One such application where IoT has made an impact is the vehicle tracking system. This paper explains the importance, working and the application of a vehicle tracking system[2].

A vehicle tracking system is the solution to the number of questions user has in his mind. Say, the user forgets the parking position of his vehicle in a mall or say the vehicle is lost. This paper talks about the simplest solutions IoT has to offer to the aforementioned questions. The GPS module which consists of the GPS Antenna generates the coordinates on the request of the user. The data (coordinates) is then passed on to the user with the help of GSM modem. Finally, the vehicle is located on the map (pointed by a marker) using the coordinates (longitude and latitude) sent to the users' mobile from the GSM modem via an SMS.

Number of papers has been published on the development of vehicle tracking system using GPS and GSM Modem [4],[5],[6],[7],[8],[9],[11],[12], [14],[15],[17] and [19].

Procedure

The vehicle tracking system consists of a GPS antenna that generates the coordinates, a GSM modem for receiving requests from the user and

sending the coordinates (viz. latitude and longitude) of the vehicle generated by the GPS antenna via SMS, an Atmega microcontroller as an interface and a mobile application based on google maps to point out the location of the vehicle. The following sections explain in detail each segment of the system.

A. ***Interface***

The Arduino is open-source, which means hardware is reasonably priced and development software is free. The Duemilanove board features an Atmel ATmega328 microcontroller operating at 5 V with 2 Kb of RAM, 32 Kb of flash memory for storing programs and 1 Kb of EEPROM for storing parameters. The clock speed is 16 MHz, which translates to about executing about 300,000 lines of C source code per second[20]. The board has 14 digital I/O pins and 6 analog input pins. There is a USB connector for talking to the host computer and a DC power jack for connecting an external 6-20 V power source, for example a 9 V battery, when running a program while not connected to the host computer. Headers are provided for interfacing to the I/O pins using 22 g solid wire or header connectors[21].

Fig.1 Arduino Uno board with Atmega microcontroller.

B. Generating Coordinates

To obtain excellent GPS reception performance, a good antenna will always be required. The antenna is the most critical item for successful GPS reception in a weak signal environment[10]. Proper choice and placement of the antenna will ensure that satellites at all elevations can be seen, and therefore accurate fix measurements are obtained[22].

User can consider following factors as:

- Choose a linear antenna with a reasonably uniform hemispherical game pattern of >-4dBi.
- Use of an antenna with lower gain then this will give less than desirable results[13].
- Proper surface plain sizing is a critical consideration for small gps antennas.

To obtain the coordinates, use the AT commands specified in the table I.

TABLE I: AT commands used for GPS[23]

Command	Description
AT+CGPSPWR	GPS POWER CONTROL
AT+CGPSRST	GPS RESET MODE
AT+CGPSINF	GET CURRENT GPS LOCATION INFO
AT+CGPSOUT	GPS NMEA DATA OUTPUT CONTROL
AT+CGPSSTATUS	GPS FIX STATUS

C. Sending/Receiving SMS

AT commands necessary for sending and receiving SMS are:

- AT+CMGF=1

Set SMS system into text mode, as opposed to PDU mode[24].

Response on success: OK

- AT+CSCA=[<sca>,<tosca>]

  Service Center Address, value field in string format, BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command AT+CSCS), type of address given by . SC address Type-of-Address octet in integer format, when first character of is + (IRA 43) default is 145, otherwise default is 129 [24].

  Response on success: OK

- AT+CNMI=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]] 0 – Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and

replaced with the new received indications[3].

1 – Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE[16].

2 – Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE [24].

Response on success: OK

- AT+CMGL=<stat>

1. Text Mode:

a. "REC UNREAD" received unread message (i.e. new message)

b. "REC READ" received read message

c. "STO UNSENT" stored unsent message

d. "STO SENT" stored sent message

e. "ALL" all messages

2. PDU Mode:

0 – received unread message (i.e. new message)

1 – received read message

2 – stored unsent message

3 – stored sent message

4 – all messages

- AT+CMGS=<da>[,<toda>]<CR>

<da>

Destination-Address, Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set, type of address given by <toda> [18].

<toda>

TP-Destination-Address, Type-of-Address octet in integer format. (when first character of is + (IRA 43) default is 145, otherwise default is 129). The range of value is from 128 to 255 [24].

Example:

AT+CMGS="1234567890"<CR>

>ABCD<ctrl-z>

+CMGS: 46

OK

D. User Interface

A mobile app is developed using android-studio and google maps API to locate the traced vehicle on the map and also help the user navigate to it.

Results

A mobile app is developed for user convenience. Following are the images of the user interface developed and the location of the vehicle marked on the map.

Fig. 2 Request screen of user interface(mobile app)

The user is allowed to press the "Request Location" button and the app sends a request to the GSM modem to initiate the process of generating coordinates and send them via an SMS.

Fig. 3 Received coordinates via SMS

Now, the user has to enter the latitude and the longitude mentioned in the received message in the app to locate the vehicle (Fig. 4).

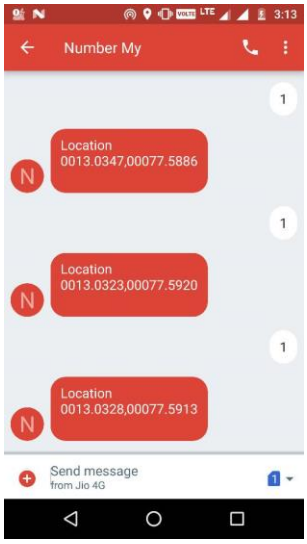

Fig. 4 Entering the longitude and latitude

The vehicle will be pointed by a marker on the map based on the received coordinates from the GPS antenna (Fig. 5).

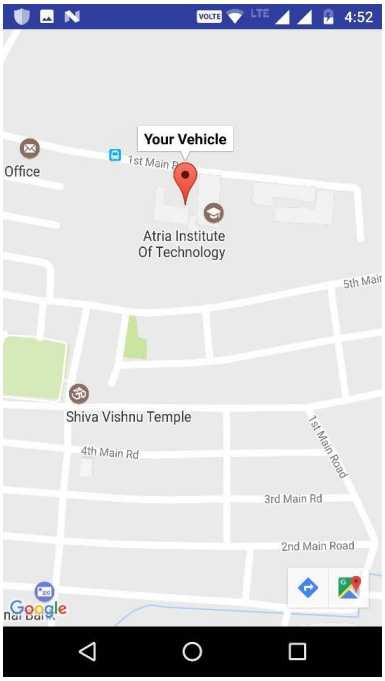

Fig. 5 Marker pointing to the users' vehicle on a map

Conclusions

Internet of Things (IoT) is a trending topic in this technologically advancing world. IoT has evolved remarkably over a very short period of time. The existing systems can be internetworked with the various hardware platforms available in the market. The functionality of the platform varies but the essence more or less will remain the same. The vehicle tracking system as seen in this paper has its traditional roots but with the touch of IoT. This is quite evident as various elements in the system generate data, communicate with one another and produce the outcome.

In conclusion, Internet of Things announced its arrival by doing extremely well in a variety of streams across the globe. This is just the beginning and one can predict more in the coming years. One may say that it will be much more than "things".

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AUTHOR PHOTOS AND BIOGRAPHY

SIVANANDA G
VIII semester, Dept. of Information Science and Engineering, Atria Institute of Technology.
Mobile No: +919538147823
Email: gorugantu.sivananda@gmail.com

AISHWARYA KASHYAP M
VIII semester, Dept. of Information Science and Engineering, Atria Institute of Technology.
Mobile No: +919535068722
Email: aishwarya.kashyap27@gmail.com

VINUTHA
VIII semester, Dept. of Information Science and Engineering, Atria Institute of Technology.
Mobile No: +919945553187
Email: vinutha.g1995@gmail.com

Dr. Neha Mangla
Associate Professor, Dept. of Information Science and Engineering, Atria Institute of Technology
11 years of teaching experience.
Contributed in many national and International journals
Mobile No: +919916030088
Email: apj.neha@gmail.com

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ENDOSCOPIC IMAGES FOR COMPUTER AIDED DIAGNOSIS OF THROAT CANCER FEATURE EXTRACTION

Shankaragowda B.B.[1], Dr. Siddappa M.[2] Dr. Suresha M.[3]

[1]Research Scholar & Assistant Professor,Department of Master of Computer Applications
Bapuji Institute of Engineering and Technology, Davangere, Karnataka,India, bs_gowda@yahoo.com
[2]Prof. & Head,Department of Computer Science and Engineering,
Sri Siddhartha Institute of Technology, Tumkur, Karnataka,India.
[3]Assistant Professor, Department of PG Studies and Research in Computer Science,
Kuvempu University, Shankaraghatta, Shivamogga, Karnataka, India

ABSTRACT

The main aim of our proposed algorithm is to develop to perform the segmentation, classification and analysis of medical images, especially the endoscopic images for the identification of commonly occurring throat cancer abnormalities. We propose a new approach based on edge detection method using Endoscopic images. In this paper we introduce the Artificial Neural Network features the shape, edge characteristics, darkness of nodules and tested our results signs of Throat cancer and investigate whether they are benign or malignant.

Keywords: Endoscopic Images, Throat Cancer, Segmentation, Benign, Malignant. .

I. INTRODUCTION

Throat Cancer occurs when cells in your throat develop genetic mutations. These mutations cause cells to grow uncontrollably and continue living after healthy cells would normally die. The accumulating cells can form a tumour in your throat. Throat Cancer is a general term that applies to cancer that develops in the throat Pharyngeal cancer or in the voice box Laryngeal Cancer. The Throat and the voice box are closely connected, with the voice box located just below the throat. Specific terms are used to differentiate the part of the throat where cancer organized. Nasopharyngeal begins in the nasopharynx, the part of your throat just behind your nose. Hypopharyngeal cancer begins in the hypopharynx, the lower part of your throat, just above your esophagus and windpipe. Glottic cancer begins in the vocal cords. Supraglottic cancer begins in the upper portion of the larynx and includes cancer that affects the epiglottis, which is a piece of cartilage that blocks food from going into your windpipe. Subglottic cancer begins in the lower portion of your voice box, below your vocal cords. The purpose of this paper is to develop a CAD system for early detection of Throat cancer based on an automatic diagnosis in Endoscopic images.

II. RELATED WORK

In the history, several methods have been proposed to detect and classify Throat cancer in Endoscopic images using different algorithms.

Erzhong Hu [1] proposed a modified anomaly detection method, by which both known and unknown anomalies in capsule endoscopy images of small intestine are expected to be detected.

Zuriani Sobri and Harsa Amylia Mat Sakim[4]. SVM is one of the kernels based classifier. It is a method of obtaining the optimal boundary of two sets in a vector space independently on the probabilistic distributions of training vectors in the sets. Its fundamental idea is locating the boundary that is most distant from the vectors nearest to the boundary in both classes. For this experiment, we have analyzed the data using four types of kernels,

which are linear, radial basis function (RBF), quadratic and polynomial to figure out the best kernel for this classification. The total ROI cropped from endoscopic images are 110 ROIs for normal antrum and 110 ROIs for abnormal antrum. All 220 ROIs are classified into two classes, which are normal and abnormal antrum.

Deepti Shikha and B.V. Dhandra [5] proposed a mathematical morphology provides a number of important images processing operations. It was observed that the proposed segmentation generates larger number of regions in the abnormal images as compared to normal. Further, it was seen that a large number of segmented regions generated in normal images due to the presence of noise such as lumen regions, bright spots generated by the reflection of light sources.

P.S. Hiremath and H.Y. Iranna [7] proposed that the preprocessed endoscopic color images are segmented using color segmentation based on 3σ-intervals around mean RGB values. The zero-crossing method of edge detection is applied on the gray scale image corresponding to the segmented image.

III. PROPOSED METHOD

The image is preprocessed before feature extraction to find the edge of the Throat nodule. The region of Interest (ROI) of the tumour area was first segmented out manually by Radiologist. This ROI was processed to extract the following features. Speculation, Ellipsoid shape, Branch pattern, Relative Brightness of Nodule and Lobulations.

A. Neural Network Approach:

Artificial Neural Network features the shape, edge characteristics, darkness of nodules, tested our results signs of cancer, and investigates whether they are benign or malignant.

The CAD (Computer Aided Diagnosis) system consist of image acquisition, preprocessing, Segmentation, Feature extraction and Classification. The proposed design flow is as shown below:

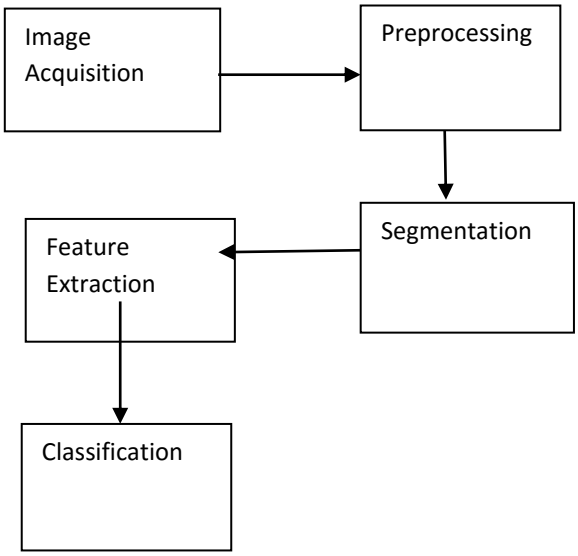

Figure 1: CAD System

CAD System have the following objectives:

- Improve accuracy in diagnosis;
- Assist in early detection of cancer;

Important factors should be investigated in designing any CAD system for detecting Throat nodules including the automation level, the speed, the ability of the detection scheme to detect nodules of different shapes, for example, irregular-shape nodules and spherical, and the ability of the CAD system to detect Throat borders, and small nodules.

B. ENDOSCOPIC IMAGE

A common way for Medical expert to describe Endoscopic Image findings based on the Throat cancer.

Fig. 2 Infected Throat Endoscopic image

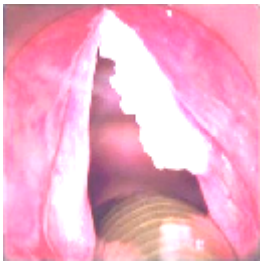

Figure 3: Infected Throat Endoscopic image

Figure 4: Malignant image

The original Endoscopic images should be of size 130x130, pixel containing the cancerous region of the throat are considered, which were assumed to be free from lumen region and are pre-processed.

Algorithm:

Load the image and detect the edge using algorithm in MATLAB.

Check whether the edge-detected image is of size 130*130.

If it is more, print the error message

To load the image, use the fields height, width, color and pixel and skip the remaining fields.

Find the Center Point of the image.

Extract the features.

Calculate the normalized input image.

To extract the ellipsoidal features:

Then calculate height/Width

Calculate normalized input image.

To extract the lobulations.

Repeat the above steps for different images.

If the calculated value is less than or equal 0.60, then it is Benign else it is Malignant.

IV. RESULTS

TABLE 1 : The table shows the values for Malignant tumour in the Neural Systems.

Neural Network Analysis			
Threshold	Benign Value	Malignant Value	Test Value
0.60	<=0.60	>0.60	1.02
Result: Malignant			
0.60	<=0.60	>0.60	1.04
Result: Malignant			

V. CONCLUSION

The segmentation results were compared with the manual segmentation performed by the medical experts. The experimental results agreement with the manual segmentation. Thus, the proposed segmentation method can be used for automatic detection of cancerous region in endoscopic images, which assists the medical doctor for faster and proper diagnosis of the disease for immediate treatment. This paper mainly works presented a CAD system which can help medical doctor is identifying whether the Throat nodule is malignant or benign. The objective of this work diagnosis is faster than the present system and biopsies can be avoided.

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AUTHOR BIOGRAPHY

Shankaragowda B.B.

Author is Research Scholar in the Department of P.G. Studies and Research in Computer Science, Kuvempu University, Shivamogga, Karnataka, India and working as a Assistant Professor in Bapuji Institute of Engineering and Technology, Davangere. He is author of more than six Research Publications in National, International Journal and Conference. Field of Specialization is Image Processing and Pattern Recognition.

Dr. Siddappa

He is Professor and Head of Computer Science and Engineering, Sri Siddhartha Institute of Technology, Tumkur, Karnataka, India. Ph.D. in Computer Science and Engineering, 2010 from Dr. MGR University, Chennai. M.Tech. in Computer Science and Engineering, 1993 from Sri Jayachamarajendra College of Engineering, Mysore University. B.E. in Computer Science and Engineering,1989 from PESCE, Mandya, Mysore University. Life member of Compute Society of India, ISTE, New Delhi, IJERIA, India and Member of IEEEInc., USA. Honours received: Suvarna Kannadiga State Level Award in 2006, Who's who in the world from America for two times and Rajarambapu Patil National Award for Promising Engineering Teacher for creative work done in Technical Education for the year 2011. 27 Years Teaching experience (Including Industry: 1 Year and Research: 3 Years). He is author of more than fifty Publication in National, International Journal and Conference. Field of Specialization are Computer Network, Artificial Intelligence and its applications, Data Structures, Image Processing, Pattern Recognition,

Dr. Suresh M

He is Assistant Professor in the Department of P.G. Studies and Research in Computer Science, Kuvempu University, Shivamogga, Karnataka, India. Ph.D. in Computer Science, 2014 from Kuvempu University. Chairman, BOE 2013-14, 2014-15 and BOS Member 2014-17. He is author of more than 25 Research Publications in National, International Journal and Conferences. Field of Specialization is Image Processing, Pattern Recognition, and Soft Computing.

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"Survey on Six Sigma Approach for Software Process"

KRISHNA S GUDI[1], DR.KAILASH PAREEK[2], RAMESH B N[3], VEERANNA KOTAGI [4]

[1] Research Scholar , Department of Computer Science Engineering ,Singhania, University,Rajasthan,India
Krishna.gudi@gmail.com

[2]Research Supervisor , Department of Computer Science Engineering, Singhania University,Rajasthan,India
pareek271@gmail.com

[3] Assistant Professor , Department of Computer Science Engineering, East West Institute of Polytechnic , Blore
rameshbnjava@gmail.com

[4]Assistant Professor , Department of Computer Science Engineering, East West College of Engineering , Blore
veerkotagi21@gmail.com

ABSTRACT

Six Sigma is a data-driven leadership approach using specific tools and methodologies that lead to fact-based decision making. My Research work will deal with the application of the Six Sigma methodology in reducing defects in Maintenance Projects of a Software industry. The DMAIC (Define–Measure–Analyze–Improve–Control) approach has been followed here to solve the underlying problem of reducing the customer reported defects in user acceptance testing phase of the software development lifecycle. This research shall explore how a Software process can use a systematic methodology to move towards world-class quality level. In my Research I would like to carry out a survey on different software firms to identify and analyze their Maintenance Projects & Analyze models, carry out a SWOT (strength weakness opportunities threats) analysis of each model, identify non value added activities in these models using VSM (Value stream mapping) and FMEA (Failure Model Effective Analysis) as a tool & finally come out with an adoptive model which will have benefits of all models & can be widely used.

Keywords: Six Sigma, SWOT, FMEA & DMAIC

INTRODUCTION

As the popularity of Lean Six Sigma techniques expands into software and technology environments, the notion that these methods and tools can provide a quick fix, unrealistic results or a panacea (for all that is wrong) has been proliferated. Some of these notions are further compounded by the reality that many of these environments are at a low maturity level with regard to process stability, repeatability and even basic measurement. Software and technology processes are often the result of a start-up mentality or organization.

These dynamics complicate – and are even counterproductive to – a conventional Six Sigma deployment approach that a typical manufacturing or service organization might use successfully. This reality must be taken into consideration to develop an acceptable approach to successful implementation. By carefully studying the actions of early adopting organizations and characterizing each individual organization's needs and culture, analysts can design and implement a deployment strategy that is more finely tuned and has a higher probability of success.

Assess and Characterize

It can be useful to quickly assess and characterize an organization prior to jumping into any scope of Lean Six Sigma implementation to minimize risk of failure. One quick way to think about this characterization is to consider:

- Organizational history, culture and age
- People and knowledge (especially leadership)
- Improvement process experience (successes and failures)
- What must be accomplished (and when)
- Process and measurement system maturity

These guidelines, coupled with some experienced objective advice (either internal or external), can help analysts to quickly identify key considerations and a proper path for Lean Six Sigma deployment.

While some organizations are ready for full-blown deployments, others may need to do some preliminary work on process stabilization, measurement systems or project selection. Leadership may need training, and resources will need to be allocated and organized. The Lean tool set is particularly useful, especially with low process maturity levels that have never been mapped or streamlined. Even workflow organization can be a good stabilization starting point. For many organizations, laying this ground work places a solid foundation from which to build better and faster Six Sigma results for the long haul.

One Size Does Not Fit All

Examining the processes and results of two organizations can reveal some best practices and pitfalls in implementing Lean Six Sigma in software and technology environments.

The first example concerns a software development company. It started with a small wave of Black Belts, completed two significant projects (multi-millions in savings and market share), and parlayed that into a full-blown, organization-wide Six Sigma deployment. The deployment has yielded tens of millions of dollars in savings and significant market growth.

The second example concerns a medical devices company with a software development department. The company trained software engineers using a manufacturing-based Six Sigma curriculum and failed to complete a single project in one and a half years. The company is currently retraining its engineers with a software-based Six Sigma curriculum and is completing its first wave of projects.

Laying a Solid Foundation

The software development company had made several attempts at general quality improvement, in pockets, based on customer complaints and organizational pain. Some small, short-term gains were realized, but in general the efforts evaporated and were written off as another failed corporate initiative. The pain, however, persisted, and customer calls to improve were increasing.

Finally, the organization hired two key outsiders to top leadership positions, both with deep operations and Six Sigma experience (from Motorola and GE). What they saw was an organization that had a desire to improve, a reasonable historical database and very good people. The company also had a skeptical CEO who had a low tolerance for another failed initiative. For these reasons, the organization took a proof-of-concept path, training just a few Black Belts in a software-specific Six Sigma curriculum, but being sure they were the top people in their areas. They also selected highly important projects, which if successful, would make a big difference to the organization and win the CEO's full support.

Of course, the risk to the two individuals was high if this failed. They had confidence from their previous experiences, however, and permission from the CEO to proceed. They made sure that they freed their Black Belts from all other commitments and gave them access to the resources they would need to do their jobs. Schedule flexibility was granted to allow time for proper analysis work to be done.

In one of these early projects, a simple measurement system analysis (MSA), revealed why earlier improvement attempts had failed. The data was not accurate, leading to wrong conclusions and

solutions. Quick hits were realized as a result and subsequent systemic issues were revealed and resolved. The result was several million dollars realized and a master Six Sigma plan implemented. The right strategy (proof of concept) was selected to minimize risk of failure based on the situation, experience of leadership and the needs of the business.

Moving Too Fast

The medical devices company is a large, global company with a very good conventional Six Sigma program. It recognized that the software development department was continually causing schedule slips and that released software was full of bugs and missing needed features. A Six Sigma approach was mandated, and without much hesitation or planning, Black Belts were trained using the corporate-approved company Six Sigma curriculum.

Project selection was weak and suffered from scope creep because the ambitions of these projects were too big and too broad. The problem was that this curriculum was manufacturing based and did not account for the fact that the software development department's process and measurement maturity was significantly lower than its counterpart systems in manufacturing departments. Meaning, there was very little data to work with and an unstable process.

The company also did not consider scope when selecting the initial projects, setting up the candidates for possible failure. Leadership lacked the requisite skills and experience to recognize something was wrong and continued to try to drive the process, not fully understanding why this worked everywhere else except in the software development department. Finally, after getting some objective advice and feeling the need to improve, a Master Black Belt was hired from the outside to get the process on track.

The Master Black Belt quickly realized that projects needed to be re-scoped and aligned to critical business issues, and the Six Sigma tools needed to be expanded and aligned to the software development process (requirements, design, coding, testing, and release). Some projects were scrapped and others were redefined. Additional software-specific training has been brought in, expert coaching has been provided, and projects are now nearing successful completion.

The Master Black Belt also realized that for long-term success, the process and data collection systems needed to be streamlined and organized. Using Lean principles tailored for software development, the organization has been running kaizen events, creating value stream maps and creating a stable and repeatable process with consistent measures.

This two-pronged approach of making the process Lean and creating software Black Belt competencies is starting to yield the result the organization aspired to one and a half years ago. With better upfront assessment, characterization and understanding, the organization might have avoided a lot of this rework.

While there are many factors that contribute to the success or failure of Lean Six Sigma projects, it is important to make informed deployment plans and be sure to consider some basics, even if it means delaying the training until an environment for success has been created through some of the smaller steps

Literature Survey

Six Sigma is a process improvement management framework to achieve bottom-line results, and customer's loyalty. In short the objective of Six Sigma is the implementation of a measurement based strategy that is focused on process improvement and variation reduction. Software Process Improvement programs are being integrated with the key processes practiced in different software organizations, who really want to improve their processes continuously in order to enhance their quality of the products. Software Process Improvement (SPI) encompasses a set of activities that will lead to a better software process, and as a consequence, higher quality software delivered in a desired time span .Software Process Improvement is an important activity which starts when an organization plans to enhance the

capabilities of its ongoing processes. There are many Software Process Models those exist in software industry. There exist a set of key processes those are practiced and are being applied by different organizations to improve quality of these products [1]

Software process improvement is recognized as an important Part of the software development life cycle. Several models have been developed to assist organizations to evaluate and improve their software Development processes and capabilities. The development of software products is a complex activity with a large number of factors involved in defining success. Measurement is a necessary essential, for software process improvement. However few guidelines exist for logical planning of measurement programs within software projects and for multi-project selection. Software development process presents the task or activities used to produce a software product. A software development life cycle model is either a descriptive or prescriptive characterization of how software is or should be developed. There are tons of SDLC models each model contains specific activities to be performed to develop software [2]

A typical Six Sigma methodology for the existing process improvements has 5 phases: Define, Measure, Analyze, Improve, and Control. DMAIC methodology can be used to find problems in existing processes and fix them for improvements. It can also be used to expand the current capabilities of an existing process by identifying opportunities to improve current processes. Each phase of DMAIC is explained as follows:

• **Define phase** is to define project goals aligned with business goals, project scope, customers with their requirements, project charter and project teams. A high-level map of the current process is also created.

• **Measure phase** is to collect data about current processes, and develop measurement systems to validate collected data. Based on measured data, the current process performance is calculated.

• **Analyze phase** is to identify ways to decrease the gap between the current performance level and the desired goals. The project team analyzes collected data of current processes, and determines the root causes of the poor sigma performance of the processes.

• **Improve phase** is to identify, evaluate, and select the right improvement solutions. Focusing on the root causes identified in Analyze phase, the project team generates and selects a set of solutions to improve sigma performance.

• **Control phase** is to implement the final solutions and guarantee the maintenance of newly improved processes so that the improved sigma performance holds up over time [3]

Six Sigma is a structured quantitative method which is originally invented for reducing defects in manufacturing by Motorola in 1986. Its aim is using statistical analytic techniques to enhancing organization s performances, and to improving quality. Since Six Sigma has evolved over the last two decades, its definition is extended to three levels:

- Metric
- Methodology
- Management system [4]

When the Six Sigma program was launched in 1997, quality was made the first objective of every senior level manager. By 2000, Wipro identified critical business processes, 70 Black Belts were trained, and quality objectives percolated down to middle management. Wipro developed Six Sigma methodologies to meet specific requirements of transactional processes, software design, and development processes and to improve existing processes using the rigor of statistical tools and techniques. Wipro also launched its own Six Sigma methodology called Developing Six Sigma Software. As opposed to traditional methods of software development, the application of DSSS methodology built a tighter integration of the customer requirements (called Voice of Customer) to the technical requirements (called Voice of Engineer) and the control that needs to be exercised on both of these using statistical techniques (called Voice of Process). The initial part of the DSSS process focuses on developing the user requirements correctly, and

the latter part focuses on rigorous design and implementation using a variety of tools from a toolkit. By 2001, Wipro developed more problem domain-specific methodologies aligned to the nature of business and projects, 150 Black Belts were trained, and more than 500 projects were conducted. The projects Predominantly addressed transactional areas such as sales process, billing accuracy, internal management information system (MIS) accuracy, and software engineering/design. The Six Sigma Engagement Effectiveness Index (SEE Index) was also institutionalized across the organization. By 2002, we attained the maturity phase where statistical rigor was taken to a new level.

The main benefits that Wipro derived from the Six Sigma drive were as follows:

- ✓ Improved customer satisfaction measured through an annual customer satisfaction
- ✓ (CSAT) survey
- ✓ Significant improvement in the performance of software products developed for customers
- ✓ through application of Wipro's DSSS methodology based on project-specific needs
- ✓ Reduction in the field errors in software projects
- ✓ Significant decrease in installation failures in the hardware business
- ✓ Significant year-on-year financial savings through reduced rework and reduced cycle time
- ✓ Increase in cost benefits translated to customers [5]

Author has explored the answer to the use of software project tracking and oversight process area. The different organizations undergo different national and international software projects. Different small and medium enterprises (SMEs) of Indian software industry has used different measures for tracking software project progress. The software engineers and the project managers of different software projects play a vital role in tracking the project progress and [6]

The software industry is a multibillion industry today .All organizations, individuals and businesses use software today for a variety of purposes that range from paying bills online to managing aerospace systems. However, software by itself is proneto errors and bugs leading to disastrous results at times. This has caused many software agencies to look for standardized software engineering processes which result in increased reliability, less debugging and improved quality control. Six Sigma has taken the manufacturing world by storm with its proven results in increasing quality and reducing defects. It is therefore natural that in the past few years, software corporations and firms are now looking to see how Six Sigma methods can be incorporated into the software engineering process. Many companies have tried and successfully implemented Six Sigma methods in the software development, design and testing processes in Software Engineering. However there is still a lot of scepticism with regard to the application of the Six Sigma process to software .There is also a lack of academic research in this area [7]

PROBLEM STATEMENT

- The software market is becoming more dynamic which can be seen in frequently changing customer needs
- Software companies need to be able to quickly respond to these changes.
- This means that they have to become agile with the objective of developing features with very short lead-time and of high quality.
- A consequence of this challenge is the appearance of Six Sigma usage in software firms
- Improved customer satisfaction measured through an annual customer satisfaction can be achieved using six sigma approach
- Increase in cost benefits can be translated to customers using six sigma

Objectives:

- To study & identify present Quality Techniques in software Firms in Software Maintenance Projects
- To Analyze various Projects using 7QC Tools & Map the current value stream using VSM Tool
- To identify defects detouring Quality & suggesting corrective actions using FMEA Technique
- To conduct a SWOT Analysis after implementation of Model & Finally deliver A Model for Adopting best six sigma approach to reduce defects & achieve high quality

Sources of data collection:

In the present study, both primary and secondary data are utilized. Primary data was collected through administering the questionnaire / schedule and also participant observation. Meetings were attended, took part in discussions and visited the actual workplace with the concerned respondent to observe the system and practices. Getting information through questionnaire and having discussions at each stage was done at primary level in collection of required information.

Secondary data includes written policy statements, work records, annual reports, documentations, bulletins, write-ups, procedure charts, instructions, personal files, case histories, site maps, follow up reports, suggestions done and field notes. All the policy papers related to vision statement, mission set, objectives, guiding principles, code of conduct were referred, reviewed and examined. To add, all the data was meaningfully related to the objectives of study, the hypothesis to be tested and the intended results.

RESEARCH METHODOLOGY

Task 1 (Data Collection)

1. For Data collection, we will be using questionnaires and visit many software industries.
2. Primary sources of data like statistics given by IBM Global CEO study etc.
3. Secondary data like published articles by Companies like IBM,Wipro,Infosys and IEEE papers ,SciDirect articles ,Willey's Library etc.

Task 2 (Data analysis)

4. Value stream mapping tool will be used to identify non value added activity
5. Failure mode effective analysis tool will be used to identify possible failure modes
6. 7 quality control tools will be used to analyze quality after implementing the model.

Task 3(Data Behavior)

7. Regression testing mathematical model to find out effect of variables.
8. Chi square test to track behavior of variables.

Task 4(Mathematical Models)

We will be using a typical mathematical program which consists of a single objective function, representing either a profit to be maximized or a cost to be minimized, and a set of constraints that circumscribe the decision variables. In the case of a linear program (LP) the objective function and constraints are all linear functions of the decision variables. We will identify which activities to be targeted to get maximum value in terms of time.

Then network flow program its class of network flow programs includes problems as the transportation problem, the assignment problem, the shortest path problem, the maximum flow problem, the pure minimum cost flow problem, and the generalized minimum cost flow problem. By using this class because many aspects of actual situations are readily recognized as networks and the representation of the model is much more compact than the general linear program.

Integer programming will be used to solve optimization problems in which some of the variables are required to take on discrete values. Rather than allow a variable to assume all real values in a given range, only predetermined discrete values within the range are permitted.

We now investigate a finite-state stochastic process in which the defining random variables are observed at discrete points in time. When the future probabilistic behavior of the process depends only

on the present state regardless of when the present state is measured, the resultant model is called a Markov chain.

SOFTWARE REQUIREMENTS

1. Operating system: Windows XP or above.
2. RAM: 2GB or Above.
3. MS Office 2007 or Above.
4. SPSS Statistical Software
5. IBM Rationale Tool.
6. JIRA Software.
7. MATLAB
8. 7QC TOOLS
9. Arena Simulation Tool

Software	Description	Source
Netscape Directory Server (Sun Java System Directory Server Enterprise Edition)	Directory server for Windows or UNIX	Download from Sun Microsystems: http://www.sun.com/software/download/index.html
WU-FTPD	Alternative ftp server application	Download from WU-FTPD Development group: http://www.wu-ftpd.org/
LaTeX	A tool for customizing reports for output to PDF. This is required for report generation.	For Windows, download from MiKTeX.org: http://www.latex-project.org Linux is pre-installed as a component of the operating system. For UNIX, download from: http://www.latex-project.org
External applications (Patran, BlowSim, and so on)	External applications for processing data	As required. Specific applications, such as MSC Patran and MSC Nastran, are required to fully exercise demonstration portals.

Software	Source
Java JRE	Download from Sun Microsystems: http://java.sun.com/j2se/1.4.2/download.html
Netscape	Download from Netscape Communications Corporation: http://browser.netscape.com/ns8/
Internet Explorer	Download from Microsoft: http://www.microsoft.com/windows/ie/ie6/default.mspx

Software	Description	Source
IBM DB2 Universal Database Enterprise Server Edition (ESE)	Relational database server	Included with SimManager Enterprise
Oracle Enterprise Edition	Relational database server	Download from Oracle Corp: http://www.oracle.com/technology/software/products/database/oracle10g/index.html

- The primary research method that will be used is case study in various small and medium level enterprises.
- For each case Value stream mapping will be mapped to find non value added activities
- 7QC Tools will be used to measure quality and control.
- FMEA to calculate risk and reduce RPN.
- Finally quantitative analysis on data to interpret the result.

Innovative aspects

The study aims to achieve robust software development in a typical software development process of a software organization, and identify obstacles in applying a six sigma framework to remove such waste. Six sigma is in conflict with many traditional values of manufacturing organizations.

Although lean may be prevalent in other parts of the organization, this does not

necessarily include the IT function. IT still has a hard time comprehending the benefits of concepts such as flow, waste and value. This study might also reveal challenges in adopting six sigma and reducing non value added activities. A robust model will be developed which helps small industries to easily adopt six sigma and improve its efficiency and robustness.

An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it.

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SCHEDULING AND DELIVERING REAL TIME BUS TRACKING SYSTEM USING GPS ,RFID AND ANDROID APPLICATION

RAJESH S L, AKSHATHA S, TEJASWINI T R
CSE, MSEC, BANGALORE, INDIA, hod.cse@msec.ac.in
CSE, MSEC, BANGALORE, INDIA,akshatha.srinivasr@gmail.com
CSE, MSEC, BANGALORE, INDIA,tejaswinitrgowda@gmail.com

ABSTRACT
Transportation like buses has become a major source for middle class people. Majority of population rely on public transportation. The major drawback of public transportation is that commuter has to kill the time, till the particular bus arrives. As suburban people travel from one place to another place, the availability of particular bus timing will be not known. Hence, for the convenience of citizens a bus tracking system using GPS for obtaining the location of bus, RFID for identification of bus and also an Android application for calculating the appropriate bus timing to reach the destination which also includes the traffic analysis for people who are aware of android systems. The optimum aim of the system is to improve the transportation facility, to reduce the time, to display the availability the buses and ease to understand the scheduling and delivery of bus tracking system.
Keywords: GPS,GSM,ARM,RFID,Android

INTRODUCTION

In today's world of precision and timing the public transportation has not being upon to the mark.

Transport is the backbone of massive Indian economy and it is very important because it enables trade between people which is essential for development of civilization. It is a part of growth and the globalization but most of the vehicles leads to air pollution, and use large amount of fuel. So, transportation requires a good planning to make essential traffic flow and restrain urban conurbation.

Bus tracking system is a method of identifying the location of a bus on its route in a real time .The data obtained from the system is fed into a number of devices for providing information for the users and for transport operators about the position of bus.

Global positioning system (GPS) is a device tracking system, not only improve the efficiency of operation of buses and also influence the commuters to take benefits of bus system like city buses or any other business interested areas.

Radio frequency identification(RFID) is a computerized identification method based on storing and remotely retrieving information and tracks the tags attached to the objects using the device called RFID tags.

Android applicatioans is the open source, user friendly platform there by authorize ease of access for all users. The aim is to provide an application to the general public to ease to use of public transport.

Existing systems

Many vehicle tracking system has been developed to figure out the problems faced by commuters .In India they developed number of tracking systems some of those systems for vehicle tracking are referred as follows.

GPS,GSM based system for bus tracking system

The Fig 1. Shows the design of bus tracking system for public transportation it consist of ARM controller, a GPS and GSM modem abide into a

vehicle. A real time tracking system effectively report the location and also provide information about system where your vehicle how longer it has taken time to been there. The function of system in vehicle is to achieve guide and convey the positions ,time management on demand .The Microcontroller in tracking unit, which conveys and process the system data from the GPS module.

The GPS terminal is a receiver which receives and conclude the navigated data transmit by GPS position satellites measure the location of vehicle coordinates and transmits into the GSM data form by GSM communication controller and sends the message to guide via the GSM network.

Fig 1.GPS ,GSM tracking system for public transportation

RFID based on public transportation

Over a year's Several technologies has been proposed for RFID technology Fig 2 represents It basically consists of three components Tag, Reader and the Middleware which interface with the back-end database. The main aim to provide several features like isolation, authority management, safety and security is challenging task.

Usually RFID knots[4] are installed on every bus for identifying bus terminals. Every bus stop has commit unique ID is to transmitted around some distance around the transmitters and when the PF receiver on the bus comes within the boundary of the transmitters, it will receive signal that is generated by bus stop and it will suggest the passengers the next stop. Here real time tracking is not possible due to shorter distance

A real time tracking and guided system is developed which idolizes an Event, Condition and Action (ECA) framework. This services efficiently penetrating data to erase redundant occurrences and then departing useful data by aggregation. And also separated data identifies the movement of bus in order to improve services.

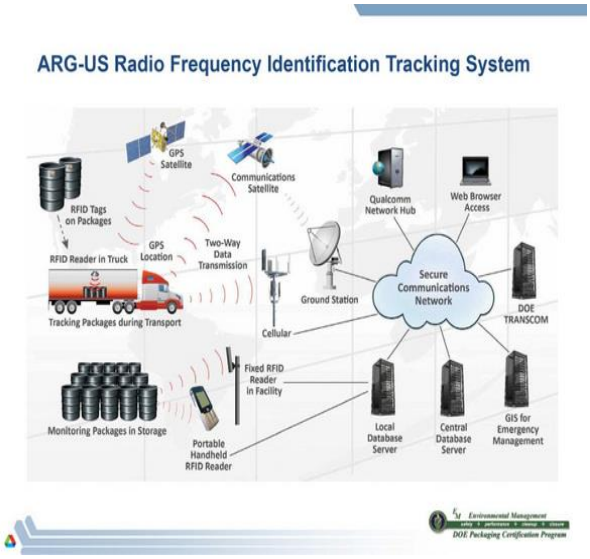

Fig 2.shows the RFID based tracking system

Tracking system based on Android applications

The fig 3.shows the [6] android application provide a real time tracking system .the arrival of buses provides an alert message through SMS by assigned code number for each bus stop which is enabled by GPS ,which will track the location of buses .The authorized user can access the data when they logged in will be capable send SMS to given number by specifying code number on the bus stop.

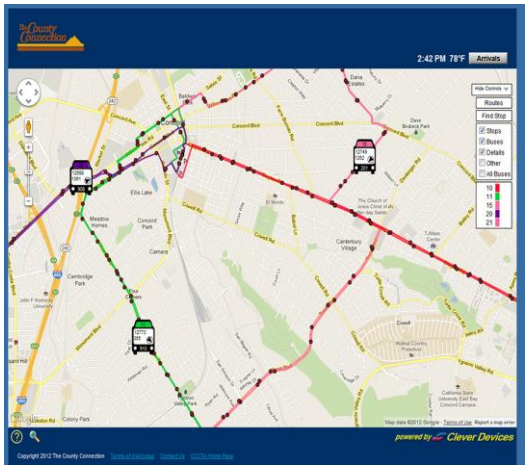

Fig 3.Android application for tracking system

III. CONCLUSION

The paper mainly deals to improve the overall design of transportation facility which uses GPS,RFID and Android applications for real time bus tracking system. The important aim is to provide greater comfort for the commuters and reduce the waiting time, make to plan the journey easier, low cost and highly effective.

ACKNOWLEDGEMENT

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CATEGORY: CSE

Survey on Software Defect Prediction for Quality Optimization

Swathi.K[1], Dr.Arun Biradar[2], Ramesh B N [3], Veeranna Kotagi[4]

[1]Research Scholar, Department of Computer Science Engineering, Visvesvaraya Technological University
K.swathi980@gmail.com

[2] Research Supervisor, Department of Computer Science Engineering, Visvesvaraya Technological University
hodcsea@gmail.com

3Assistant Professor, Department of Computer Science Engineering, East West Institute of Polytechnic, Blore
rameshbnjava@gmail.com

[4]Assistant Professor, Department of Computer Science Engineering, East West College of Engineering, Blore
veerkotagi21@gmail.com

ABSTRACT

Software Defect Prediction (SDP) is an important activity in testing Phase of SDLC. It identifies the modules that are defect prone and require extensive testing. This way, the testing resources can be used efficiently without violating the constraints. Though SDP is very helpful in testing, it's not always easy to predict the defective modules. There are various issues that hinder the smooth performance as well as use of the Defect Prediction models. In my Research I would like to carry out a survey on different software firms to identify and analyze their software prediction models, carry out a SWOT (strength weakness opportunities threats) analysis of each model, identify non value added activities in these models using VSM (Value stream mapping) and FMEA (Failure Model Effective Analysis) as a tool & finally come out with an adoptive model which will have benefits of all models & can be widely used.

Keywords: VSM, FMEA & SWOT.

Introduction

Software Defect Prediction (SDP) is one of the most assisting activities of the Testing Phase of SDLC. It identifies the modules that are defect prone and require extensive testing. This way, the testing resources can be used efficiently without violating the constraints. Though SDP is very helpful in testing, it's not always easy to predict the defective modules. There are various issues that hinder the smooth performance as well as use of the Defect Prediction models.

Software defect prediction can help to allocate testing resources efficiently through ranking software modules according to their defects. Existing software defect prediction models that are optimized to predict explicitly the number of defects in a software module might fail to give an accurate order because it is very difficult to predict the exact number of defects in a software module due to noisy data.

Defect prediction models help software quality assurance teams to effectively allocate their limited resources to the most defect-prone software

modules. A variety of classification techniques have been used to build defect prediction models ranging from simple (e.g., logistic regression) to advanced techniques(e.g., Multivariate Adaptive Regression Splines (MARS)).Surprisingly, recent research on the NASA dataset suggests that the performance of a defect prediction model is not significantly impacted by the classification technique that is used to train it. However, the dataset that is used in the prior study is both: (a)noisy, i.e., contains erroneous entries and (b) biased, i.e., only contains software developed in one setting.

There are different fault prediction approaches available in the software Engineering discipline. Such as fault prediction, security prediction, effort prediction, reusability prediction, test effort prediction and quality prediction. These approaches help us to minimize the cost of testing which minimize the cost of the project.

VSM: A process is the transformation of raw materials into finished goods (what is now referred to as the internal value stream); an operation is the interaction of operator, machine and materials. While most members of an organization are involved in one or more operations, few have a complete understanding of the process. Consequently, much of the effort to improve is spent on operations. More benefits could be derived from improving the process as a whole than from optimizing individual operations. It is better to eliminate transportation than to find ways to speed up the movement of materials. All improvements to operations must therefore fit into an overall plan for what the process should look like. An operation not only includes the interaction of operator, materials and machine, but also their interaction with information. When studying the process, it is therefore also essential to consider the role of information in the internal value stream. Information comes, ultimately, from the customers; their requirements are translated into product specifications, production schedules, pull signals, and delivery directions.

Understanding the internal value stream is therefore critical both to serving the needs of the customer, and to improving the efficiency (and profitability) of the value stream. Value stream mapping, a means of representing the value stream with symbols and numbers, is the key to understanding the entirety of the transformation of raw materials into finished goods.

For most of the time that industry has existed on a large scale, the process has been devised as the push of materials through a set of operations. Production has occurred in large batches, almost as if this was a natural law of how things are made. Without a value stream map that thoroughly describes the current state of operations, and which provides key performance measures of the process, today's organizations are likely to repeat some of these errors of the past, and fail to see opportunities in simple changes to the value stream.

A value stream, as the name implies, flows to some specific end. This end is a set of requirements, as expressed by the customers of the value stream. When the value stream fails to meet the requirements it is intended to serve, it must be improved. Customers have three simple requirements – price, quality and delivery. In today's market, competitive price and quality are basic requirements for staying in business. On time delivery at a cost that allows for profitability is therefore the key to competitiveness.

SWOT: SWOT Analysis is a useful technique for understanding your Strengths and Weaknesses, and for identifying both the Opportunities open to you and the Threats you face.

A SWOT analysis (alternatively SWOT matrix) is a structured planning method used to evaluate the strengths, weaknesses, opportunities and threats involved in a project or in a business venture. A SWOT analysis can be carried out for a product, place, industry or person. It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable to achieve that objective.

FMEA: A failure modes and effects analysis (FMEA) is an inductive failure analysis used

in product development, systems engineering / Reliability Engineering and operations management for analysis of potential failure modes within a system for classification by the severity and likelihood of the failures.

A successful FMEA activity helps a team to identify potential failure modes based on past experience with similar products or processes or based on common sense logic, enabling the team to design those failures out of the system with the minimum of effort and resource expenditure, thereby reducing development time and costs. Because it forces a review of functions and functional requirements, it also serves as a form of design review to erase weakness (related to failure) out of the design. It is widely used in development and manufacturing industries in various phases of the product life cycle and is now increasingly finding use in the service industry. Failure modes are any errors or defects in a process, design, or item, especially those that affect the intended function of the product and or process, and can be potential or actual. Effects analysis refers to studying the consequences of those failures on different system levels.

Literature Survey

Author had survey of various machine learning techniques for software defect predication. From the survey, it can be observed that software defect is indeed a major issue in software engineering. Software defect module prediction using different machine learning techniques is to improve the quality of software development process. By using this technique, software manager effectively allocate resources. For predicting defects he analyzed the advantages and limitation of artificial neural network, Support vector machine, Decision tree, Association rule and Clustering machine learning techniques [1]

Author introduces a learning-to-rank approach to construct software defect prediction models by directly optimizing the ranking performance. Author build on his previous work, and further study whether the idea of directly optimizing the model performance measure can benefit software defect prediction model construction. The work includes two aspects: one is a novel application of the learning-to-rank approach to real-world data sets for software defect prediction, and the other is a comprehensive evaluation and comparison of the learning-to-rank method against other algorithms that have been used for predicting the order of software modules according to the predicted number of defects. Our empirical studies demonstrate the effectiveness of directly optimizing the model performance measure for the learning-to-rank approach to construct defect prediction models for the ranking task [2]

Author used NASA dataset, where he derived similar results to the prior study, i.e., the impact that classification techniques have appear to be minimal. Next, we apply the replicated procedure to two new datasets: (a) the cleaned version of the NASA dataset and (b) the PROMISE dataset, which contains open source software developed in a variety of settings (e.g., Apache, GNU). The results in these new datasets show a clear, statistically distinct separation of groups of techniques, i.e., the choice of classification technique has an impact on the performance of defect prediction models. Indeed, contrary to earlier research, our results suggest that some classification techniques tend to produce defect prediction models that outperform others [3]

Author observed that that most of the techniques of software fault detection are based upon the machine learning approaches and using the NASA's public datasets to predict the Software faults. Public Datasets are mostly located in PROMISE and NASA MDP (metrics data program) repositories and they are distributed freely. Method level metrics and class level metrics are importantly used. Machine learning models have better features than statistical methods or expert opinion. So, it is found that machine learning models are mostly used and these models are used to increase the usage of public datasets for fault prediction in future [4]

As per Authors survey It was evident that product metric, process metrics and object oriented metrics are widely used in fault prediction techniques. But fault prediction result is also

dependent on human expertise apart from these metrics. So measuring human expertise in software fault prediction techniques is expected for future work. It is evident that fault prediction is dependent on skewed data. But there is no evidence of Fault prediction techniques for big data with real time and interactive data sets in this SR review and is expected for future work [5]

Author analyzed the related technologies about classifiers and distribution model. From the representative collected software defects data of GUI projects, the paper used several classifier algorithms to get defect classification table, then applied mathematical methods to show that the distribution of this kind of software project defects inconsistent with the lognormal distribution better. If we can find out which distribution the software defects obeyed in accordance with the defects classification, we can use the fault injection method to simulate software fault, and study the accelerated test method under certain defects distribution, which can effectively improve the software test coverage, reduce test time, and reduce cost of test [6]

Software systems continue to play an increasingly important role in our daily lives, making the quality of software systems an extremely important issue. Therefore, a sign cant amount of recent research focused on the prioritization of software quality assurance efforts. One line of work that has been receiving an increasing amount of attention is Software Defect Prediction (SDP), where predictions are made to determine where future defects might appear. Our survey showed that in the past decade, more than 100 papers were published on SDP. Nevertheless, the practical adoption of SDP to date is limited [7]

Processes used for improving the quality of a system emphasize reducing the number of possible defects, but quality measures and the techniques applied to improved quality can vary in effectiveness and importance depending on the consequences of a defect and whether the measures and techniques are applied to hardware or software. Considerable experience exists on measuring hardware quality. For example, the mean time between failures is often used to measure the quality of a hardware component. Consistently long periods between failures is evidence of general hardware reliability. For measuring safety, the mean time between failures is not sufficient. We need to identify and mitigate defects that could create hazardous conditions, which could affect human life. For security, the consideration of impact also applies. Voting machine quality includes accurate tallies, butalso includes mitigating design defects that could enable tampering with the device. There is an underlying assumption that a hardware device is perfectible over time. A reduction inknown defects improves the quality of a hardware device. A comparison of the failure distributionsfor hardware and software shows that the same reasoning does not apply to the reliability orsecurity of a software component [8]

The objectives of Research are:

1. To carry out a survey in small & Medium level enterprises on present software defect prediction model adopted
2. To carry out SWOT analysis & understanding Current Value stream Map
3. To use FMEA Technique to improve quality of software defect model by illustrating Future VSM
4. To propose a model which best adopts software prediction model suggested on a generic scenario.

Research Design: The focus of study is to understand why and what makes top performing companies different and what are the innovative and unique strategies in software defect prediction in creating a global standard organization. It was therefore, decided to use explorative and descriptive design, which befits into the pattern of investigation. We will focus on the current practices of developing and managing software defect prediction, explore, describe, analyze through appropriate questionnaire and schedule, including verbatim recording of the responses, per se.

Method of Study:

a) Geographical Area

Karnataka State in India is an industrially developed State, with a wide range of organizations. Bangalore was the selected geographical area for the present study.

b) Organization

50 Small & Medium Level Enterprises were selected for study as per convenient sampling.

Data Collection: An exhaustive empowerment questionnaire was put to test. Software Defect prediction angles will be posed, valid and relevant on five point scale, viz: Strongly agree; Agree; can't say; Disagree; and strongly disagree. Such areas put to test includes understanding the system of accountability within the organization, communication process adopted, decision making process, delegation and shared responsibility, feed-back system adopted, methods for information sharing, leadership development at all spheres, organizational transparency processes followed in SDLC and the like were put to test.

Pre-pilot observation; b) Pre-pilot study; and c) Final observation.

Pre-pilot observation : The study began with pre-pilot observation through a survey over a period of 8-10 months. We will observe and identify the management practices that were thought to influence business success-broad areas such as: Processes in SDLC, Cycle time of web developed projects, communication, leadership, transparency, values, decision-making, participation, management style, knowledge sharing, ownership culture and the like. Initial micro level discussion with employees was held from time to time.

Pre-pilot study : A pilot study with specific practices will be undertaken with few enquiry areas identified and put to test. This pilot study allowed us to verify and extend the larger survey findings. Pilot study also paved way for further exploration of new areas and few areas of in-significance were ignored.

Final observation : At final stage, while collecting actual data, an exhaustive questionnaire / schedule will be administered focusing all valid areas of empowerment and the extent of such organizational practices in growth of the company and creating a winning organization, per se. The collection and examining of data will be done in three stages on case-by-case basis, with a sense of purpose & direction at all three stages of data collection.

Mode of Data Collection: Personal discussions, interviews with each respondents, group discussions and several meetings with the concerned employees personally at various places like work-place (temple of ethics), recreational hall (temple of health), yoga center (temple of peace), R and D section, rest rooms was extensively undertaken. The study injected case-by-case method for collecting the required information. It was, at one instance, the employee, the manager and the CEO put together, were allowed to express opinions on the system in presence of each other. A holistic approach is what makes software defect prediction and hence this was the final pathway followed for final data collection.

Sources of data collection: In the present study, both primary and secondary data are utilized. Primary data was collected through administering the questionnaire / schedule and also participant observation. Meetings were attended, took part in discussions and visited the actual workplace with the concerned respondent to observe the system and practices. Getting information through questionnaire and having discussions at each stage was done at primary level in collection of required information.

Secondary data includes written policy statements, work records, annual reports, documentations, bulletins, write-ups, procedure charts, instructions, personal files, case histories, site maps, follow up reports, suggestions done and field notes. All the policy papers related to vision statement, mission set, objectives, guiding principles, code of conduct were referred, reviewed and examined. To add, all the data was meaningfully related to the objectives of study, the hypothesis to be tested and the intended results.

Analysis of the Results: The focus in present study was on the qualitative analysis of the responses and results based on case-by-case observations. SPSS

Tool was used to analyze the relationships, FMEA & VSM tools were Used, Finally Future VSM & Model was arrived.

RESEARCH METHODOLOGY

Task 1 (Data Collection)

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Encryption Enabled Secure Data Deduplication Using Hybrid Cloud

ARUNA M.G[1], ARCHANA P. S[2], CHITHRA M. V[3], TINA JOSEPH[4], ASHWATHI K. R[5]

[1]Associate Professor, CSE Department, M S Engineering College, Bangalore

[2,3,4,5,]8th semester Students, CSE Department, M S Engineering College, Bangalore

ABSTRACT

Hybrid cloud consists of a group of clients who have an authorized access to the cloud. These clients use cryptosystem and de-duplication technique. This cloud storage helps in data backup and synchronization of application rather than some types of abstraction. This paper reviews an approach for implementing a secure hybrid cloud. Due to this hybrid cloud approach, virtual workloads can be migrated from the private cloud to the public cloud and continue to be part of the same Layer 2 domain as in the private cloud. It maintains consistent operational paradigms in both the public and private cloud. The repeated copy of duplicate data is eliminated by data de-duplication, a data compression technique, which reduces the storage space and also save bandwidth. To ensure the confidentiality of sensitive data and the protection of data security, convergent encryption technique is effectively used before outsourcing data by encrypting it.

Key Words -Hybrid cloud, encryption, decryption, key generation, authorized de-duplication, data security

1 INTRODUCTION

Cloud computing, also called on-demand computing, is a kind of internet-based computing. It also includes sharing of data or resources to other computers or devices that requires the information. It provides on demand access to the shared data pool. It does computing resources configuration which includes components like servers, storage and network components. Cloud provides a lot of services to its users. Efforts to manage cloud is minimal. Storage solutions, cloud services and computing provides various facilities to the individual users and business enterprise to store and compute data externally or internally using data centers. Data center is a third party. It uses resource sharing and pooling as an important part in providing economy of scale.

Cloud computing allows companies to reduce the investment on infrastructure costs on data storage. It helps to focus on the project at hand that gives them a lot of profit, instead of investing time on infrastructure development and management. Users also state that using cloud enables them to get their applications up and running faster with cloud technology. It provides less maintenance cost and also helps IT to quickly adjust the resources to meet highly fluctuating and unpredictable business demands. The crucial technology for cloud computing is virtualization. Virtualization software separates interprets physical computing devices into virtual devices. Cloud computing uses concepts from Service-oriented Architecture (SOA) helps users break the problem into services and provide solution. Here we use hybrid cloud to deploy services. In this project, we consider a combination of public and private cloud as hybrid cloud. These remain distinct but are bound together, it also offers the benefits of deploying multiple models. Example of hybrid cloud is when IT companies uses public cloud to meet the temporary storage and computation needs, these cannot be met by private cloud as it becomes very expensive. Hence cloud bursting is used to scale across clouds for efficiency. Cloud bursting is a model in which all applications run. Here applications run in a private cloud or data center and “bursts” to public cloud

when there is a demand for more computing. Its advantage is that the company only pays for other computing resources when they need it. One problem with cloud storage is the ever-increasing need for ever increasing volume of data. Initially the user sends a token to the private cloud asking for privileges to upload or download data to and from public cloud. These privileges have to be granted by public cloud along with user name and password as requested by the user. Once the user wants to upload a file onto the cloud, he must first encrypt the file using convergent key. When the same user or other user wants to decrypt the data also he uses the convergent key. This key is obtained using cryptosystem. The is generated using key generation algorithm. After generating the key and encrypting the data or files, the user retains the key and only transfers the ciphertext to the public cloud for storage. Only authorized users are allowed to access the cipher text stored on the cloud, proof of ownership is also required. The user can download the cipher text from the cloud using the same convergent key to decrypt the data.

Using convergent encryption method, the cloud can perform data de-duplication on cipher text on the cloud. This technique reduces the storage space requirement. Data de-duplication is a compression technique for eliminating multiple copies of data on the cloud. It helps in improving storage utilization by the system. Instead of keeping multiple copies of same data, the redundant that is eliminated and keeps only one physical copy of data. This can happen at block level or file level. There are certain disadvantages of de-duplication, it compromises security and privacy as data is shared. The data can be vulnerable to insider or outsider attacks.

Each file uploaded on to the cloud has a set of privileges attached to it. It contains what kind of users can download or access it. When a file is uploaded, and checked for redundancy, it is considered redundant only if the privileges also match (differential authorization de-duplication). This is not considered in this project. Both de-duplication and differential authorization de-duplication cannot be used simultaneously as they contradict each other.

1.1 Contributions: In this paper, we solve the security concerns regarding storing data on cloud. It demonstrates the use of encryption and decryption using convergent key(ck). It also demonstrates deduplication. Unlike existing deduplication systems, we use private and public cloud for this purpose. Private cloud is used as a proxy which allows users to do deduplication checking. This kind of architecture is very practical. Only the data storage is outsourced on to the public cloud, whereas the operations on the data is done internally using private cloud. We tried to introduce differential duplicate check which is 90% successful. The user does duplication check depending on the privileges provided to it.

Furthermore, we enhance the system security. We use an advance scheme to provide stronger support using encryption with differential privilege key. Only users with the same privileges can perform de-duplication. The security model analysis shows that the system is necessarily secure as defined in the proposed system. Here the overhead is very minimal when compared to other convergent key concepts.

TABLE 1 Notations used in this paper

Acronyms	Description
Convergent Key	Ck
Φ(f,p)	It is the token given to file with filename f and privilege p.
TagGen(f,Kp)	Tag generation for file f.
P_u	Privileges given to the user.
P_f	Privileges given to a file.

1.2 Organization: The rest of the paper proceeds as following. In section 2, preliminaries are revisited for assurance. In section 3 system model of our cryptosystem based system is proposed. In section 4, practical model of de-duplication based system is developed and understood. In section 5, efficiency and security analysis is done to check for proper functioning. In section 6, prototype of the system is developed and implemented. Section 7

represent tested evaluation results of the developed system. Section 8 represents conclusion about the system.

2 PRELIMINARIES

This section contains all the notations and acronyms used in the paper and depicts some security related implementation.

Symmetric Encryption. It uses a common secret key k for encryption and decryption. The notations used in the paper are described above in Table 1. This consists of three important functions:

- Key generation- generates the secret key(k).
- Enc(k.M)- symmetric encryption algorithm, it takes original message (M) and secret key(k) and generates cipher text(C).
- Dec(k,C)- symmetric decryption algorithm, it takes cipher text(C) and secret key(k) and outputs original message (M).

Convergent Encryption. It provides data confidentiality and security during encryption and decryption and de-duplication. User gets a convergent key from each original document and uses this key to encipher the original message. Along with this the user also gets a tag for each message which helps to check for duplicate copy of data. To check for duplicates, the user sends it to the server to check if any duplicate copies exist. Both tag and convergent key are separately and independently derived. Tag as well as secret key are stored in the server. This describes four important function:

KeyGen(M)- key generation algorithm, maps data (M) to convergent key (k).

Enc(K, M)- C is symmetric encryption algorithm, it takes convergent key (k) and data copy(M) and generates ciphertext(C).

Dec(k,C)- C is symmetric decryption algorithm, it takes ciphertext(C) and convergent key (k) and outputs original data copy(M).

3 SYSTEM MODEL

3.1 Hybrid Architecture for secure data de-duplication

Initially we look at enterprise networks which consists of a group of clients who have an authorized access to the cloud. These clients use cryptosystem and de-duplication technique. This cloud storage helps in data backup and synchronization of application rather than some types of abstraction. Access rights to a file are based on the privileges given to the users. Three entities are used in the system, they are user, private cloud and services of public cloud as shown in Fig

Fig 1 Hybrid Architecture for secure data de-duplication

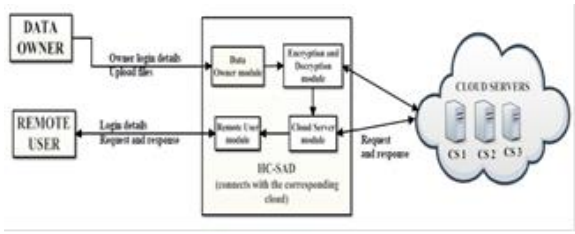

Fig 2 Overview of the System

Public cloud services- It provides data storage and cloud services using a public cloud. It also includes data outsourcing services and stores data for the user. In order to reduce the storage cost, the public cloud eliminate the storage of redundant data using data de-duplication. Only unique data is stored on public cloud. In this paper, the public cloud works online and has abundant space.

Data users- These are the users of the cloud who want to outsource the data. They also want to access the data later. User uploads data and the cloud checks for its uniqueness. Only unique data can be saved on the cloud to increase the efficiency of the cloud. In authorized de-duplication method users are provided with privileges associated to each file or data. Convergent key is used to encipher data and store it on the cloud.

Private cloud- Unlike traditional cloud architecture, here the private cloud is used to ensure user's secure usage of cloud. The user side data is secure and restricted. When this data is saved on the public cloud it is not fully secure. Hence private cloud architecture is utilized to provide security. Private key and privileges are managed by the private cloud.

This is an approach using twin cloud architecture which provides security for the data stored on the cloud. Public cloud can be utilized form any enterprise like Amazon S3 etc for archived data. Here the computation is in house, managed by private cloud.

3.2 Adversary Model: Public and private clouds are "honest but curious". All the protocols specified to it will be followed, but it tries to find out secret information based on possession. Here the users may try to access to data within or beyond the privilege specified for it. There are two types of adversaries that are taken for assumption, they are i) external adversaries tries to get secret information from public and private cloud ii) internal adversaries which tries to get all the information about the file to check for de-duplication checks token information using private cloud.

3.3 Design Goals: In this paper, we address the problems related to encryption, decryption and data de-duplication in cloud computing and propose new architecture for de-duplication.

- Encryption during file upload- When a user wants to upload a file, a convergent key is generated along with tag. Convergent key is used to encipher original file into encrypted message.
- Decryption during download- Downloading data from the cloud is possible only when user has the privilege to do so. During download data is deciphered and downloaded at the destination. Same convergent key is used during encryption and decryption.
- Differential user authorization- Initially when the user sends a token to the private cloud to access the public cloud. This technique is used to check if the token returned by the private cloud to the user has a duplicate value. It checks if the privileges are given rightly. Duplicate tokens cannot be generated.
- Authorized Duplicate Check and unforgeability- This is done by the public cloud to ensure no duplicate copies of data exists in the cloud to increase the efficiency of the cloud. Unauthorized users must not be able to generate token for their files and must not be allowed to check duplication.
- Data Security- This helps in maintaining the confidentiality of the data stored on the cloud. The main function is to retrieve and recover the files on the cloud which do not actually belong to them. These are shared files from different users.

4 SECURE CRYPTOSYSTEM BASED DEDUPLICATION

The main idea includes tag generation for deduplication and convergent key generation for encryption and decryption. Consider a file has a tag f, this tag is generated by the file. Here a secret key Kp is generated with privilege p to generate file token. $\Phi(f,p)$= TagGen(f,Kp) denotes the toke for file f. Token generation function can be easily used in the system.

4.1 The Proposed System Architecture

The tag for the file to be uploaded is TagGen(f,Kp). When there are N users in the system, privileges can be determined using a set p= {p1, p2…,ps}. Pu is the privilege of the user towards a file in the system.

File Uploading- If a user has a privilege Pu, user is denoted by U using file f. Then the token is Pf={p2}.

- If duplicates are found, it is not encrypted and stored. A message is displayed to the user saying the file already exists.
- If no duplicates exist, it computes the encrypts the file Cf=Enc(Kf,f) has a convergent key Kf=KeyGen(f) uploads {Cf,Φ(f,p)} to the cloud.
- File Retrieving- When a user wants to get a file from the cloud, the file name is specified to the cloud service provider. On getting the request, the file is checked by the cloud if the user had the privilege to use it. If downloading feature was present, then the privilege has to be checked before it is downloaded.
- Problems- Such constructions have a few problems, which can be solved easily:

- To generate the file tokens, the user has to know all the privileges keys (p1, p2, p3), this is chosen from Pu.
- The process does not prevent privilege key sharing among users. They might also generate their own private privilege key.
- It cannot provide confidentiality to unpredictable films which might fall to attacks which can be recovered using brute force technique.

5 IMPLEMENTATION

Implementation is the stage of the project when the theoretical design is turned into working system. Thus, it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective. Modules are:

- Cloud Service Provider
- Data Users Module
- Private Cloud Module
- Secure De-Duplication System

i) Cloud Service Provider

- In this module, we develop Cloud Service Provider module. This is an entity that provides a data storage service in public cloud.
- The S-CSP provides the data outsourcing service and stores data on behalf of the users.
- To reduce the storage cost, the S-CSP eliminates the storage of redundant data via de-duplication and keeps only unique data.
- In this paper, we assume that S-CSP is always online and has abundant storage capacity and computation power.

ii) Data Users Module

- A user is an entity that wants to outsource data storage to the S-CSP and access the data later.
- In a storage system supporting de-duplication, the user only uploads unique data but does not upload any duplicate data to save the upload bandwidth, which may be owned by the same user or different users.
- In the authorized de-duplication system, each user is issued a set of privileges in the setup of the system. Each file is protected with the convergent encryption key and privilege keys to realize the authorized de-duplication with differential privileges.

iii) Private Cloud Module

- Compared with the traditional de-duplication architecture in cloud computing, this is a new entity introduced for facilitating user's secure usage of cloud service.
- Specifically, since the computing resources at data user/owner side are restricted and the public cloud is not fully trusted in practice, private cloud is able to provide data user/owner with an execution environment and infrastructure working as an interface between user and the public cloud.
- The private keys for the privileges are managed by the private cloud, who answers the file token requests from the users. The interface offered by the private cloud allows user to submit files and queries to be securely stored and computed respectively.

iv) Secure De-Duplication System

- We consider several types of privacy we need protect, that is, i) unforgeability of duplicate-check token: There are two types of adversaries, that is, external adversary and internal adversary.
- As shown below, the external adversary can be viewed as an internal adversary without any privilege.
- If a user has privilege p, it requires that the adversary cannot forge and output a valid duplicate token with any other privilege p' on any file F, where p does not match p'. Furthermore, it also requires that if the adversary does not make a request of token with its own privilege from private cloud server, it cannot forget and output a

valid duplicate token with p on any F that has been queried.

5.1 Algorithms Used

- **Private Cloud Module(username, password)**

{
// Input: username, password
//Output: Successful Login
Step 1: Read username
Read password
Step 2: if (uname= "cloud" && password= "cloud")
write success goto step 4
else write invalid username or password
Step 3: goto step 1
Step4: Stop
}

- **User Module (username, password)**

{
//Input: username, password
//Output: Successful Login
Step 1: Read username
Step 2: Read password
Step 3: if(check DB for username and password)
Establish connection
Else
goto step 1
Step 4: Print "invalid username"goto step 1
Step 5: Print "invalid password"goto step 2
}

- **Public Cloud Module(username, password)**

{
// Input: username, password
// Output: Successful Login
Step 1: Read username
Read password
Step 2: if(username= admin && password= admin)
write successgoto step 3
else incorrect username or password
goto step 1
Step 3: Stop
}

- **AES Encryption(file, cipher text)**

{
// Input: File,Cipher Key
// Output: cipher text
Step 1: Select File content (State)
Step 2: if (State>= 0)
then substitute State with S-box
a[4][4]=State
else incorrect format
Step 3: if(a[4][4]==State)
then First row is not shifted.
Second row is shifted one position to the left.
Third row is shifted two positions to the left.
Fourth row is shifted three positions to the left.
else goto Step 1
Step 4: if (a[4][4] =! 0)
then p[16][16]= a[4][4] * I[1][4]
else goto Step 3
Step 5: Padding to convert p[16][16] to q[128][128]
Step 6:Cipher_text[128][128]=(q[128][128]||Cipher_Key[128][128])
Step 7: Stop
}

- **AES Decryption (cipher text, cipher key)**

{
// Input: Cipher_text,Cipher_ Key
// Output: File
Step 1: q [128][128]= (Cipher_text[128][128] || Cipher_Key[128][128])
Step 2: Reverse padding to convert q[128][128] to p[16][16]
Step 3: if (p[16][16] =! 0)
then a[4][4]= p[16][16] / I[1][16]
else goto Step 1
Step 4: if(a[4][4]==0)
then state= a[4][4]
Fourth row is not shifted.
Third row is shifted one position to the left.
Second row is shifted two positions to the left.
First row is shifted three positions to the left.
else goto Step 3

Step 5: if (a[4][4] >= 0)
then substitute State with S-box
else incorrect format
Step 6: Stop
}

- **SHA1 Algorithm For Key Generation**

Step 1: Padding
Pad the message with a single '0' followed by '0s' till final block has 448 bits.
Append the size of the original message as an unsigned 64 bit integer.
Step 2: Initialize the 5 hash blocks (h0,h1,h2,h3, h4) to the specific constants defined in the SHA1 standard.
Step 3:Hash (for each 512bit Block)
Allocate an 80 word array for the message schedule
Set the first 16 words to be the 512bit block split into 16 words.
The rest of the words are generated using the following algorithm
Step 4: Word[i3] XOR word[i8] XOR word[i14] XOR word[i16] then rotated 1 bit to the left Loop 80 times doing the following.
Calculate SHAfunction() and the constant K
e=d
d=c
c=b (rotated left 30)
b=a
a = a (rotated left 5) + SHAfunction() + e + k + word[i]
Add a,b,c,d and e to the hash output.
Step 5: Output the concatenation (h0,h1,h2,h3,h4) which is the message digest

6 EVALUATION

We conduct various tests to prove that our system is working as desired. Our analysis is based on the comparison of desired output and obtained output. Evaluation can also be done by varying different factors. This includes i) File size ii) Number of files stored iii) Privilege set size

6.1 File Size

To evaluate the file upload, we upload a number of files on to the cloud. Using this worst case and best case scenario can be developed. It also observes the time taken to encrypt, decrypt, de-duplication check, convergent key generation and tag generation. As the size of the file to be uploaded increases, the time taken to upload also increases.

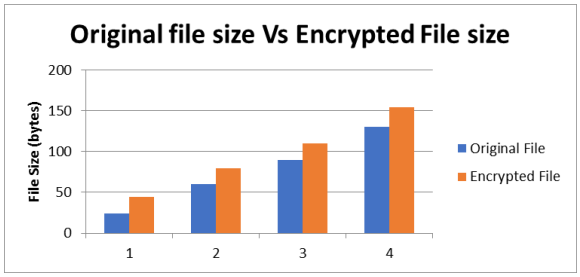

Fig 6.1 Original file size Vs Encrypted File size

6.2 Number of Files Stored

To evaluate the effect of uploading many files on the cloud, more files are uploaded to check. We can upload 1000MB unique data on the cloud. Token checking is done using hash table and linear search algorithm. The time taken to perform this is small as the collision happens rarely.

Privilege Set Size

To evaluate the privilege set key, we upload files of size 1000MB. When the number of keys increases, total time spent on the system cloud also increases. The effect is much visible when larger files are uploaded on the public cloud.

7 RESULTS

New user can register his details to get new account for the secure authorized de-duplication. Fig 7.1 shows the User Registration Form.

Fig 7.1 User Registration Form

Private Cloud needs to enter the username and password to login. Fig 7.2 shows the Private Cloud login.

Fig 7.2 Public Cloud Login

Fig 7.3 shows the private cloud giving rights to activated users.

Fig 7.3 User Privilege Access

Fig 7.4 shows the de-duplication check performed stating file already exists.

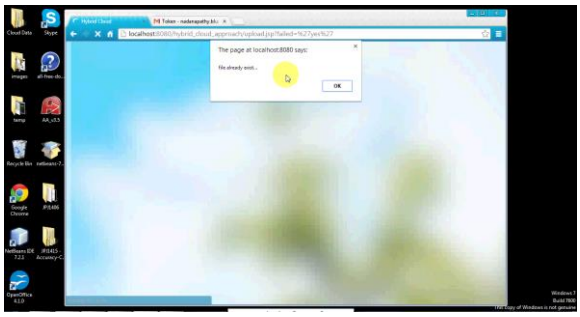

Fig 7.4 De-duplication Check

Fig 7.5 show the database of all files uploaded along with size and time of uploading.

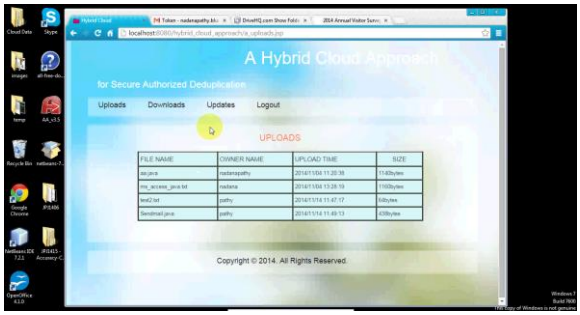

Fig 7.5 Database of Uploaded Files

8 CONCLUSION

In this paper, the notion of cryptosystem, data de-duplication was proposed to protect the data security by including differential privileges of users in the duplicate check. We used the hybrid cloud architecture, in which the duplicate-check tokens of files are generated by the private cloud with private keys generated using convergent key. Security analysis demonstrates that our schemes are secure in terms of insider and outsider attacks specified in the proposed security model. Here the file encryption and decryption is done to maintain the security. An extra feature is added to the system, Update function. Proof of ownership is provided to the users to maintain integrity. We also showed that files can remain on the cloud without the invasion of intruders into the system. The cloud protects the data stored in the system.

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Improvising Video Change Detection by implying Low Dimensionality Frame Matching Algorithm

SINDHU.K, SHRUTHI.A.R, SAIKIRAN JIROBE, ROZINA KHATUN

Dept. of CSE, East West Institute of Technology
Off Magadi road, Anjananagar, Bangalore-91, India
sindhuk13.rao@gmail.com; shruar22531@gmail.com; skjirobe@gmail.com
rinkuhaldar@gmail.com

ABSTRACT

Open CV can capture, show, and record a stream of images from either a video file or a camera, but there are some special considerations in each case. Presenting an efficient open-source implementation of a video alignment algorithm, based on low dimensionality frame matching. The algorithm will be written in Java language. Two videos are recorded in different times. One video is recorded offline and other online and by matching the frames of the two video best matched frame is resulted leading to efficient video alignment. We test our application on realistic video benchmarks and obtain a good alignment quality. The videos are aligned by temporal and spatial alignment. We achieve a sequential performance of at most 10.47x real-time performance when processing a query video of resolution 240x320, with 30 fps.

Key Words—video alignment; OpenCV; Java;temporal alignment; spatial alignment;

I. INTRODUCTION

The most computationally expensive part of many video alignment algorithms consists of searching for the most similar matches to high-dimensional images. Having an efficient algorithm for performing fast frame matching in large datasets can bring speed improvements of several orders of magnitude to many applications. Examples of such problems include finding the best matches for local image features in large datasets [Lowe, 2004; Philbin et al., 2007], clustering local features into visual words using the k-means or similar algorithms [Sivic and Zisserman, 2003], global image feature matching for human pose estimation [Shakhnarovich et al.,2003], matchingdeformable shapes for object recognition [Berg et al., 2005] or performing normalized cross-correlation to compare image patches in large datasets [Torralba et al.,2008a]. The best frame matching problem is also of major importance in many other applications, including driver assistance systems, surveillance cameras. In this work two videos are recorded at different time , considerably at different speeds and probably at similar trajectories. The two videos are considered as query and reference video, the query video is said to be the subset of the reference video. The reference video is pre-processed and stored in offline. As soon as query video is available the frame matching of the both videos is performed resulting in alignment of the two videos. This can be able to run on parallel hardware such as general purpose graphical processing units.Our primary contribution is a method for spatially and temporally aligning videos using image comparisons. Our image comparison method is also novel, insofar as it is explicitly designed to handle large- scale differences between the images. The accuracy of alignment of the videos is increased by low dimensionality frame matching algorithm.The main limitation of our approach is that we require the input video to follow spatially similar camera trajectories.

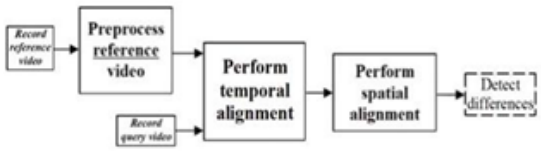

Figure 1: The computer vision pipeline

II. RELATED WORK

Aligning a pair of images is a standard problem in computer vision. The methods employed earlier are very complex kind of techniques. In this work we are employing pipeline alignment of the videos in which videos are aligned by temporal and spatial alignment. In the temporal alignment stage it makes use of quad descriptors. Quad descriptors are low-dimensional 4D feature representation of each frame, which are stored and retrieved efficiently from a kd-tree. Spatial alignment includes recently introduced area based image registration algorithm. The synchronization techniques used by computer vision are very complex so the synchronization of two temporally related video sequences, where the reference sequence is pre processed and indexed before the input sequence becomes available. This way, we make efficient use of the time that elapses between the two recordings. The algorithm which is being implemented for matching of video frames is optimized and designed to achieve performance that is required to run on parallel hardware such as GPU's and CMPs. The matching of video frames is done as soon as the input of two recorded video is available. The area based algorithm which is used in this work provides better accurate alignment results than Lucas-Kanade's method which was used earlier. We describes a very efficient spatiotemporal alignment pipeline of videos captured from independently moving cameras at different times, benefiting from the following:

i) in the temporal alignment stage it makes use of quad descriptors, a low-dimensional 4D feature representation of each frame, which are stored and retrieved efficiently from a kd-tree;

ii) it employs a robust spatial alignment procedure, Enhanced Correlation Coefficient (ECC), recently introduced in [7]. ECC is an area- based image alignment (or registration) algorithm, which has been included in the OpenCV 3.0 library. This video-alignment pipeline was designed to target real-time performance, i.e., on-the-fly processing as the video frames become available. However, to achieve such a performance we normally require to use parallel hardware such as GPUs or CMPs.

Once the preprocessing is performed, when we are given a query video we execute the following steps:

- for each query frame we build 4D quad descriptors for each scale, after obtaining the MSH features for these frames;
- we build for each scale a vote space to have each query frame and the corresponding reference frame using the ECC method. We can also perform change detection on the aligned frames, but normally we omit it because it does not take long to execute.

III. THE COMPUTER VISION PIPELINE

Our alignment application handles two input videos. The first, the reference video, is captured under controlled conditions once per day, for example. The second, the query video, is recorded as often as we require to perform surveillance and compare it with the reference. The CV application does the following given these videos:

i) it performs temporal alignment, by finding for each frame of the query video the best matching reference frame, and, then,

ii) it executes spatial alignment, by applying the ECC image alignment procedure on each pair of matched frames; after this, we can also detect differences between the matching frames and report them if they are big enough.

Therefore, it makes sense to preprocess the reference video, in order to quickly align it with the future query videos. The CV pipeline depicted in Figure 1 has two major phases: i) a preprocessing phase, performed e.g. only once per day, in which we process the reference video to benefit the overall temporal alignment performed after and ii)

a query phase, in which the query video is fed to the already ”trained” pipeline in order to be aligned with the reference video and, eventually, to detect differences between the query and reference videos. We underline that the temporal alignment, and possibly the spatial alignment also, is performed for a few image scales in order to increase the quality of the algorithm. More exactly, each frame from the input videos is normally downscaled five times, by factors of 1, 2, 4, 8 and 16. The succession of these scales of an image is called the pyramid of images. Note that for computer vision it is very efficient to use 4 quad descriptors, which are represented by four real numbers Normally, standard feature detectors such as ORB an SIFT, also implemented in OpenCV, use descriptor vector of 32, respectively 128, elements. While quads are more abstract than the other descriptors mentioned, they perform very well in video synchronization, where errors for various pairs of frames are levelled out because we compute a globally optimal maximum cost matching for all query frames, different scales. The voting procedure for each image scale employs several NNS-like queries in the quad descriptor space of the reference video, namely radius search - searching all neighbors within a given radius from the query quad, and k-nearest neighbors (kNN). Therefore, we have to carefully choose the NNS data structure used for voting in the temporal alignment phase. As anticipated, the low-dimensional space allows us to perform efficient NNS operations by using the popular kd-tree data structure. The ECC algorithm is available in two different flavors:

i) single-resolution and also implemented in the OpenCV 3.0 library;

ii) multi-resolution, a better quality version of the ECC method presented above, able to cope with bigger perspective differences and lens deformations because it runs a level-wise alignment on the pyramid of resolutions of both input frames, starting with the coarsest resolution and ending with the original image. Let levels ECC be the number of levels of the pyramid. This method can lead to better quality alignment results, at the expense of being slower. This algorithm is implemented in the Image Alignment Toolbox (IAT), and we currently have implemented it only in Python. In the following pages, when we talk about the ECC procedure, if we do not state explicitly, it means we refer to the single-resolution method. ECC is an iterative algorithm, where each step attempts to align the reference image closer to the query image and, therefore, the convergence rules and input data have a big impact on its behaviour and execution time. Note that the quality of the alignment of the ECC algorithm depends, among others, on the exact content of the input images and the overlapping or perspective difference of the frames. The CV pipeline is able to cope, to a certain degree, with wide-angle lens effect of the camera used to record the videos. Temporal alignment handles reasonably well this effect using features as input, while single-resolution ECC, being an area-based method has alignment issues when the same region is presented with different distortions in the two videos. On the other hand, the multi-resolution ECC algorithm is able to cope better with such wide-angle lens deformations. However, the best is for the frames of the input videos to apply at the very beginning a ”fisheye” deformation removal effect, which is not very compute intensive.

(a) (b) (c)

Figure 2: Example with aligned pair of frames of videos from the drone benchmark introduced in Section V:

a) the query frame;

b) the matched frame from the reference video - note the difference in perspective w.r.t. subfigure (a); c) the output of the CV pipeline from the two videos above, using multi-resolution ECC with three levels

A. A Video Alignment Example

We present now an example of aligning two videos from the drone benchmark we introduce in Section V. Our CV pipeline creates an

output fusion video, by combining the R and B channels from the query video sequence and the G component of the spatiotemporally aligned reference sequence. This way, ideally, changes are identified in the output with green color if the reference frame has elements that are not in the query image, or pink if it is the other way around. If the output frame is gray, it means that no differences were discovered. In Figure 2 we present an example of running our video alignment program. We can see the differences between the two input videos: on one hand, the query frame (a) has a smaller FOV, due to the fact the drone flies at a lower altitude; also, we see in (c) some changes in pink and green due to the different perspectives on the buildings on the two sides of the road and because there are different cars and a truck going on the road in the two input images.

B. The Optimal Frame Matching Problem

The optimal-cost frame matching problem has the following formulation: given a 2D vote space for the input reference and query videos, which is basically a match cost matrix with rows for each reference frame and columns for each query image, we need to find reference matches for all frames of the query video in order to maximize the sum of the corresponding votes. Additional sanity constraints should be added, such as: i) in order to avoid big ”jumps” in the reference video we allow to go from point $< q_i, r_j >$ (query frame i paired with reference frame i) to point $< q_i+1, r_k >$, where $|k-j| <= M$ with e.g., M = 10; ii) the matching reference frames are in the same temporal order as the corresponding query frames - this property is not always realistic since, e.g., a camera mounted on a drone can be pushed by the wind, backwards, while recording the query video. These conditions are related to the ”smoothness” property, which forces the temporal alignment not jump w.r.t. the reference frame back and forth chaotically. This matching problem can be easily reduced to a max-cost (or critical) path on a directed acyclic graph (DAG). The graph can be best thought of as a function from query frames to reference frames, depicted in the 2D plane of the cost matrix. This means the vertices of the graph are points in this 2D grid with abscissas the indices of the query frames and ordinates the indices of the reference frames. An optimal path starts on this 2D grid on the left side, with query frame 0 and walks up to the last query frame, one step at a time towards East. Normally, every query frame can be matched with any reference frame. But, the additional constraint i) means that we allow from any vertex only certain edges in the 2D grid graph by going from that point one step East and only up to M units towards North or South; constraint ii)implies that the function is monotonic. Note that we do not need to employ a standard topological sorting because, given the DAG structure, we obtain a topological order by simply traversing the 2D grid from left to right.

IV. IMPLEMENTING THE PIPELINE

We started developing our application from an implementation in Mat lab, part of it available in the IAT tool [6]. Open CV is the best choice to implement efficient, possibly parallel, CV applications: it is an industry supported open-source library. Open CV’s parallel modules, which implement linear algebra and CV primitives, is pretty straightforward once you know the standard Open CV modules, compared to programming directly in CUDA or Open CL. We implemented the pipeline first in Python, using the bindings Open CV offers and the NumPy package for linear algebra. The reason is that Python with NumPy and Open CV is very similar to Mat lab together with the Computer Vision System Toolbox, since NumPy allows also writing concisely matrix operations. People have started using Python in CV applications, and its support for Open CV is extensive, well documented and mature [9], [15]. Choosing this route turned out to be a good idea, since it allowed us to explore
quickly quite a few alternatives, before arriving at a well-understood implementation, in about four months, starting with almost no OpenCV background. We note there are also disadvantages: Python is an interpreted language, at the writing of this paper has little open source support for parallelization similar to OpenMP, namely the

multiprocessing package and no possibility to run OpenCV's transformations accelerated on GPU. This is why we had to write an OpenCV C++ application.

VI. APPLICATION OPTIMIZATION

To increase the performance of the application we can: i)perform algorithmic optimization, either by using exact or approximate methods; ii) reduce the memory footprint of the program; iii) parallelize the application.

A. Profiling the Application To understand more about the application, we profile it and provide the results in Table I. We need to make distinction between the preprocessing and the query video processing phases. So, in this table, with we denote preprocessing computations, which need to be run less frequently because a reference video is normally matched against many query videos. This implies we care less about the performance of the entries

V. EXPERIMENTAL SETUP

We use for our experiments a machine: M11.4 Ghz processor 2 GB RAMS 40 GB hard disk Web Camera. It has also installed the JDK 1.8, Eclipse, MySql, Java CV and OpenCV 3.0 libraries.

The video benchmarks we use are:

- The highway videos used in [8], [5], of resolution 240x320, with 30 fps, recorded while driving, available at http://xanthippi.ceid.upatras.gr/people/evangelidis /video alignment/;
- The drone videos, a very demanding benchmark set we created by flying a drone manually at an altitude of around 100 meters, in very good weather conditions, recording at HD resolution, with 30 fps, a road traversing a field, in a few runs with moderate trajectory changes. We note that, in principle, we can use a smaller resolution of 270x480 if we are to detect objects of the size of a vehicle.

We attain a query video processing and alignment speed (change detection excluded) of 10.47x real-time with the C++ application on the highway benchmark. We also observe that Python is usually slower because it is an interpreted language and it adds extra complexity when interfacing the NumPy objects it handles with calls to the C++ OpenCV transformations.

B. Algorithmic Optimization

The performance of the voting stage depends basically on a good choice of kd-tree, performing all the required types of NNS queries, namely radius search and kNN. Initially, we employed the Python kd-tree implementation from the scipy library. But, we noticed that the voting stage could take very long, for example in the order of days, for a four minutes long HD reference video of 30 fps and a two minutes long query video. Therefore, we had to use a better implementation, and it was simple for us to choose the kd-tree from the Fast Library for Approximate Nearest Neighbours (FLANN) C++ library included also in OpenCV. This reduced the voting step to hours on the same videos. The FLANN kd-tree implementation is written in mind with the idea that we search descriptors generated with the ORB or SIFT detectors, represented in spaces with 32 or more dimensions. The FLANN library allows us to configure the kd tree at instantiation, in order to increase performance: the data structure can create in fact a specified number of kd-trees, in order to search more intelligently in all of them, by performing a "time- bounded" approximate search and relying on the randomization of each tree, for better efficiency and precision [11].

C. Aspects Regarding the Memory Consumption

To further increase the performance, we now address the memory consumption of the application

D. Parallelizing the Application

Current stream processor (data-parallel) architectures, such as NVIDIA GPUs, offer better performance and energy efficiency for dense matrix CV operations, when compared with CMPs. This makes GPUs more suitable for embedded operation also. Therefore, a straightforward way for parallel implementation is to use in our CV application the OpenCV GPU accelerated class cuda::GpuMat, which is able to achieve a great performance due to running transparently CUDA code on the GPU.

Since OpenCV does not provide Python

bindings to the GPU functionality, we took the OpenCV C++ version of our application and made the MSH and ECC stages of the C++ application run on the GPU. This step was a rather elaborate task of about three weeks of work since the latest OpenCV 3.0 library is currently lacking several functions required by our CV pipeline, which prompted us to write them ourselves using NVIDIA NPP and CUDA. When running on the GPU, the results from floating point operations are slightly different from the ones obtained on the CPU, due to the fact reductions of sums, multiply or max are not performed in the same order when ran on the parallel hardware as in the sequential case and these operations are not exactly associative due to rounding errors. Normally, the warp matrix computed by ECC exhibits errors of at most 10−2 units for It's co-efficients. This holds also for the 2D points computed with the multi-scale Harris detector on the GPU. In Table II, we present the execution times of the MSH and ECC stages when running on machine M1 and on an NVIDIA Tesla M2070 GPU. We use for the MSH stage the same HD.

VI. Forward Additive ECC Iterative Algorithm

Let us now translate the above results into an iterative scheme in order to obtain the solution to the original nonlinear optimization problem. Assuming that estimate (P_{J-1}) of the parameter vector is available from iteration j- 1, we can compute $\overline{\iota_w}\ (P_{J-1})$ and $\bar{G}(P_{J-1})$; then, we can approximate $\rho(P)$ with the help of $\rho(\Delta P_j|P_{J-1})$ and optimize this approximation with respect to ΔP_j.

As is indicated in Step S4, we stop iterating whenever the norm of the updating vector ΔP_j becomes smaller than some predefined threshold value T. The iteration steps are summarized in Table 1 and we call the corresponding algorithm the Forward Additive ECC (FA-ECC).

VII. Inverse Compositional ECC Iterative Algorithm

When the alignment problem is restricted to specific classes of parametric models, it is possible to devise more computationally efficient versions since certain parts of the algorithm can be computed offline. If, for example, we adopt the methodology proposed, we can come up with the Inverse Compositional ECC (IC-ECC) version of our algorithm which has the significantly reduced complexity O(KN) per iteration. We briefly mention that the methodology found in relies on interchanging the role of iw and ir. Consequently, matrix G becomes the Jacobian matrix of the reference intensity vector.

TABLE 1: Outline of the Proposed Forward Additive ECC (FA-ECC) Refinement Algorithm

Initialization	
Use reference image I_r to compute the zero-mean normalized vector $\bar{\mathbf{i}}_r$. Initialize $\mathbf{p}_0$ and set $j = 1$.	
Iteration Steps	
S_1 :	Using $\phi(\mathbf{x}; \mathbf{p}_{j-1})$ warp I_w and compute its zero-mean counterpart vector $\bar{\mathbf{i}}_w(\mathbf{p}_{j-1})$.
S_2 :	Using $\phi(\mathbf{x}; \mathbf{p}_{j-1})$ compute the Jacobian $\bar{G}(\mathbf{p}_{j-1})$ using (9).
S_3 :	Compare $\bar{\mathbf{i}}_r^t \bar{\mathbf{i}}_w$ with $\bar{\mathbf{i}}_r^t P_{\bar{G}} \bar{\mathbf{i}}_w$ and compute perturbations $\Delta\mathbf{p}_j$ either from (19) or using (20) and (21).
S_4 :	Update parameter vector $\mathbf{p}_j = \mathbf{p}_{j-1} + \Delta\mathbf{p}_j$. If $\|\Delta\mathbf{p}_j\| \geq T$ then, $j++$ and goto S_1; else stop.

Fig.. Video alignment concept: temporal and spatial registration. Frame overlapping amounts to about 90% and yaw angle is 3 . Temporal alignment, or synchronization, is used to map the time domain of the first sequence to that of the second one, such that each corresponding frame pair has the highest possible "similar content" (Fig. 1).

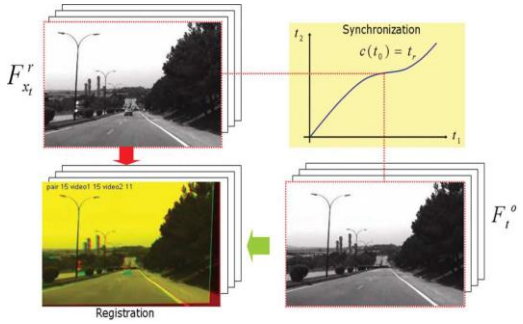

Figure 3:Pixel-wise.

VIII. Results

We have aligned five video sequence pairs with the four DBN models and evaluated the synchronization error. They were recorded with a SONY DCR–PC330E camcorder on different environments: a university campus at day ('campus' pair) and night, a suburban street, a back road and a highway. Figure 4 shows a few sample frames of each one. The back road and the night pair contain few distinct scene features compared with the suburban street and the campus pairs, which are populated by a number of buildings, parked cars and lamp posts, on both sides of the image. In addition, the GPS reliability was also different in the campus and the street sequences due to the proximity of tall buildings and also to the variation of the number of visible satellites along time. In order to quantitatively assess the performance of the temporal alignment, we manually obtained the ground–truth for all five video pairs. Every five frames of the observed video we determined the corresponding frame in the reference video. In between, we performed a linear interpolation.

Mainly the position and size of the closest static scene objects were taken into account, like lane markings, traffic signs, other cars etc. This decision, however, often proved difficult to make because the vehicle undergoes lateral and longitudinal relative displacements, to which camera pose variations are added. Therefore, we ended up by selecting not a single frame number but an interval [lt, ut] always containing the true corresponding frame. The width of the ground truth intervals thus obtained is typically just 3 to 6 frames. A figure containing just a few frames of the aligned videos would be a poor reflex of the results. The original, synchronized and fully aligned video sequences can be viewed at the webpage www.cvc.uab.es/ADAS/projects. To assess the quality of the spatial registration we perform a simple image fusion assigning the reference frame to the red channel of a color image and the registered observed frame to the green channel.

Algorithm 1: Find the difference percentage :

```
Read images A, B
for (int y=0; y<A.height&& y<B.height; i++) {
        for (int x=0;x<A.width&& x<B.width;
x++) {
 if (A.getRGB(x,y) != (B.getRGB(x,y)) {
                Pixel pixel = new Pixel (x,y);

                pixelsList.add(pixel);
                diffcount++;
 }
}
}
diffcount = diffcount + (getWidthDiff() *
getHeightDiff());
dimension = A.height * A.width;
diffpercentage = (diffcount / dimension) * 100;
```

Algorithm 2: Find the frame count :--

```
Read image
frame_count = 0;
while (true) {
 if (image.getNextFrame() != null) {
        frame_count++;
} else {
break;
}
return frame_count;
```

Algorithm 3: Video Alignment Detection

```
Read reference, query, accuracy
reference_frame_count<-
find_frame_count(reference)
query_frame_count<- find_frame_count(query)
initialize diffMap(video_name, total_diff)
for (inti=0; i<reference_frame_count -
query_frame_count; i=i+accuracy) {
 for (int j=0; j<i;j++) {
reference.getNextFrame();
 }
video_i = empty;
total_diff = 0;
```

```
        while (true) {
query_snap = query.getNextFrame();
 if (query_snap==null)
        break;
reference_snap = reference.getNextFrame();
video_i+= reference_snap
total_diff += Find_Difference(query_snap, reference_snap);
}
diffMap.put(video_i, total_diff);
}
return diffMap.get(min_diff_video)
```

IX. CONCLUSION AND FUTUREWORK

The images are both temporally and spatially aligned for better results using area based registration algorithm. The complete implementation is provided using java, html, css. Unlike existing methods, the algorithm is explicitly designed to handle large-scale differences between images. The biggest performance obtained with this implementation using openCV library is to run on parallel hardware.The performance is made closer to the real time with 30fps and resolution of 240x320 by spatiotemporal alignment of reference and query videos. As for the spatiotemporal alignment, we extended the ECC image alignment algorithm to space-time dimensions for registering videos . We tested our method on real-video sequences captured by moving or static cameras and we compared the proposed methods with the state of the art. The results verified both the efficiency and the effectiveness of the proposed method. Although we mainly considered surveillance and driving assistance applications, the proposed scheme can also be adopted in automated 3D map building.

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[16]. Alexandru.E.Susa, Valeriu Codreanu, Georgious Evangelidis and Lucian Petricas, University Politechnica of Bucharest, Romania

Authors Photo and Biography:

Sindhu K, pursuing 8TH Semester B.E., in East West Institute of Technology with CSE as Major. Her personal interests include Image Processing.

Shruthi A R, pursuing 8TH Semester B.E., in East West Institute of Technology with CSE as Major. Her personal interests include Image Processing.

Saikiran Jirobe, pursuing 8TH Semester B.E., in East West Institute of Technology with CSE as Major. His personal interests include Image Processing.

Rozina Khatun, pursuing 8TH Semester B.E., in East West Institute of Technology with CSE as Major. Her personal interests include Image Processing.

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Automated Smart Sericulture System: An Embedded System Approach

VIJAYALAKSHMI M.S[1], KAVANA GOWDA.J[2], KAVYASHREE G.M[3]

[1]Assistant professor,vijayausha@gmail.com

[2]kavanamadura05@gmail.com,

[3]gmkavya96.kk5@gmail.com

Dept. of computer science and Engineering, M.S Engineering College, Karnataka India

ABSTRACT

Sericulture plays an important role in Indian agriculture, in which production of silk by the rearing of silkworms is the major task. In this paper we consider IOT [Internet Of Things] framework, with the COAP (Constrained Application Protocol) to monitor the sericulture system. In sericulture humidity and temperature plays a major role, hence we use the temperature and humidity sensors to collect the data from and store it wirelessly in the cloud and the user can access it either through the android applications or the personal computers. Sensors and actuators are connected intact to the raspberry pi which routes the data with the help of the routers. Security is another aspect which is to be considered in the designing of any system, we involve the IP based security, by longing in securely. The complete project is based on the monitoring of the sericulture system using the concept of IOT along with IP.

Key Words: IOT (Internet of Things), Raspberry Pi, COAP, Actuators, WSN (Wireless sensor networks

1. INTRODUCTION

The main concept involved in this project is the current trend in technology which is the IOT technology which provides inter-networking and also enables the global communication by connecting to physical devices; it also embeds the sensors, actuators and the software etc. The world has minimised in size is a saying heard everywhere. This has been prospective because of communication is what defines our daily activities. Communication technology includes a broad range of mediums, from the internet to radio to television to wireless signal sources. It is used in the business circle, in personal relationships and also in public spaces that are neither mainly commercial nor personal, such as a channel stop that uses televisions to broadcast agenda changes. Traditionally, communication technology is restricted to hardware such as radio receptors or television sets. However, the fame of wireless technologies has correspondingly made the idea of communication technology slightly more unearthly. Wireless Sensor Networks is unique such technology.

DHT11 digital temperature and humidity sensor is a composite sensor contains a calibrated digital signal output of the temperature and humidity. The Raspberry Pi is a credit-card sized computer it can be easily plugged into your television and keyboard etc.

The raspberry Pi is fully featured micro-computer.

1.1 RELATED TO THE WORK

The traditional silk farming deficiencies proper refined and automated mechanism for silkworm growth. The extreme differences in the moisture, temperature, frequent human intervention, absence of appropriate treatment of silk worms with medicine indications to poor quality silk. Also, an inappropriate care may lead to severe disease spread among silkworms which leads to loss of investment for the farmer since common of the

silkworm diseases seem in the end stage of worm growth leading to the death of silkworms or the silkworms fading to produce silk. Hence, we suggest a novel automated sericulture plant, which contains less human intervention to maintain right environmental requirements for the growth of silk worms, reducing the chances of lessening in silk production. This project emphasis on designing and developing an automated system for sericulture founded on embedded system and wireless sensor network.

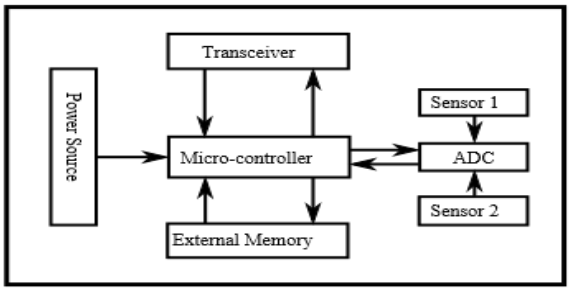

Figure 1.1: Block Diagram of Sensor Node

In this method, the sericulture atmosphere is measured using sensors and automated actuators. The data from these sensors will be conveyed wirelessly to the end user.

1.2 WORKING METHODOLOGY

Sensors will read real time data from the system and data will be transferred to sensor node GPIO pins. According to the variations found in sericulture system, suitable actions will be taken by the automated system. This is to monitor the temperature variation that is the root cause of many diseases in silk farming. We design a timer based disinfectant sprayer and lime water sprayer to avoid the disease spread. The chopper blade selection buttons act as inputs for selection of blades to chop the mulberry leaves if required, since in the initial stages of larva development chopped leaves has to be fed. Sprinkler selection buttons are used to select a suitable sprinkler if there is requirement. The system block diagram is shown in Figure 1.2

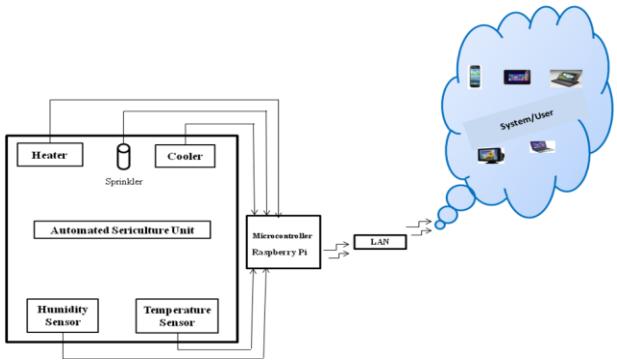

Figure 1.2: Deployment Architecture for Sericulture Use case

2. OBJECTIVES

This paper proposes a novel approach to address all the above listed problems about the sericulture. The proposed technique involves various steps like Data acquisition, computation, and actuation for the sericulture. It involves the design and implementation of Wireless Sensor Network for monitoring the sericulture unit with parameters like temperature, humidity and so on using various sensors. The acquired data from various sericulture units will communicated wirelessly to a remote station, and then interfaced to a Network enabled host computer, wherein all the received data will be displayed real time on a web page. Based on the data available some parameters can be controlled to maintain the unit with some actuators to maintain the parameters at their standard acceptable levels, adding some organic compounds.

3. NEED FOR WIRELESS SENSOR NETWORKS

All the things that were previously inaccessible have become accessible due to Wireless Sensor Networks. In recent times, wireless sensor networks have been widely deployed in many areas such as military, mining, health care, sericulture etc. WSN networks generally operate in areas where a man cannot reach for activities such as structural monitoring, environment monitoring etc., and most of WSNs operate unattended over a period.

WSNs operate in complex and noisy real-time, real-world applications. Whatever we thought was impossible before is possible because of WSNs. Home automation systems, monitoring of

parameters pertaining to sericulture, geography, environment etc., at low cost has been possible because of WSNs. Therefore, we have explored WSN to apply to precision sericulture as well.

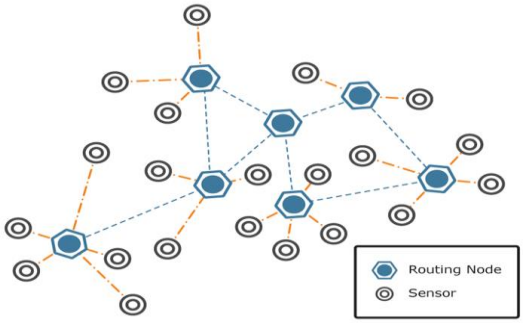

Figure 3: Sensor Nodes Interconnection

4. IOTIVITY ARCHITECTURE

The Iotivity is an open source project. The Iotivity project is hosted by the Linux Foundation, and sponsored by the Open Connectivity Foundation (OCF) that is a group of technology companies such as Samsung and Intel who together will develop standard specifications, promote a set of interoperability guidelines, and provide a certification program to enable the Internet of Things.

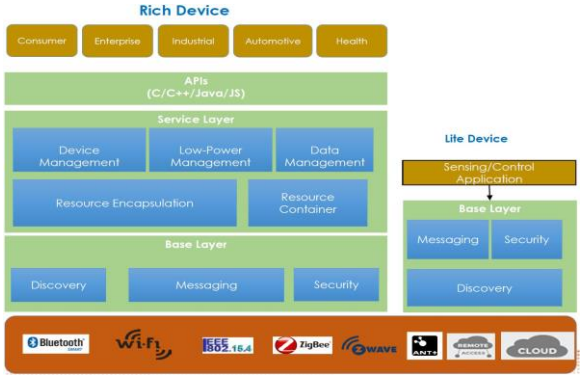

Figure 4: Different layers in Iotivity Architecture

This project is independent from the OCF. Any individual or company can contribute to the project, and this may influence OCF standards indirectly. However, being a member of the OCF can benefit from patent cross-licensing protection.

The Iotivity architectural goal is to create a new standard by which billions of wired and wireless devices will connect to each other and to the internet. The goal is an extensible and robust architecture that works for smart and thin devices.

5. CONCLUSIONS

The whole paper will present a design of IOT based smart monitoring and automated actuating sericulture system using COAP and WSN. The IOT will enable the end user to monitor and to actuate the sericulture system in real time by making use of an internet and sensors. COAP protocol will be successfully implemented for an application layer. Prototype will operates in real time for monitoring and actuation inside the system and preliminary test proves that implemented prototype is successfully capable to monitor the parameters in real time and to control the condition inside the deployed environment and has several advantages in term of remote monitoring, automated actuation to suitable condition inside the system, image processing to know the real time status in complete sericulture process, low cost of the system, flexibility, user friendliness and energy efficiency. Future work includes the field deployment of COAP-based sericulture sensors network and its connectivity to IPv6 backbone for real-time monitoring over the internet. In addition to temperature and humidity many more other parameter sensors can be interfaced with this system and to make it more smart and intelligent.

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NCETAR - 17

CATEGORY: CSE

A Review of Solutions to Avoid DNS Attacks on Net-Banking Systems

CHANNAKESHAVA RN
Department of Computer Science, Government Science College, Chitradurga, India
keshavarn@gmail.com.

ABSTRACT
This paper provides a study on existing security schemes in net-banking systems and their strengths and weaknesses. If the transactions carried through online are not secured enough customers or banks are exposed to threat of losing money. For ensuring secured transactions security is enforced in different levels encryption, OTP through phone, security pin etc. all these methods adopted for security will not deny intruder from reading the content, but makes the information unreadable for a third person. But the DNS Attacks completely compromise the banks website and all traffic routed to a fake website designed exactly the same. And the customer is also not aware of the site is fake as it displays the same website address and probably fake websites may contain the exact SSL certificates also. This paper will find how these DNS attacks are carried out then we will discuss the precautionary measures to be taken and will propose technique about how a client can safeguard himself even after a DNS spoofing has occurred.
Keywords: DNS, Poisoning, Trickle down, Caching, Spoofing, Phishing, Pharming.

I. INTRODUCTION.

With the increasing popularity towards cashless payments, and with many payments such as online shopping, utility bill payments etc., are accepting online payments internet banking is becoming important as it not only allows the payments but also allows do more with his account. As with all crucial data net banking transactions are very confidential and they are secured with SSL Certificates and encryption techniques during transactions. Hackers have more important motive money for their job will always attempt with different ways to break this security. As the banking system is protected with strong security and all these transactions are closely monitored. So normally hackers choose the weaker part of the system i.e, the end user or account holder. Normally hacking a customer's account is easier than hacking a banks server. Passwords, PINs or any access certificates issued to the customer are the things to be stolen.

II. SECURITY SCHEMES IN NET BANKING SYSTEMS.

To ensure a secured transactions through net banking many security measures are taken such as SSL, Kerberos, OTPs, CAPTCHA etc.

SSL (Secured Server Login) is a security protocol. The SSL protocol determines variables of the encryption for both the link and the data being transmitted. Transport Layer Security TLS Protocol is the successor of SSLv3. When a web browser attempts to access a website secured with SSL, a "SSL handshake" is executed between the browser and web server. A public key, private key and session keys are used in the SSL. Data encrypted using public key can be decrypted by private key and vice-versa. As encrypting using public key and private key uses lot of computation, they are used only during SSL handshake and for communication after establishing secured connection; session key is used to encrypt/decrypt all the data being communicated as shown in below Fig-1.

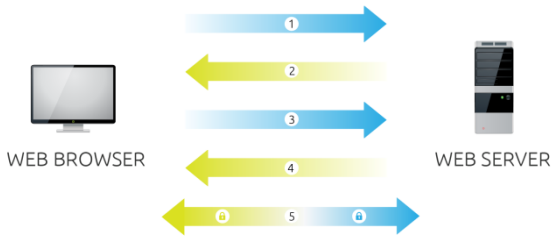

Fig-1 Communication during SSL Handshake.

SSL uses a 128 bit encryption which means key used for encrypting data to be transmitted maybe one among 2^128 possibilities. During the handshake process web server also installs an Extended Validation (EV) SSL Certificate which ensures the end user with assured confidentiality of the website. And this can be verified by the following signs in the browser. Green in the address bar (green bar or issuance name, see below)

- Website owner's company name in the address bar
- https:// at the beginning of the domain name
- Padlock in the address bar
- Organization information in the certificate details.

Kerberos: Kerberos is a network authentication tool uses port no 88. Kerberos uses on the basis of tickets to allow nodes communicating over a non-secure network prove their identity to each other in a secure manner. Kerberos is used for only authentications; Whereas SSL is an encryption technique for authentication as well as communication.

One Time Passwords (OTP): to ensure the person trying to login is genuine and authenticated person; most of the web-servers generates a random code and sends it to customer's phone or e-mail. And login is permitted only after introducing himself with the OTP through the window provided.

CAPTCHA: "Completely Automated Public Turing test to tell Computers and Humans Apart" a randomly generated image which contains text or numbers. This is to be again input for authentication through the same page. CAPTCHA avoids automated programs from trying with randomly generated passwords and other security data.

Device Identification: Web servers keep the tracking details of devices from which each user logging in. If the user is trying to login from a different device than a regular device them more stringent security is enforced. For the regularly logging in devices less security checks are adopted.

Transaction Monitoring for fraud detection: practices of user logging in are cross-checked with login failure patterns to block certain devices from logging in. Ex: if a user failed to login from certain device continuously, Security checks for that particular device are increased for further logins from that machine.

*Virtual Keyboard***:** most of the net-banking websites force the users to input login details from the virtual keyboards provided. This prevents key-loggers from tracking the key pressings while inputting usernames/passwords.

Personalized Messages: Some websites provide way to display personal message before the user provides password to login to ensure user is logged into genuine site.

Digital Signature: **is a digital code** generated and authenticated by public key encryption, digital signature is attached to documents transmitted through electronic messages to verify its authenticity.

Three things in the internet that may be attacket for getting information are. 1. Webserver, 2. Network Infrastructure, and 3. End user. As the banks websites are always monitored by experts of the networks so it is difficult for an attacker to hack a server of bank. Hackers will choose the easiest way to take passwords/pins from the users.

This stealing of passwords are executed by making the user login to the fake websites controlled by the attacker and as soon as the user input his authentication details the authentication details are stored by the hacker for his intended purpose obviously money.

In order to make the user login to the attacker's fake sites many different techniques are used; Phishing, Pharming, or DNS poisoning etc.

Phishing is done by sending fraudulent e-mails to the victims. The e-mail consists of links to fake sites where it will ask for inputting authentication requests. Or even some emails infect the browsers of the system and all the information input is leaked to a hacker.

Pharming is cyber attack which incorporates into the browser of the user or personal routers and redirects the web addresses to an intended site, which is a fake site with similar design as the normal net-banking site and even the web address is also shown as official, once the user inputs the authentication data that will be captured by the hacker.

DNS Attacks are done on the internet or network infrastructure which will eventually redirects the user to a faulty site. In all the cases above the Bank website is un aware of the things going on and it cannot help the end user in any way.

III. DNS ATTACKS.

DNS Servers are the ones which help to find the web server. These servers are targeted by the hackers to divert most of the client's logins to a fake site.

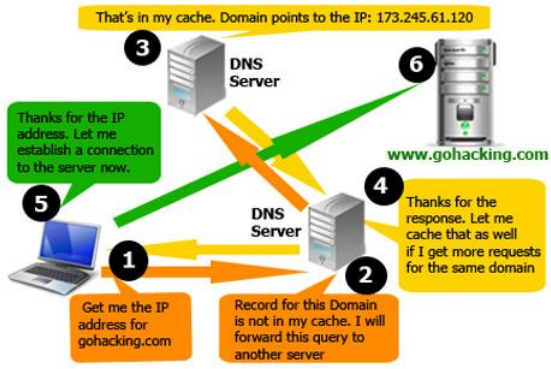

Fig-2: Trickle down DNS cache poisoning

DNS Attacks are centred towards servers of net-banking site, where a fake website with same appearance as original is developed and all the users logging to the site are diverted to that fake website. The fake website will catch the login information input from the users. As the users will be typing the website address of the bank and the same will be displayed in the address bar the users will be unaware that they have input sensitive information into a fake site.

DNS attacks may be done in different ways. Some of them are;

DNS poisoning and spoofing: Trickle Down DNS caching: DNS caching is a technique adopted by routers in the subnet to accelerate load times and reduce strain on DNS Servers. Once a system queries a DNS server and receives a response, it is stored in the local machine for faster reference. Storing of DNS response is used across the routers in a trickle down fashion. Information in one machine is used to update information in a nearby machine. If a router is compromised all the users using the routers will be logging to a fake website. The false DNS records, then trickle-down to the DNS caches on each user's machine.

This can be more serious if a major DNS Server is compromised. This can poison DNS servers of all service providers and there by the poison is trickle down to almost all machines of the web. This causes millions of users diverted to websites designed by a hacker.

DDoS Amplification Attacks: These attacks on DNS servers are not intended for stealing data but for destroying banks reputation by keeping banks website busy all the time so that one cannot login to the banks website. The attacker sends large amounts traffic to a target such as a server, to overload the server and crash it. Amplification attacks are done by sending requests to other systems rather than sending directly to DNS Server, which in turn sends the request to the victim server, which increases the intensity of the crash.

IV. RELATED WORK.

[1] Alex Polyakov in his paper DNS Spoofing and Poisoning: Trust, Danger, and Solutions discussed a method how an attacker has chance of $1/2^{16}$ to spoof the site so before that how it can be detected and blocked. [2] Karel Mikoin his lecture notes has taken the problem in banking to the real world and the solutions are more real life than technical. Such as OTPs, PKI, Hardware Password generators etc. [3] Georgios Kambourakis, Tassos Moschos, Dimitris Geneiatakis and Stefanos Gritzalis has goven a solution for DDoS Amplification attacks in their A Fair Solution to DNS Amplification Attacks, the

method keeps track of the requests and responses into a database and the number of responses without corresponding requests increases the system raises an attack alert. [4] DNS Cache Poisoning Definition and Prevention-Tom Olzak. [5] The State of the Art in DNS Spoofing- U. Steinhoff, A. Wiesmaier, and R. Araújo has suggested the use of specialized firewalls for securing the DNS servers, Split servers or two name servers, Port Randomizing, and stopping recursion, Concurrent Resolution Requests to Different Servers etc. [6] concludes to use up gradation of DNS Servers to BIND V9 and latest Operating system. Use of strong authentication and encryption like SSH, Splitting DNS Servers and disabling recursion etc. [7] A Comprehensive Analysis of Spoofing- P. Ramesh Babu, D.Lalitha Bhaskari, CH.Satyanarayana has proposed a spoofing prevention method (SPM) in which routers closer to the destination of a packet verify the authenticity of the packet. [8] Review Paper on Prevention of DNS Spoofing - Roopam, Bandana Sharma, CSE, Kurukshetra University, INDIA. [9] Spoofing Attacks of Domain Name System Internet - Simar Preet Singh, A Raman Maini has used to randomize TIDs and also ports used by name servers randomized then the possibility of the attacker spoofing the website becomes very very less in the order of 1/4227858432. [10] Sooel Son and Vitaly Shmatikov has explored possibilities for introducing fake website addresses in the victims cache with lookalike website names such as www.google.edu, www.google.mail.org etc. [11] The Threat of DNS Spoofing on Financial Services – Whitepaper by Trusteer is a corporate paper who proposes their software for identification of client which can be identified by the webserver.

V. CONCLUSION.

DNSSEC is a Security system by ICANN stands for “Domain Name System Security Extensions”. is a technology that was developed to, among other things, protect against such attacks by digitally 'signing' data so you can be assured it is valid. However, in order to eliminate the vulnerability from the Internet, it must be deployed at each step in the lookup from root zone to final domain name.

As general purpose firewalls installed in the DNS servers keep port 53 open for incoming requests it is difficult to block DDoS attacks, we require a special purpose firewalls and technologies to find and block such activities.

Solutions for DNS poisoning: DNS poisoning is very difficult to detect. It can last until TTL/Time to Live, Expires. Or Administrator realizes and resolves the problem. Depending on the TTL sometimes it may take days to solve the problem if undetected.

Regular program updating, Setting short TTL times and clearing DNS caches of local machines and Networking systems regularly is the method to solve the Issue.

DDoS Attacks can be stopped by configuring UTM Firewall to detect the artificial packets trying to flood the system. One more method is to spread the architecture to more than one DNS servers so that if one is crashed another will take up. If attacks are small, IP addresses sending such traffic can be blocked. And increasing the bandwidth of the receiving server is also one more technique.

Of all the solutions discussed above are about maintaining the security by network infrastructure and by web servers and DNS Servers. These things can be simplified if the customer or user takes a little risk of authenticating website by the information provided by the banks server.

All the above techniques will be precautionary measures for avoiding DNS spoofing. If DNS Spoofing has occurred and the client is provided a fake website, a client can still safeguard himself by detecting the DNS spoofing by the use of personalized messages.

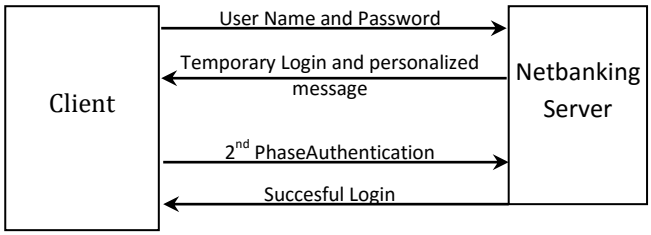

Fig-3(a). Succesful Personalized Message authentication

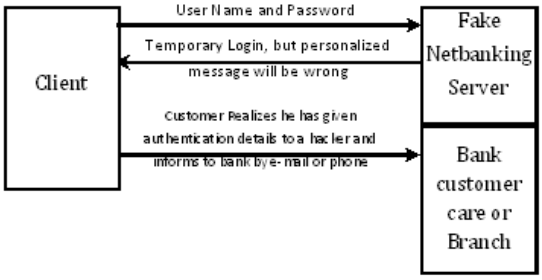

Fig-3(b). Wrong personalized message or no messages from Fake website.

In this model the client sets his personalized message and it may be modified any time later. The user will have to login with username and password. Then the net-banking server will reply with the personalised message given by the client. The client will get assurance that this is the original net-banking server. Then he will proceed with logging into next step with second password. Upon successful authentication, User is logged into the net-banking server.

If the DNS server is poisoned and fake website is loaded user will still login with his user name and password but the fake web server cannot return the personalized message as it can resemble the original web site but personalized message comes from authentication module of the net-banking server. So upon wrong message or no message user will come to know that he has come across DNS spoofing and he has entered his authentication information into a fake site. Customer has to contact with bank directly through phone or e-mail about this malicious attack. However customer account will not be hacked as customer's second authentication password is not hacked.

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AUTHOR PHOTOS AND BIOGRAPHY

Mr. Channakeshava RN, working as Assistant Professor in the Department of Computer Science, Government Science College, Chitradurga since from last 8 years. He has published 1 Research Paper in International Journal ijircce, and presented 7 papers in various national level conferences. He has served for Davanagere University as BOE Chairman (2013-14), BOE Member (2014-15), BOS Member (2014-17). His areas of interest are Networking and Communications, Security and IOT devices.

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NCETAR - 17

CATEGORY: CSE

SIMULATION OF URBAN MOBILITY (SUMO)

Shweta V Telgane, Poornima.R, Kiran, KavyaShree.L*

Assistant Professor, Dept. Computer Science and Engineering, MSEC, Bengaluru

*6Th sem students, Dept. Computer Science and Engineering, MSEC, Bengaluru

shwetatelgane@gmail.com, poornimaramgauni@gmail.com, Kiranp1331@gmail.com, kavyal1996@gmail.com

ABSTRACT

SUMO is an open resource traffic simulation package as well as net import and demand model components. We explain the current state of the package as well as future developments and extension. SUMO helps to investigate several study topics ex. route choice and traffic light algorithm or simulate a vehicular communication. Therefore the structure is used in different projects to simulate automatic driving or traffic management strategies. The traffic simulation offers a socket based interface to external applications, allowing interacting with a running simulation online. Values and states of objects the simulation consists of can be both retrieved and changes. SUMO has been used within different projects both by the DLR and by external organization.

Keywords-microscopic traffic simulation; traffic Management; open source; software.

INTRODUCTION

The DLR started the development of open source traffic simulation package SUMO back in 2001. Since then SUMO has Evolved into a Full featured suite of traffic modeling utilities including a Road network capable to read different sources formats, Demand generation and routing utilities from various input Sources (origin destination matrices, traffic counts, etc.), a High performance simulation usable for single junctions as Well as whole cities including a “remote control” interface (Traci) to adapt the simulation online. In this paper we will survey some of the recent developments and future prospects of SUMO. We start with an overview of the applications in the suite, showing how they help in preparing and performing a traffic simulation. Then, major research topics, which can be addressed using SUMO are presented. We then outline the usage of SUMO within some recent research projects. Finally we present recent extensions and discuss current development topics

THE SUMO SUITE

SUMO is not only a traffic simulation, but rather a suite of applications, which help to prepare and to perform the Simulation of a traffic scenario. As the simulation application “*Sumo*”, which is included in the suite, uses own formats for Road networks and traffic demand both have to be imported or generated from existing sources of different kind. Having the simulation of large-scale areas as the major application for *sumo* in mind, much effort has been put into the design and implementation of heuristics which determine missing, but needed attributes.

In the following, the applications included in the suite are presented, dividing them by their purpose: network Generation, demand generation, and simulation.

SUMO is a purely microscopic traffic simulation. Each Vehicle is given explicitly, defined at least by an identifier (Name), the departure time, and the vehicle’s route through the network. If wanted, each vehicle can be described more

Detailed. The departure and arrival properties, such as the Lane to use, the velocity, or the position can be defined.

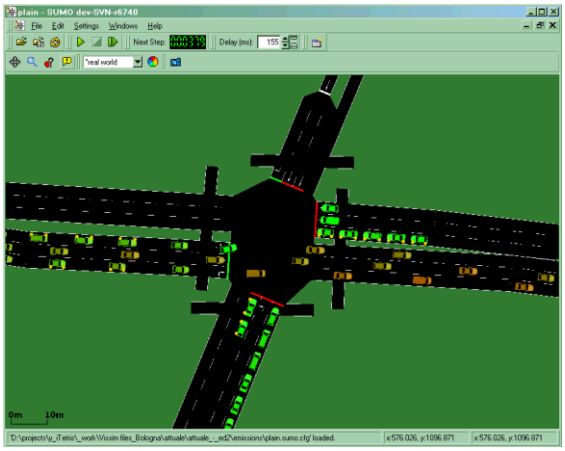


Figure 1

Each Vehicle can get a type assigned which describes the vehicles Physical properties and the variables of the used movement Model. Each vehicle can also be assigned to one of the Available pollutant or noise emission classes. Additional Variables allow the definition of the vehicle's appearance within the simulation's graphical user interface. In 2006 the simulation was extended by the possibility to Interact with an external application via a socket connection.

This API was implemented by Axel Wegener and his colleagues from the University of Lübeck, and was made available as a part of SUMO's official release. Within the ITETRIS project, see section IV.A, this API was reworked, integrating it closer to SUMO's architecture and specification.

TraCI is not the only contribution to SUMO from other parties. SUMO Traffic Modeler [1] allows to define a population for a given area and compute this population's mobility wishes which can be used as an input for the traffic simulation. The same is done by "*activitygen*" written by Piotr Woznica and Walter Bamberger from TU Munich. eWorld [2] allows to set up further environmental characteristics, such as weather condition and visualizes a running, connected simulation. In the following, the applications included in the suite are presented, dividing them by their purpose: network generation, demand generation, and simulation.

ROAD NETWORK GENERATION

SUMO road networks represent real-world networks as graphs, where nodes are intersections, and roads are represented by edges A lane contains geometry, the information about vehicle classes allowed on it, and the maximum allowed speed. Therefore, changes in the number of lanes along a road are represented using multiple edges. Such a view on road networks is common; though some other approaches, such as Vissim's [3] network format or the OpenDRIVE [4] format, exist. SUMO road networks can be either generated using an application named "*netgenerate*" or by importing a digital road map using "*netconvert*". *netgenerate* builds three different kinds of abstract road networks: "manhattan"-like grid networks, circular "spider-net" networks, and random networks. Each of the generation algorithms has a set of options, which allow adjusting the network's properties.

VECHILES AND ROUTES

Each vehicle is given explicitly, defined at least by a unique Identifier, the departure time, and the vehicle's route through the network. By "route" we mean the complete list of connected edges between a vehicle's start and destination. If needed, each vehicle can be described in a finer detail using departure and arrival properties, such as the lane to use, the velocity, or the exact position on an edge. Each vehicle can get a type assigned, which describes the vehicle's physical properties and the variables of the used movement model.

Each vehicle can also be assigned to one of the available pollutant or noise emission classes. Additional variables allow the definition of the vehicle's appearance within the simulation's graphical user interface A simulation scenario of a large city easily covers one million vehicles and their routes. Even for small areas, it is hardly possible to define the traffic demand physically. The SUMO suite includes some applications, which utilize different sources of information for setting up a demand. For large-scale scenarios usually so-called "origin/ destination matrices" (O/D matrices) are used. They describe the movement between so-called traffic analysis zones (TAZ) in vehicle numbers

per time. For use in SUMO these matrices must be disaggregated into individual vehicle trips with depart times spread across the described time span. Unfortunately, often, a single matrix is given for a single day, which is too imprecise for a microscopic traffic simulation since flows between two TAZ strongly vary over the duration of a day. For example, people are moving into the inner-city centers to get to work in the morning, and leave the inner-city area in the afternoon or evening. Such direction changes cannot be retrieved from an aggregated 24h matrix. Much more useful but only sometimes available are matrices with a scale of 1h. The SUMO suite includes "*od2trips*", an application for converting O/D matrices to single vehicle trips.

SUMO includes two further route computation applications. The first, "*jtrrouter*", uses definitions of turn percentages at intersection for computing routes through the network. Such an approach can be used to set up the demand within a part of a city's road network consisting of few nodes. The second, "*dfrouter*", computes routes by using, 3 information from inductive loop or other cross-section detectors. This approach is quite successful when applied to highway scenarios where the road network does not contain rings and the highway entries and exits are completely covered by detectors. It fails on inner-city networks with rings or if the coverage with detectors is low.

ON-LINE INTERACTION

In 2006, the simulation was extended by the possibility to interact with an external application via a socket connection. This API, called "TraCI" for "Traffic Control Interface" was implemented by Axel Wegener and his colleagues at the University of Lübeck [4], and was made available as a part of SUMO's official release. Within the iTETRIS project, see Section IV.B, this API was reworked, integrating it closer into SUMO's architecture. To enable on-line interaction, SUMO has to be started with an additional option, this obtains the port number to listen to. After the simulation has been loaded, SUMO starts to listen on this port for an incoming connection. After being connected, the client is responsible for triggering simulation steps in SUMO as well as for closing down the connection what also forces the replication to quit. The client can access values from almost all simulation artifacts, such as intersections, edges, lanes, traffic lights, inductive loops, and of course vehicles. The client may also change values, for example instantiate a new traffic light program, change a vehicle's velocity or force it to change a lane. This allows complex interaction such as online synchronization of traffic lights or modeling special behavior of individual vehicles.

A. VEHICULAR COMMUNICATION

The probably most popular application for the SUMO suite is modeling traffic within research on V2X – vehicle-to-vehicle and vehicle-to-infrastructure – communication. In this context, SUMO is often used for generating so-called "trace files", which describe the movement of communication nodes by converting the output of a SUMO simulation into a setup the used communication simulator can read. Such a post-processing procedure allows feeding a communication simulator with realistic vehicle behavior, but fails on simulating the effects of in-vehicle applications that change the vehicles' behavior. To investigate these effects, a combined simulation of both, traffic and communication is necessary [5]. For such research, SUMO is usually coupled to an external communication simulation, such as ns2 or ns3 [6] using TraCI. For obtaining a functioning environment for the simulation of vehicular communications, a further module that contains the model of the V2X application to simulate is needed. Additionally, synchronization and message excange mechanisms have to be involved.

B.Route Choice and Dynamic Navigation

The assignment of proper routes to a complete demand or a subset of vehicles is investigated both, on a theoretical base as well as within the development of new real-world applications. On the theoretical level, the interest lies in a proper modeling of how traffic participants choose a route –a path through the given road network – to their desired destination. As the

duration to pass an edge of the road graph highly depends on the numbers of participants using this edge, the computation of routes through the network under load is a critical step in preparing large-scale traffic simulations. Due to its fast execution speed, SUMO allows to investigate algorithms for this "user assignment" or "traffic assignment" process on a miniscule scale. Usually, such algorithms are investigated using macroscopic traffic flow models, or even using coarser road capacity models, which ignore effects such as dissolving road congestions. The SUMO suite supports such investigations using the *duarouter* application. Two algorithms for computing a user assignment are implemented, c-logit [7] and Gawron's [8] dynamic user assignment algorithm. Both are iterative and therefore time consuming. Possibilities to reduce the duration to compute an assignment were estimated and are reported in [9]. A further possibility to reduce the computational effort is given in [10]. Here, vehicles are routed only once, directly by the simulation and the route choice is done based on a continuous alteration of the edge weights during the simulation.

C. Traffic Light Algorithms

The evaluation of developed traffic light programs or algorithms for making traffic lights adaptable to current traffic situation is one of the main applications for microscopic traffic flow simulations. The first investigation in traffic lights was performed within the project "OIS" [11] where a traffic light control algorithm, which used queue lengths determined by image processing should have been evaluated. As a real-world deployment of the OIS system was not possible due to legal constraints, the evaluation had to be done using a simulation.

The simulation was prepared by implementing a real-world scenario, including real-world traffic light programs. The simulation application itself was extended by a simulated sensor, which allowed re-claiming queue lengths in front of the intersection similar to the real image processing system. The traffic light control was also implemented directly into the imitation. At the end, the obtained simulation of OIS-based traffic control was compared against the real-world traffic lights, [12] shows the results. In ORINOKO, a German project on traffic management, the focus was put on educating the weekly switch plans within the fair trade center area of the city of Nürnberg. Here, the initial and the new algorithm for performing the switch procedure between two programs were implemented and evaluated. Additionally, the best switching times were computed by a brute-force iteration over the complete simulated day and the available switch plans. By distinguishing different vehicle types, SUMO also allowed to simulate a V2X-based emergency vehicle prioritizing at meetings [13]. Other approaches for traffic light control were also investigated and reported by other parties, see, e.g., [14], or [15]. As mentioned before, the first investigations were performed by fulfilling the traffic light algorithms to estimate directly into the simulation's core. Over the years, this approach was found to be hard to maintain. Using TraCI seems to be a more justifiable procedure currently.

D. Evaluation of Traffic Surveillance Systems

Simulation-based evaluation of surveillance systems mainly targets on predicting whether and to what degree the developed surveillance technology is capable to fulfill the posed needs at an assumed rate of recognized and/or equipped vehicles. Such investigations usually compare the output of the surveillance system, fed with values from the simulation to the according output of the simulation. An example will be given later, in Section IV.A. On the project "Traffic Online". A direct evaluation of traffic surveillance systems' hardware, for example image processing of screenshots of the simulated area, is uncommon, as the simulation models of vehicles and the environment are too coarse for being a meaningful input to such systems. Nonetheless, the simulation can be used to compute vehicle trajectories, which can be enhanced to match the inputs needed by the evaluated system afterwards. An example of such an Enquiry is the evaluation of hyperspectral sensors reported in [3]. Besides evaluating developed following systems, possibilities to incorporate traffic measurements of

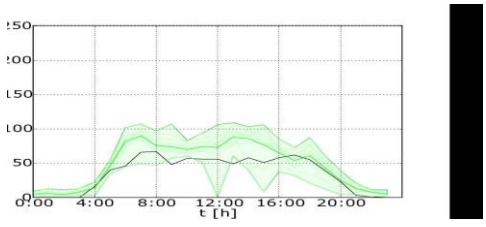
various kinds into a simulation are evaluated, see for example Section IV.C. On "VABENE".

RECENT AND CURRENT RESEARCH

SUMO was used in past research projects performed by the DLR and other parties. In the following, some of the recently performed projects are described.

TRAFFIC ONLINE

Within the Traffic Online project, a system for determining travel times using GSM telephony data was designed, implemented, and estimated. SUMO was used to authenticate this system's functionality and robustness. In the following, we focus on the simulation's part only, neither describing the Traffic online system itself, nor the evaluation results. The outline for using the simulation was as follows. Real-world scenarios were set up in the simulation. When being executed, the simulation was responsible for writing per-edge travel time information as well as simulated telephony behavior values. The traffic online system itself obtained the latter, only, and computed travel times in the underlying road network. These were then compared to the travel times computed by the simulation. Or validating the Traffic Online system, a model of telephony behavior was implemented, first. The telephony model covered the probability to start a call and a started call's duration, both retrieved from real-world data. For a satisfactory simulation of GSM functionality, the real-world GSM cell topology was put onto the modeled road networks. It should be noted, that dynamic properties of the GSM network, such as cell size variations, or delays on passing a cell border, have not been considered. Figure 2 shows the results of validating the simulated telephone call number (black) against the numbers found in real-world data (green, dark green showing the average call number) over a day for two selected GSM cells.



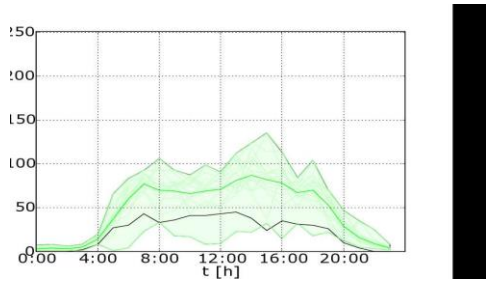


Figure 2. Validation of the telephony behavior in Traffic Online

A. *i*TETRIS

The interest in V2X communication is increasing but the Deployment of this technology is still expensive, and ad-hoc implementations of new traffic control systems in the real world may even be hazardous. For research studies where the benefits of a system are measured before it is deployed, a simulation framework, which simulates the interaction between vehicles and infrastructure is needed, as described in III.A. The aim of the iTETRIS project was to develop such a framework, combination the communication simulator Ns3 and SUMO using an open source system called "iCS" – iTETRIS Control System – which had to be developed within the project. In contrary to other, outdated solutions such as TraNS, iTETRIS was meant to deliver a sustainable product, supported and continued to be developed after the project's end. Besides implementing the V2X simulation system itself, which was already presented in Section III.A., the work within iTETRIS included a large variety of preparation tasks and – after completing the iCS implementation of the evaluation of traffic management applications as well as of message routing protocols. The preparations mainly included the investigation of real world traffic problems and their modelling in a simulation environment. The city of Bologna, who was a project partner in iTETRIS, supported traffic simulation scenarios covering different parts of the town, mainly as. Inputs for the simulations Vissim and VISUM, both commercial products of PTV AG. These circumstances were converted into the SUMO-format using the tools from the SUMO package. Besides the road networks and the demand for the peak hour between 8:00am and 9:00am, they

included partial definitions of the traffic lights, public transport, and other infrastructure information. One of the project's outputs is a set of in-depth descriptions of V2X-based traffic management applications, including different attempts for traffic surveillance, navigation, and traffic light control. In the following, one of these applications, the *bus lane management*, is described, showing the complete application design process, starting at problem recognition, moving over the design of a management application that tries to solve it, and ending at its evaluation using the simulation system. A more detailed report on this application is [9]. Public transport plays an important role within the city of Bologna, and the authorities are trying to keep it attractive by giving lanes, and even streets free to public busses only. On the other hand, the city is confronted with event traffic – e.g., visitors of football matches, or the fair trade centre – coming in the form of surplus private passenger cars. One idea developed in iTETRIS was to open bus lanes for private traffic in the case of additional demand due to such an event. The application was meant to include two sub-systems. The first one was responsible for determining the state on the roads. The second one used this information to decide whether bus lanes shall be opened for passenger cars and should inform equipped vehicles about giving bus lanes for usage.

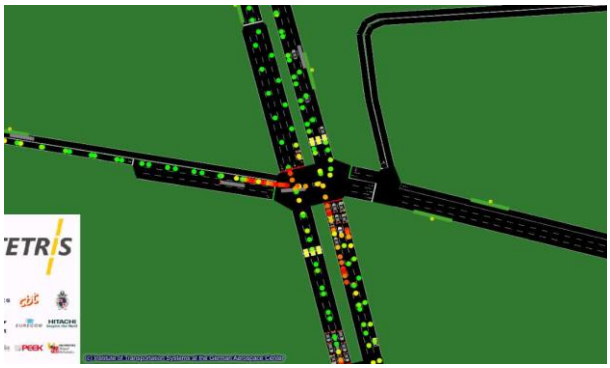


Figure 3. Speed information collection by RSUs. Each dot represents one data point, the color represents the speed (green means fast, red slow).

In order to use standardised techniques, traffic Investigation was implemented by collecting and averaging the speed information contained in the CAMs (cooperative sentience messages) at road side units (RSUs) placed at major intersections (see Figure 3). As soon as the average speed falls below a threshold, the application, assuming a high traffic amount, gives bus lanes free for passenger cars.The RSU sends then the information about free bus lanes to vehicles in range.

B.VABENE

Traffic is more and more important for large cities. Big events or even catastrophes might cause traffic jams and problems to the transport systems and might even be dangerous for the people who live in the city. Public authorities are responsible to take the according action to prevent the worst case. The objective of VABENE is to implement a system which supports the public authority to decide which action should be taken. The focus in this project lies on simulating the traffic of large cities. The system shows the current traffic state of the Whole traffic network which helps the traffic manager to realize when a critical traffic state will be reached. To simulate the traffic of a large region like Munich and the area around Munich a mesoscopic traffic model was implemented into SUMO which is available for internal proposes only. The simulation is restarted every 10 minutes, loads a previously saved state of the road network and computes the state for half an hour ahead. While running, the simulation state is calibrated using induction loop measures and measures collected from airborne traffic surveillance system. Both, the current traffic state as well as the Prediction of the future state is presented to the specialists. This system is the successor of demonstrators used during the pope's visit in Germany in 2005 and during the FIFA World Cup in 2006.

C. City Mobil

Microscopic traffic simulations also allow the evaluation of large scale effects of changes in vehicle or driver behavior such as the introduction of automated vehicles or electro mobility. The former was examined with the help of SUMO in the EU project CityMobil where different scenarios of (partly) automated cars or personal rapid transit were set up on different scales, from a parking area

up to whole cities. On a small scale, the benefits of an autonomous bus system were evaluated. In this scenario, busses are informed about waiting passengers and adapt their routes to this demand. On a large scale, the influence of platooning vehicles was considered, using the model of a middle-sized city of 100.000 inhabitants. Both simulations showed positive effects of the transport automation.

V. RECENT EXTENSIONS

A. Emission and Noise Modeling

Within the iTETRIS project, SUMO was extended by a model for noise emission and a model for pollutant emission and fuel consumption. This was required within the project for evaluating the ecological influences of the developed V2X applications. Both models are based on existing descriptions. 7 models for noise emission and 15 pollutant emission / fuel consumption models were evaluated, first. The parameter they need and their output were put against values available within the simulation and against the wanted output, respectively. Finally, HARMONOISE [7] was chosen as noise emission model. Pollutant emission and fuel consumption is implemented using a continuous model derived from values stored in the HBEFA database [5]. The pollutant emission model's implementation within SUMO allows to collect the emissions and fuel consumption of a vehicle over the vehicle's complete ride and to write this values into a file. It is also possible to write collected emissions for lanes or edges for defined, variable aggregation time intervals. The only available noise output collects the noise emitted on lanes or edges within predefined time intervals. A per-vehicle noise collecting output is not available. Additionally, it is possible to retrieve the noise, emitted pollutants, and fuel consumption of a vehicle in each time step via TraCI. Also, collected emissions, intake, and noise level for a lane or a road can be retrieved. Besides measuring the level of emissions or noise for certain scenarios, the emission computation was also used for investigating new concepts of vehicle routing and Enslavements between the traffic light signal plans and emissions [5].

B. Person-based Intermodal Traffic Simulation

A rising relevance of intermodal traffic can be expected due to ongoing urbanization and increasing environmental concerns. To accommodate this trend SUMO was extended by abilities for simulating intermodal traffic. We give a brief account of the newly added concepts and report on our experience with person-based intermodal simulation. The conceptual center of intermodal-traffic is the individual person. This person needs to undertake a series of trips each of which may be taken with a different mode of transport such as personal car, public bus or walking. Trips may include traffic related delays, such as waiting in a jam, waiting for a bus or waiting to pick up an additional passenger. While all trips may be simulated independently it is important to note that earlier delays influence later trips of the person. The above concept is reflected in an extension of the SUMO route input. One can now specify a person as list of rides, stops and walks. A ride can stand for any vehicular transportation, both private and public. It is specified by giving a starting edge, ending edge and a specification of the allowed vehicles. Stops correspond to non-traffic related activities such as working or shopping. A walk models a trip taken by foot but it can also stand for other modes of transport which do not interfere with road traffic. Another extension concerns the vehicles. In addition to their route, a list of stops and a line attribute can be assigned. Each stop has a position, and a trigger which may be either a fixed time, a waiting time or the id of a person for which the vehicle must wait. The line attribute can be used to group multiple vehicles as a public transport route. These few additions are sufficient to express the above mentioned person trips. They are being used within the TAPAS [10] [11] project to simulate intermodal traffic for the city of Berlin. Preliminary benchmarks have shown that the simulation performance is hardly affected by the overhead of managing persons. In the future we would like to address the following issues:

- Online redirecting of persons. At the moment routing across trips must be undertaken before the start of the simulation. It is therefore not possible to compensate a missed bus by walking instead of waiting for the next bus.
- Visualization of persons.
- Smart integration of bicycles. Depending on road infrastructure bicycle traffic may or may not interact with road traffic. Import modules for importing public time tables.

CURRENT DEVELOPMENT

A. Car-Following and Lane-Change API

Within the I TETRIS project, first steps towards using other models than the used Krauß extension for computing the vehicles' longitudinal movement were taken. An API for Implementing and embedding other car-following models was implemented. Some initial implementations of other models exist, though not all of them are able to deal correctly with multi-lane urban traffic. The work is assumed to continue, especially as the decision was taken to concentrate on extending the default model instead of sticking to a well-defined scientific model. What is already possible to do with car-following models is also meant to be implemented for lane-change models.

B. Model Improvements

One of the initial tasks SUMO was developed for was the Comparison of traffic flow models, mainly microscopic car following and an e-changing models. This wish requires a clean implementation of the models to evaluate. On the other hand, most models are concentrating to describe a certain behavior, e.g. spontaneous jams, making them inappropriate to be used within complex scenarios which contain a large variety of situations. As a recent conclusion, next steps of SUMO Development will go beyond established car-following models. Instead, an own model will be developed, aiming on its inconsistency mainly. In a first step, the internal representation of road networks will be revalidated and cleaned. Then, the work will aim on coupling the car following and the lane-changing models closer

.

C: Interoperability

SUMO is not the only available open source traffic simulation platform. Some other simulations, such as MAT sim [26], offer their own set of tools for demand generation, traffic assignment etc. It is intended to make these tools being usable in combination with SUMO by increasing the competencies to exchange data. Besides connecting with other traffic simulation packages, SUMO is extended for being capable to interact with driving or world simulators. Within the DLR project "Sim World Urban", SUMO is connected to the DLR driver simulator, allowing performing Simulator test drives through a full-sized and inhabited city area.

D. Network Editor

Since 2011, a graphical network editor is implemented. It allows to set up a complete road network for SUMO, including all needed information, such as correct lane number, speed limits, connections across intersections, and traffic lights. For now, this tool is not part of the open source package, but is held for core purposes only.

SUMMARY

We have presented a coarse overview of the microscopic traffic simulation package SUMO, presenting the included application along with some common use cases, and the next steps within the development. We kindly invite the reader to participate in the development.

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Self-healing Cognitive Networks for defence against attacks

Rajagopala M V[1], Dr. S C Linga Reddy[2]

[1]Technical Specialist, HCL Technologies, Chennai, India
Email:raju.medpur@gmail.com
[2]HOD, Dept. of CSE, Alpha College of Engineering, India
Email: sclingareddy@gmail.com

ABSTRACT

Cognitive Network is a promising methodology for the next-generation 'Wireless Network' ($\boldsymbol{WN}$) in order to provide efficient use of limited spectrum resources. Furthermore, to fulfill the fast growing demand for wireless services and applications. Security issue in Cognitive Network ($\boldsymbol{CN}$) is very much important but not addressed well enough. In this paper, we focusing on security problem that arises from the 'Primary User' Emulation ('$\boldsymbol{PUE}$') attacks in $\boldsymbol{CN}$. We present the inclusive introduction of PUE attacks and to locate the PUE attackers, we proposed the Received Signal Strength ($\boldsymbol{RSS}$) based algorithm. The location verification and energy detection from every CRs node has done by the RSS-CRB (Cramer-Rao bounds). Result analysis has presented to validate the effectiveness of our proposed system methodology.

Introduction

The currently used wireless network has categorized by the static spectrum policy, in which the government policy only provides access of spectrum to the licensed users [1]. Because of increasing in the number of user, there are numerous demand of spectrum allocation, which causes the fading of government policy. In spite of spectrum bands shortage, it has found that the standing spectrum bands has also not used properly.

To overcome the inefficient spectrum use, a new Cognitive Network (CN) technology developed that is based upon the Dynamic Spectrum Access (DSA) technique [2]. By this, the spectrum utilization improves and, provides many individual and social benefits. The objective of CN technology is to utilize/consume the unutilized spectrum of primary user (PU), accomplish the secondary user's requirement irrespective of location, and time (any place and any time). Figure 1.1 shows the dynamic spectrum access, where empty space shows the spectrum holes that are not in use and the block of spectrum shows the occupied spectrum, which are being use by PU. Due to the flexibility CN, it is vulnerable for the various threats and the security problems, which can degrade the network performance. A very little attention has given in CN to the security aspects. In the design and analysis phase of the secure distribution system, a trust is the important feature [3]. They are mutually inclusive and complementize to each other.

There are many different attacks such as jamming attacks [3] [9] [11], cross-layer attacks [12], objective-function attack [8], and primary-user emulation attack ('$PUEA$') [6] [7], etc. In this paper, we are concentrating on $PUEA$; the major challenges associated with this to 'accurately distinguish' the PU signals from the secondary user (SU) signals. In a CN network, the first priority has always given to a PU to 'access' the channels. If a PU start to transmit across the frequency band, which occupied by a SU, it is necessary to leave that specific occupied band immediately. Equally, when there is no active PU's present within a range of

frequency, then SU is having equal rights to occupy that frequency channel.

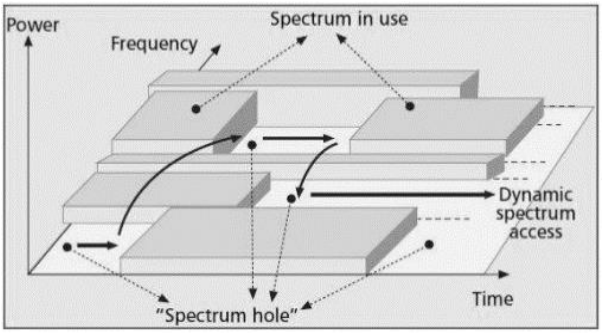

Figure 0.1: Dynamic Spectrum Access (DSA) technique

Based upon this technology, there is more chances to mimic the PU's spectral characteristics through the malicious SU's in order to achieve the priority access of wireless channels. This scenario referred as the PU Emulation (PUE) [8] [9] that is carried out via a malicious SU emulating a PU 'or' masquerading itself (i.e., SU) as the PU.

In this paper, we propose Received signal Strength (RSS) localization in CN to determine a position of the Primary transmitters. The RSS localization technology does not need the active isotropic radiated-powers for emitting the primary signal by transmitter [10]. Here we study the average power estimation and position using the RSS localization based approach in the CN.

This paper organized as follow: section II represents the related work; section III represents our proposed model, and section IV represents the experimental result and result analysis.

Related Work

A prior research on the passive localization can also be categorized into 3 classes that based on measurement types, shared among the sensors to estimates location [11]. The RSS based algorithm has used to measure a received power from primary user to deliver coarse-grained prediction at a minimal computational and hardware cost. RSS based algorithm introduce both range-free and range-based techniques [12].

The authors of [13] propose methodologies to find location of attackers by using the arrival time difference instead of RSS-localization. Therefore, that model require modification in physical layer to determine the time delays of signal. Device-unique features (fingerprints sensor) along with user unique IDs has used in [14] [15] [16] for detect the attackers in CN. These fingerprints are directly feature extracted from the transmitted analog signal by the (NN) Network nodes that vary device to device due to of inevitable alterations between the hardware components of radio interface. For measuring those different features, it requires signals analysis at in physical Layer (PL) level that excess beyond the low-cost capabilities of wireless sensor network devices.

K. Sato et al. [17] has proposed a power constructed methodologies using the kriging-based radio-environment-map (REM), to achieve the more efficient 'spectrum sharing'. This methodology dramatically increases the PU protection performance. Further [18]; in developing the CN work more effectively through presenting a "centroid" based license user "localization technique" to obtain the PU location using RSS. This technique can help to obtain information from three SU's and concept of centroid to achieve the localization process.

In paper [19], the problem has addresses of replay attack and detecting PUE relay that based on RSS-localization technique in the cognitive wireless sensor network. They proposed the usage of co-operative detection technique that based on LRT (Likelihood Ratio Test) and for most of the scenarios, they uses a free-scheme non-parametric model to recognize PUE attacks.

Proposed Model

Considering N cognitive radio's (CRs) for localize a single PU. The PU location has given in two-dimensional as $loc_P = [x_P, y_P]^T$ and n^{th} CR as $loc_n = [x_n, y_n]^T$ respectively. All location of CR in observational period is consider as static. The measurement of RSS at n^{th} CR is demonstrate as $\hat{U}_n \triangleq Pow_T \frac{c_0 10^{-s_n/10}}{d_n^{\gamma}} Watt$, Where transmit power denoted by Pow_T, c_0 is the average (constant) multiplicative gain at a reference distance. The distance between PU and CR given by $dis_n = \|loc_n - loc_P\|$, the γ denotes a path loss exponent and, $10^{-s_n/10}$ is random variable, which reflects shadowing.

The RSS generally expressed in dBm with transformation $\widehat{\emptyset_n} = 10\log_{10}(1000\hat{\mathfrak{U}}_n)$ and it given as:

$$\widehat{\emptyset_n} = 10\log_{10}(1000 Pow_T c_0) - 10\,\gamma\,\log_{10} dis_n - s_n \triangleq \overline{\emptyset}_n - s_n \quad (1)$$

RSS measured from all the CRs is denote collection as $\widehat{\emptyset} = [\widehat{\emptyset}_1, \widehat{\emptyset}_2, \ldots \widehat{\emptyset}_N]^T$. $\widehat{\emptyset}$ conditional distribution (for the given loc_P) is $\emptyset \sim \aleph\left(\overline{\emptyset},\ \Omega_s\right)$, where Ω_s and $\overline{\emptyset} = [\overline{\emptyset}_1, \overline{\emptyset}_2, \overline{\emptyset}_3, \ldots, \overline{\emptyset}_N]^T$ is a co-variance matrix of collected shadowing variables s i.e., $s = [s_1, s_2, s_3 \ldots, s_N]^T$ that is given by $\{\Omega_s\}_{mn} = \sigma_s^2 e^{-\|loc_m - loc_n\|/X_c}$, where the X_c is correlation distance under the correlated nodes of shadowing effects.

The primary user localization problem uses the RSS to obtain the estimated location $\hat{loc}_P \triangleq [\hat{x}_p, \hat{y}_p]^T$. The RMSE (Root mean square error) of predicted localization given by

$$RMSE \triangleq \sqrt{\mathbb{E}[\|\hat{loc}_P - |loc_P\|^2]} \quad (2)$$

In the far-field narrowband scenario, the reading of RSS at each antennas are identical.

Here, we derive the RSS Fisher Information Matrix (FIM) $\mathbb{F}_{\widehat{\emptyset}}$ and the corresponding RMSE bound for the fixed number of CR placement.

The CRB (Cramer-Rao bounds) and RMSE for the RSS, derive for only localization. The RSS measurements, the unbiased covariance estimation of a PU at location $\hat{loc}_P$ is the lower bounded via a CRB.

$$\Omega_{\hat{loc}_P} \triangleq \mathbb{E}\left[(\hat{loc}_P - \mathbb{E}[\hat{loc}_P])\,(\hat{loc}_P - \mathbb{E}[\hat{loc}_P])^T\right] \geq \mathrm{F}^{-1} \quad (3)$$

Where, the Fisher information matrix (FIM 2×2) given by equation (4)

$$\mathrm{F} = -\mathbb{E}_{\widehat{\emptyset}}\left[\frac{\partial^2}{\partial loc^2{}_P} \log \mathrm{p}(\widehat{\emptyset}\,|loc_P)\right]. \quad (4)$$

Therefore, the bounded RMSE given by $RMSE \geq \sqrt{\{\mathrm{F}^{-1}\}_{11} + \{\mathrm{F}^{-1}\}_{22}}$, where the $\{\mathrm{X}\}_{ij}$ represents ij^{th} element of the X matrix.

The drive formula of RSS FIM $\mathrm{F}_{\widehat{\emptyset}}$ given by equation (5)

$$\mathrm{F} = \left\{-\mathbb{E}_{\widehat{\emptyset}}\left[\frac{\partial^2}{\partial loc^2{}_P} \log \mathrm{p}(\widehat{\emptyset}\,|loc_P)\right]\right\} \triangleq \mathrm{F}_{\widehat{\emptyset}} \quad (5)$$

ρ_n is the SNR (Signal-to-Noise Ratio) that is given by equation (6)

$$\rho_n = \hat{U}_n / P_M \quad (6)$$

Where, P_M measurement noise power.

Experimental Result And Analysis

Windows 10 'operating system' with 2.80 GHz i5 processors (64-bit) has used for experimental analysis and RAM of 8 GB. Here, we have considering 5 scenarios where, 10 nodes has increased for every scenario; this has done in Matlab 2016b. In this section, the graphical and numerical results are present for RSS CRBs to study the localization performance at different node density. The derived bounds are compare with the joint constant RSS with CRB to show the new bound advantage. Practical localization performance algorithm shows the how much close a CRBs has achieved.

The basic parameter setting has done in setup that is summarize as follows. For every scenario, a fixed number of CRs has uniformly situated in the radius circle of $R = 150m$ and the radius of the forbidden region $R_0 = 50m$, centered

around with PU that location $loc_P = [0\,,0]^T$ for generality without loss and simplicity. The transmitted power of primary user $P_T = 20dBm\,(100mW)$ that is generalize radiation power of the IEEE (802.11b/g) wireless LAN transmitters (for $20MHz$ channel's in the ISM bands). The noise measurement power $P_M = -80dBm\,(10\,pW)$ that is moderate estimated noise. The shadowing standard deviation and path-loss exponent are $\sigma_s = 5\,dB$ and $\gamma = 5$ respectively. The channel setting and the power result in a minimum and average received SNR of $-10dB\ and\ 10dB$, respectively. Number of antennas N_a at each node of CR is two and uses 50 samples for every localization period.

The RSS base CRB algorithm has applied to aggregate the all nodes energy. Afterwards, aggregated energy has applied for comparison with the adaptive preset threshold values. From that comparison, we can determine the PUE attack signal is there or not, the procedure of detection has terminated and a corresponding conclusion has made.

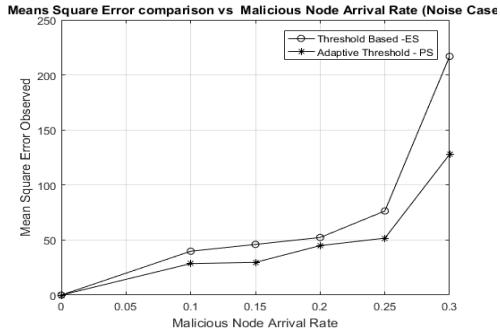

Figure 0.1: MSE observed in terms of arrival rate of malicious nodes.

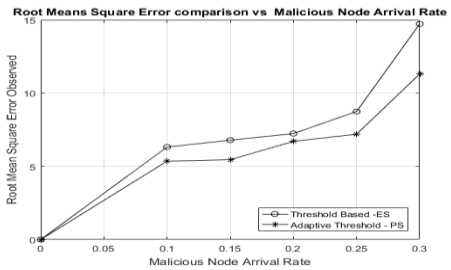

Figure 0.2: RMSE observed in terms of arrival rate of malicious nodes.

Fig IV.1 shows the MSE observed in terms of arrival rate of malicious nodes for both existing system and proposed system. Considering 10 nodes, the arrival rate of malicious node is 0.1, where the observed Mean Square Error (MSE) of proposed system is 28.2% less compare to existing approach. From node density of 20, 30, 40 and 50, we observe the decrement in proposed system MSE value of 35.5%, 14%, 32.32% and 41%. Fig IV.2 represent the observed RMSE (Root Mean Square Error) in terms of arrival rate of malicious nodes. Our obtained proposed approach RMSE values are 15.27%, 19.7%, 7.33, 17.7%, and 23% lesser compared to the existing system for different node density.

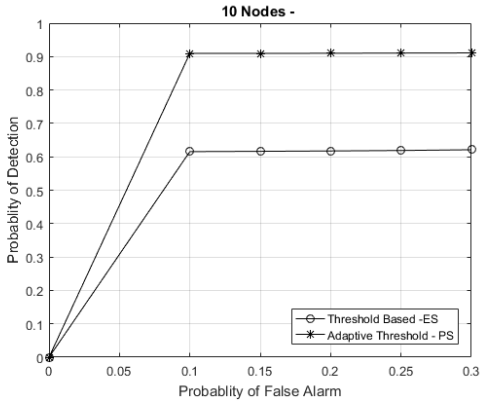

Figure 0.3: 10 Nodes- PUE attack detection probability (P_D) in terms of false alarm probability (P_{FA})

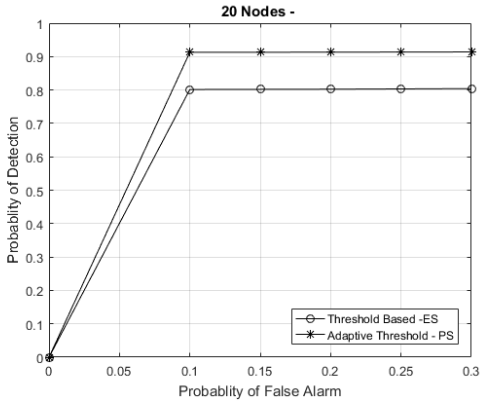

Figure 0.4: 20 Nodes- PUE attack detection probability in terms of false alarm probability.

The results of 10 nodes, probability of false alarm $(\mathrm{P_{FA}})$ versus probability of detection $(\mathrm{P_D})$ shown in

Fig. IV.3. Where the existing threshold based system [20] has compared with our proposed adaptive-threshold system, with the pre-defined false alarm probability.

From 0.1 to 0.3 of P_{FA} , five-node result has obtained where our proposed system performed 31.69% better compared to an existing system. Figure IV.4 shows for 20 Nodes- PUE attack detection probability in terms of false alarm probability. In this, the average improvement of proposed system has obtained of 12.64%.

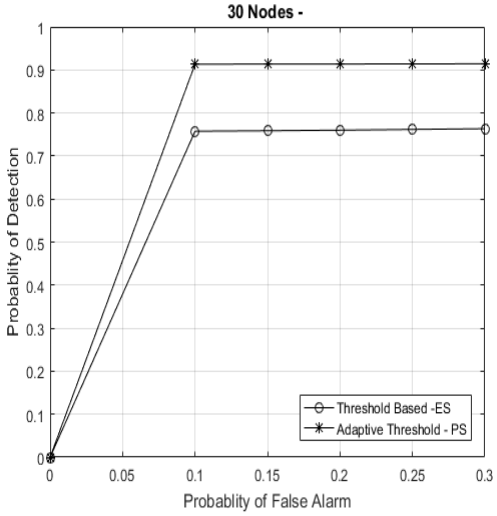

Figure 0.5: 30 Nodes- PUE attack detection probability in terms of false alarm probability.

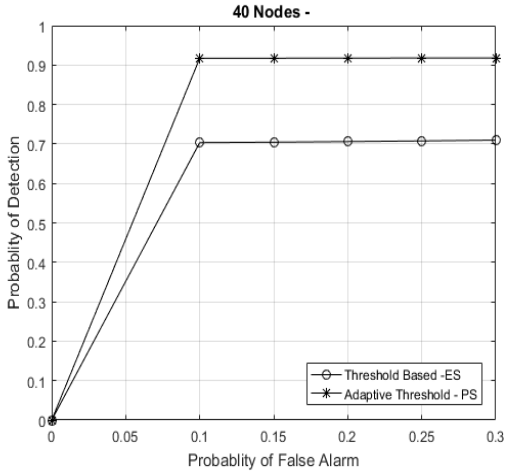

Figure 0.6: 40 Nodes- PUE attack detection probability in terms of false alarm probability.

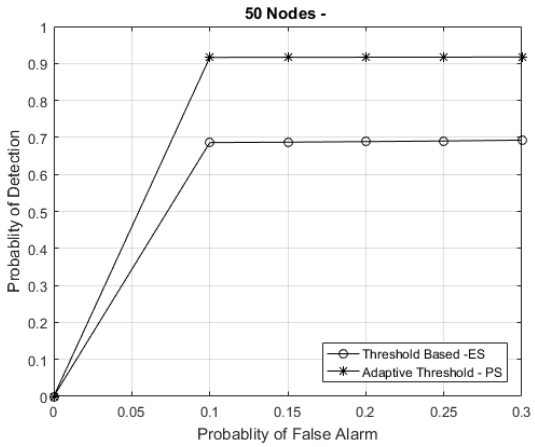

Figure 0.7: 50 Nodes- PUE attack detection probability (P_D) in terms of false alarm probability (P_{FA})

Similarly, for 30, 40, and 50 nodes the average improvement in probability detection is observe as 17.05%, 22.9% and 24.56%, which shown in graphical representation Fig IV.5, Fig IV.6 and Fig IV.7. From these result, it can observe from every node density our proposed system performing considerable well as compared to the existing system approach.

Conclusion

In this paper, we are mainly focuses on a PUE attack, which causes security problems in the Cognitive Networks. To detect the malicious users that present in CNs, we proposed a RSS based localization algorithm and, the CRB approach has consider performing for fixed cognitive radio placement. In RSS based approach, an adaptive threshold has applied after receiving the energy of signal from CRs, which causes the better performance in RSS-CRB algorithm. The guideline has given in terms of antenna array and number of nodes, that to achieve a localization accuracy. From result analysis, it is observe that the achievable MSE and RMSE decrement in every node density. Moreover, the detection probability has increases in terms of false alarm in our adaptive threshold based proposed system. Furthermore, it can be useful for the practical localization 'system-design' and node placement.

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AUTHORS PROFILE

Mr. Rajagopala M V is a Ph.D student in Computer science at Visvesvaraya technological university,Karnataka. Currently he is working as Technical Specialist in HCL technology, Chennai. He received the BE(CSE) degree from Kuvempu University, Karnataka and M. Tech (CNE) from Visvesvaraya Technological Univerisy Belgaum in 2000 and 2010 respectively. His research research interests are Network security, Coginitive networks, Wireless sensor networks.

Dr. S.C.Lingareddy received Ph.D degree in Computer Science from JawaharlalNehru Technological University Hyderabad. Currently he is working as Head of the Department of Computer Science and Engg. Alpha college of engineering, Bangalore. He received the B.E(CSE). degree from Karnataka University Dharwad and M.Tech.(CSE) degrees from Visvesvaraya Technological University Belgaum. in 1994 and 2004, respectively. He is a member of IEEE, ISTE. CSI, His research interests are Network Security, Information Security, Wireless sensor Network, Cognitive Radio Network.

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CATEGORY: CSE

A SURVEY ON EXTENSION OF WIRELESS SENSOR NETWORK LIFETIME WITH ENERGY BALANCE GLOBALLY

PADMAVATHY[1], REKHA B.N[2], VISHWANATH.H[3]

Department of Computer Science, REVA University Kattigenahalli, Bangalore, India
[1]chimmalapadmavathy88@gmail.com; [3]vishwanath.rh@reva.edu.in
[*]Sir M V I T
Hunasamaranahalli, Yelahanka, Bangalore-562157, India

ABSTRACT

Energy utilisation continues as a foremost obstacle for full deployment and exploitation of wireless sensor network (WSN) expertise nowadays. Since a large no of sensor nodes are required to enhance the fault tolerance of wireless sensor network, can lead to excessive resources wastage especially. Energy and communication ability is important during designing of a routing protocol in wireless sensor networks so that sensing data can be transmitted to the receiver.

The aim of the proposed method is to make sensor nodes supply their energy roughly at the same time, which is reached by declaiming the load balance problem at both the region and node levels. In the region level, evolutionary game theory (EGT) is used to equalize the traffic load to obtainable sub regions. At the node level, classical game theory (CGT) is used to select the best node to equalize the load in the chosen sub region. This two-level approach is shown to be a successful result for load balancing and elongating network lifetime. This survey shows the use of EGT and CGT in designing a robust protocol that offers sufficiently great improvement over existing protocols in elongate network lifetime.

Key Words:- Energy balance, geographical routing protocols, game theory, wireless sensor networks.

I. INTRODUCTION

Now days all electrical devices depends on the life of the battery and energy utilisation. It is essential to optimise their energy utilisation to increase the battery life. Optimising the energy utilisation of the network interface can be important, particularly for smaller devices. Recent research in energy conservation strategies has targeted wireless networks that are organized around base stations and regional servers, which do not have the limitations associated with small, portable devices. Fast development of system miniaturization, wireless connection, on-chip signal processing has promoted the development of wireless sensor expertise, which has endowed its broad submissions from condition founded upkeep to developed system monitoring and ecological feeling. Although, power utilisation still continues as a major obstacle for the full deployment and exploitation of this technology, although electric electric batteries can be recharged, e.g. through solar-energy-harvesting mechanisms. Prior researches have investigated different advances, such as duty-cycling and data-driven advances, for reducing power consumption. The traffic-adaptive intermediate access protocol has been designed to decrease power consumption by permitting sensor nodes to suppose a low-power inactive state when they are not working in transmission or obtaining mode. In this paper periodic sleep/wake-up design

along with data encoding is added into the sensor node conceive to farther accomplish the node-level energy keeping.

Stretching lifetime of network and sensor operation is critical for accomplishing utilization of wireless sensor networks (WSNs) in applications where restoring or filling energy storage units (i.e. batteries) is not practical or not worth for the cost. For example, the ARGO project installs thousands of floating sensors to accumulate hydro-graphic data from oceans and the energy they afford cannot be replaced or recharged after they are set free into the environment. Extension of the sensors for lifetime can remarkably reduce the cost of the ARGO project and help the researchers to know the health of the oceans effectively. Examining the value of such large data gathering projects, lifetime expansion of WSNs is highly desirable.

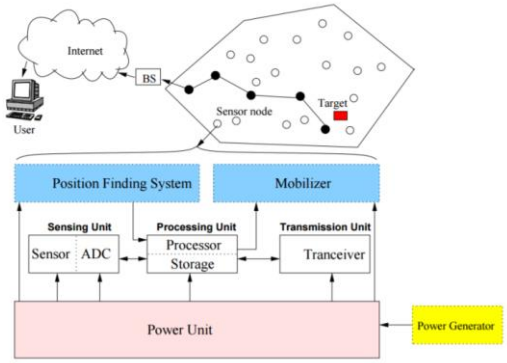

Fig. 1 The components of a sensor node [4].

II. LITERATURE SURVEY

Y.Thomas Hou et.al [1]. Author examined the flow routing problem for 2-tier WSN with the aim of expanding lifetime of upper-tier aggregation and forwarding nodes (AFNs). In order to increase the lifetime of WSN, the data obtained at each node is distributed and transferred along different paths. From the results, packet-level multisession flow routing solution is showed better results for less energy consumption. Node synchronisation and its overhead were negotiable. Apart from that, he also shown path ways to achieve optimal single-session flow routing when the bit-rate produced by AFNs is time-varying, however the average bit-rate can be evaluated. Results donate the different flow routing techniques for stretching life time of network with minimum energy consumption.

Chiara Petrioli et.al [2]. Author has projected and explored the performance of ALBA-R, a cross-link structure for join object in WSNs. ALBA-R relies on a cross-link relay selection tool neighbouring nodes that can advancing traffic more efficiently and consistently, depending on traffic and link quality. Results from a wide-ranging performance valuation associating ALBA-R, GeRa F, and IRIS show that ALBA-R accomplishes extraordinary delivery ratio and latency and can significantly limit energy utilisation, outstripping all previous solutions measured in this study.

Nikita Jaideo Gotmare et.al [3]. In this task, author has offered the design and implementation of an "energy optimized conceive for wireless sensor node using data encoding", which can help in assembling an energy-efficient WSN through facts and figures encoding before conveying the facts and figures and furthermore by "node-level power saving" and "network-level power saving". The "node level power saving is realised by accommodative forward power setting and by the periodical sleep/wake-up design, while the "network-level power saving" is realised by adaptive network topology.

Apurva Pathak et.al [4] In this paper, energy balanced routing technique FAF-EBRM constructed on the forward aware factor is suggested. Many times in the network during the communication problem of energy utilisation ascends. In order to overcome the problem, FAF-EBRM is the solution. In the FAF-EBRM the subsequent node is selected based on the link weight and forward energy density. Farther the results of the FAF-EBRM are matched with the LEACH for the energy concern.

Ali Norouzi et.al [5]. Authors considered the operation of a Conversing routing procedure with harmless energy consumption, and deliberated the factors of energy improvement. By paying attention to the Conversing procedure they find that by

varying the ways in which we choose the subsequent hop, the network life- time can be stretched. As a result, in projected procedure, stretched the network lifetime through proper use of the energy by choosing nodes with the maximum outstanding energy and shortest distance to the sink.

Laura Marie Feeney et.al [6]. Author has conducted series of experiments for IEEE 802.11 wireless interface. Results shown that the energy utilisation of an IEEE 802.11 wireless interface has a composite range of conduct that are related to the design of network layer methods – energy consumption is not similar with bandwidth consumption. Quantities of the energy utilisation for sending, receiving and removing packets of different sizes are accessible as group of linear equations as well as a visual form which brings out broad decisions.

Degan Zhang et.al [7]. An energy-balanced routing technique FAF-EBRM constructed on forward-aware factor is suggested in this paper. In FAF-EBRM, the subsequent hop node is chosen based on the awareness of link weight and forward energy density. In the experiment, FAF-EBRM is matched with LEACH and EEUC, and experimental results show that FAFEBRM outstrips LEACH and EEUC, which balances the energy utilisation, extends the function lifetime, and assurances high QoS of WSN.

Juby K Baby et.al [8.] Authors offered the EFAF EBRM based on Forward Aware Factor and Data Agregation procedure. Projected EFAF-EBRM system was widely compared with two other known routing procedures, the FAF-EBRM and LEACH, about scalability, communication costs, delivery proficiency, combination rate, and combined data delivery rate. The achieved results clearly show that EFAF-EBRM outstripped the FAF-EBRM and LEACH procedures for all assessed scenarios.

Mehmmood A. Abd et.al [9]. This paper evaluates a fully scattered routing protocol, called game theoretic energy balance (GTEB), for making the best use of the duration of WSNs. The combination of evolutionary and classical game theories with geographical routing is shown to be successful in making better lifetime of the network. The simulation results showed that GTEB has great improvement in stretching network lifetime and delivery ratio over other test rules and pass geographical protocols.

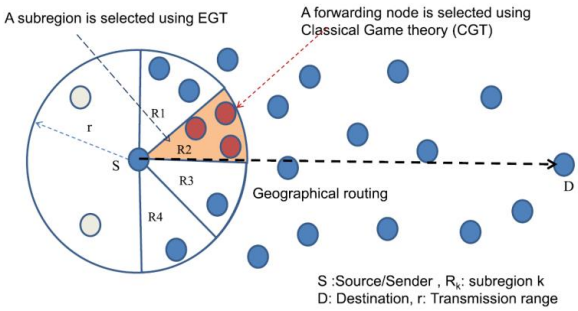

Fig. 2 Subregion and node selection [9].

III. PROTOCOL DESCRIPTION

A. Low Energy Adaptive Clustering Hierarchy (LEACH) Protocol

LEACH protocol is one of the at most well-known WSN classified routing algorithms. In LEACH, the nodes consolidate themselves into local group; the protocol is separated into a setup phase when the groups are prearranged and a steady-state phase when data are relocated from the nodes to the group head and on to the sink.

B. Game Theoretic Energy Balance routing (GTEB) protocol

The proposed GTEB protocol is depicted to supply balanced energy to equal and randomly deployed multi-hop WSNs with similar nodes where the transmission range is r .At first, energy of a node is E Joules. The nodes know their locations and the location of the destination node. The nodes learn their neighbours' location by exchanging the first packet, which includes the location details of the node.

The energy cost of this initialization sustains a one packet transmission charge for each node and one overhearing charge to its neighbours. The GTEB protocol considers geographical routing in

a motionless network. If the node is provided with GPS, the GPS needs to only run in the first phase to gain the location of the node, and then it can be switched off. The problem of attaining a network wide energy balance is split into the following two sub-problems: i) RLEB at sub-regions and ii) NLEB within the sub-region. The energy balance at the region level is attained using EGT and the energy balance at the node level is attained using CGT.

IV. COMPARATIVE STUDY OF PROTOCOLS

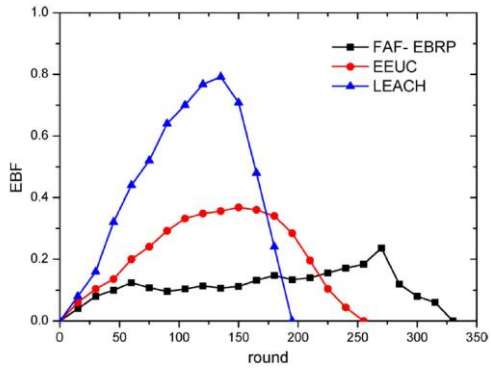

Fig. 3 Comparison of EBF [7].

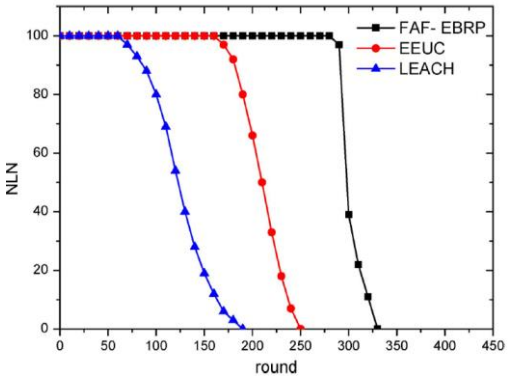

Fig. 4 Comparison of NLN [7].

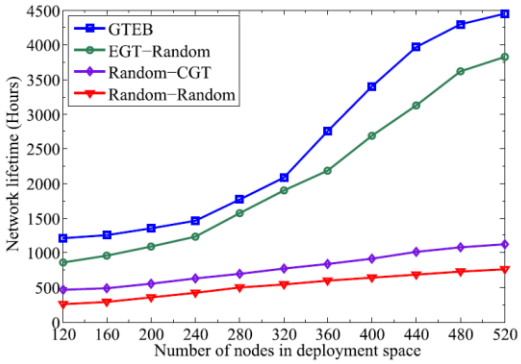

Fig. 5 Number of nodes Vs Network Lifetime in [9].

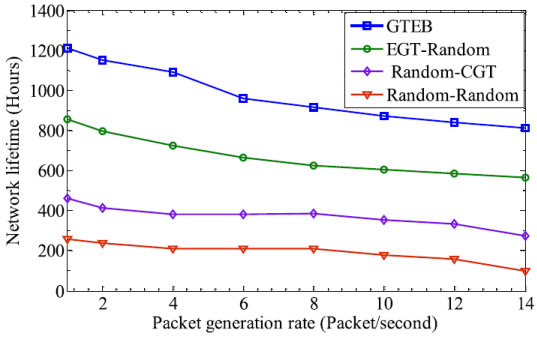

Fig. 6 Packet generation Vs Network life time [9].

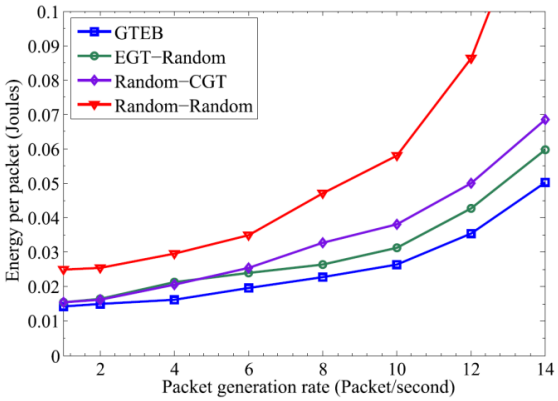

Fig.7. Packet generation rate Vs Energy per packet [9].

TABLE I: COMPARATIVE STUDY OF DIFFERENT PROTOCOLS

Publication / Year	Title	Protocols	Key Points +Pros and – Cons
IEEE / 2014	An Energy-Balanced Routing Method Based on Forward-Aware Factor for Wireless Sensor Networks	FAF-EBRM, EEUC, LEACH	experimental results show that FAF-EBRM outstrips LEACH and EEUC, which balances the energy consumption, prolongs the network lifetime, and assurances high QoS of WSN.
IOSR-JECE /2014	Energy Balanced Routing Method for In-Network Data Aggregation in WSNs	EFAF-EBRM, FAF-EBRM, LEACH	Results show that EFAF-EBRM outstripped the FAF-EBRM and LEACH algorithms for all estimated

			situations.
GVCD EBCIE EE/2014	ALBA-R: Load-Balancing Geographic Routing Around Connectivity Holes in Wireless Sensor Networks	ALBA-R GeRaF IRIS	Results from an extensive performance evaluation equating ALBA-R, GeRaF, and IRIS. It has shown that ALBA-R succeeds extraordinary delivery ratio and latency and can significantly limit energy depletion
IEEE/ 2015	Extending Wireless Sensor Network Lifetime With Global Energy Balance	GTEB (EGT & CGT)	The merging of evolutionary and classical game theoretics with geographical routing is shown to be Successful in improving lifetime of the network. The simulation results showed that GTEB provides remarkable upgrade in extending network lifetime and delivery ratio over other test protocols and competing geographical protocols

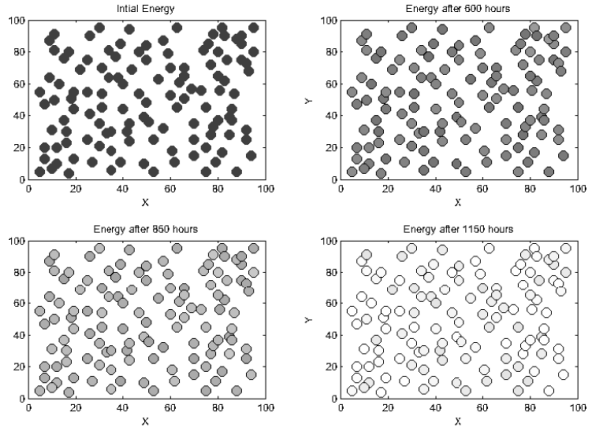

Fig. 8 Energy spreading in the network [9]

V. CONCLUSIONS

We have provided a comprehensive survey of maintaining the energy efficiency by choosing an optimal path where in all the nodes will be in the active mode. We have done comparative study of different protocol like EFAF-EBRM, FAF-EBRM, LEACH, GTEB. Results show that

(i) FAF-EBRM performs better than LEACH and EEUC, which balances the energy utilization, extends the functional lifetime of network, and assurances high QoS of WSN.

(ii) EFAF-EBRM performs better than the FAF-EBRM and LEACH algorithms for all estimated scenarios.

(iii) The simulation results showed that GTEB provides much progress in extending network lifetime and delivery ratio over other test protocols and competing geographical protocols.

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Comparison between IOT Protocols

Sneha Priya M[1], Anusha S N[2], Vijayalakshmi M S[3]

[1]Computer Science and Engineering, Visvesaraya Technological University snehapm145@gmail.com

[2]Computer Science and Engineering, Visvesaraya Technological University
anushasn22596@gmail.com

[3]Assistant professor, Computer Science and Engineering, Visvesaraya Technological University
vijayausha@gmail.com

ABSTRACT

The birth of internet of things was between 2008 and 2009, when the number of things connected to the Internet surpassed the number of people connected. While much of the Internet of things is dependent on the traditional embedded development skills, the requirement for connectivity is giving the engineers a responsibility to make decisions not only for the wireless method, but also for the communications protocol. Many protocols are competing with each another to become the best in communicating the data to the cloud. In this paper, we highlight IoT protocols like Lora and SIGFOX which mainly provide long distance transmission with less power consumption and short distance transmission protocols like 6LOWPAN and ZIGBEE. We provide a detailed comparison between the long range protocols and short range protocols based on various characteristic like bandwidth, range, security and power efficiency and business model. Our objective is to provide a summary of the most relevant protocols to provide help to researchers and application developers how the different protocols fit together to deliver desired functionalities.

Keywords-LORAWN,SIGFOX,6LOWPAN,ZIGBEE.

I. INTRODUCTION

The Internet of Things mentions the use of intelligently connected devices. It was in the early 2000 that the concept of internet of things became popular when Kevin Ashton one of the pioneers was laying the groundwork at MIT's AUTOiD lab. The Internet of Things offers advanced connectivity and services in comparison to machine-to-machine infrastructures. It also provides a wide range of protocols and standards. The internet of things and its protocols are the highly funded topics and the

Evolution of machine to machine communications has evolved internet of things technologies. The Internet of Things provides mechanism to sense and connect the devices across infrastructure and thereby increasing efficiency and reducing the human intervention. The Internet of Things plays a huge role in daily life like security, health and many other aspects.

Internet of Things can be further explained by the 3C'S namely communication, control and cost.

Communication is enabled by wireless communication that acts like a bridge between the systems and people. One of the most popular examples for communication in IOT is the Apple iwatch that provides good user experience by providing the plug and play mechanism.

Control in Internet of Things provides mechanisms for the consumer to remotely control the devices. One of the popular examples is the Philips hue smart bulbs that provide features which allow the users to control the brightness of bulb.

Cost is one the important factors in a organization. Adopting IOT mechanisms and infrastructure can reduce the expenses of equipment failure.

Internet of things enables the devices which are not computers to act, see and take decisions smartly which can be as critical as saving lifes and buildings. It transforms the passive objects around us to be active and collectively collaborate and take decisions.

Further we present the Long range and short range protocols and also a comparison based on various parameters.

II. LONG RANGE PROTOCOLS

The internet of things has seen the spread of new emerging technologies which is based on a paradigm called low power wide area network. They are characterized by links that are in kilometres. They provide wide coverage that covers the entire world and have star network topology. One of the important characteristics of this technology is the robustness it provides which enables it to work in harsh environments. They operate in the band ranging from 863 Megahertz-870 Megahertz in Europe.

Depending on the type of modulation, the technologies can be divided in categories:

Ultra Narrow Band (UNB): using narrow band channels with a bandwidth of the order of 25 kHz;

Wideband: using a larger bandwidth (125 kHz or 250 kHz). In the rest of paper we discuss about the long range protocols SIGFOX and LORAWAN.

A. Lorawan

LORA is a long range, low power communications technology and it utilizes low power. It has the advantage of having a long range capability.

It is endorsed as a infrastructure solution for the internet of things. LORA is used in such situations when end devices need to use very less power. It can be deployed when the end device acts like a sensor or acts like an actuator.

Figure 1 shows the network architecture of LORA. In the architecture the end devices are connected through the gateways to the network server. Here there are multiple gateways which are going to transmit the messages from the end devices to the network. LORA uses star architecture in order to preserve battery lifetime.

The end points are where the control is undertaken.

The gateways are transparent bridges that send messages from endpoints to application.

Here the network server plays a very important role of managing the network. It performs activities like discarding redundant packets, performs security checks, and schedules acknowledgements. Currently there are three servers that provide service Acidity ThingPark, IBMLRSC, Orbiwise UbiQ.

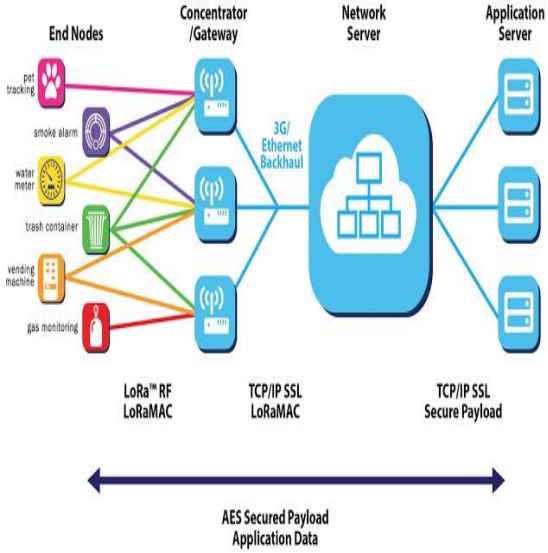

Fig. 1 Network architecture of LORA

B. Sigfox

SIGFOX is a variation of cellular system that provides a solution for low throughput internet.

It is aimed at low cost machine to machine communication areas like home and consumer goods, healthcare, transportation and security.

The end devices in sigfox can send up to 140 messages per day with payload size of each message as 12 bytes.

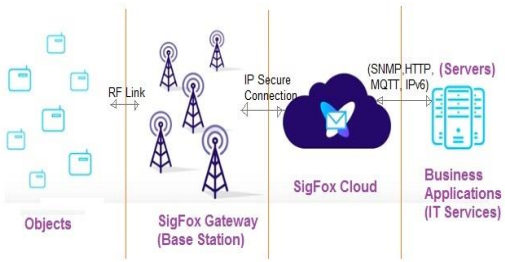

Fig. 2 Network architecture of SIGFOX

The figure 2 shows the network architecture of SIGFOX. It uses the star topology to connect the sigfox objects to the gateways. SIGFOX makes use of the point to point link. Here the sigfox objects are endpoints and the sigfox cloud connects the base station to the business application.

III. LORAWAN VS SIGFOX

Sigfox and Lora have been competitors for years.

Even though their business models and technologies are completely different but their goals are same.

Their goal is that their technology must be deployed across the city and nationwide by the mobile operators.

C. *A. Business Model*

1) ***Sigfox***

Sigfox follows a top down approach in the business model. The company owns the backend data, endpoints and software. The main difference is that the end points are in open market and relatively inexpensive.

With sigfox the user has to wait for the company to deploy and pay a subscription fee.

With Sigfox a user can buy a chip in just a few dollars and a large number of modules for less than 10 dollars.

In countries like America and France Sigfox is deploying the network itself to mobile operators in less cost rather than selling expensive end points. It is using this approach to drive many people to its market.

Sigfox has a good ecosystem of radio vendors like semtech, Texas Instruments, Silicon Labs, axom.

The challenge associated with the business model is that one has to directly work with sigfox if working with the network and also only one sigfox network can be assigned in a area.

2) Lora

Lora works with a different approach and also tells that they are a lot more open than Sigfox.

This is largely because any user who wants to use Lora can download the specifications and join Lora Alliance. Even though many companies work with Lora but one need not have to wait for them, hence a user can work with Lora without a subscription fee.

Lora is conventional in its technology which means large amounts of data can be sent when the signal is strong and also little more power is provided.

The challenge faced by Lora is to use LoRaWAN, the network server software must be run “in the cloud,” which requires a subscription from a network server vendor and semtech is the only radio vendor. Hence even though there is no subscription fee for Lora but there will be investment related to network.

B. Based on technology

1) Sigfox

It is based on ultra-narrow band technology. It uses a narrow band with a bandwidth of 0.1 kilo hertz and sends a payload of 12bytes. It provides short burst and relatively low data speed. It enables low power consumption and long battery life and hence is suitable for applications like water meter.

Device control is possible and only four control messages can be sent in one day.

It enables low power consumption and long battery life and hence is suitable for applications like water meter.

2) Lora

It uses spread spectrum technology and uses a larger bandwidth than sigfox.

It uses a narrow band with a bandwidth of 125 hertz and sends 40 bytes of payload data.

It provides a communication range upto 10 miles and also uses low power hence extending its battery life upto 10 years.

Device control is possible with higher downlink speed as the link is symmetrical and the transfer speed is higher.

D. ***.Based on technical parameters***

As shown in table 1 the technical parameters of both lora and sigfox have similarities as well as differences

TABLE I COMPARISON BASED ON TECHNICAL PARAMETERS

TECHNICAL PARAMETERS	SIGFOX	LORA
Coverage(in km)	less than 17 Km	less than 14 Km
Frequency spectrum	Unlicensed Band	Unlicensed Band
Signal Bandwidth	0.1 KHz	125 KHz
Data Rate	100 bps	10 Kbps
Battery life of NB-IoT device	10 years	10 years
Energy Consumption	Low	Very Low
Dedicated Network	Yes	No
Throughput	100bps	290 bps-50

The coverage area of Sigfox in more in comparison to Lora. One the main limitations of Lora are the use of unlicensed band. LoRa is the only one which is available for private network applications also. That means you can set up a LoRa gateway of your own just like using Wi-Fi. Sigfox is closed and proprietary technology, and use of licensed frequency bands means you got to be an operator to get the license in hand.

IV. SHORT RANGE PROTOCOLS

Current trends have directed the usage of wireless sensor network for various purposes. The applications of using this technology are endless from agriculture to health monitoring to military purposes. The development of IP base wireless sensor network is a next step to integrate this technology with the Internet devices for global connectivity and provides end to end communications.

In the rest of paper we discuss about short range protocols like 6LoWPAN and Zigbee.

E. ***1) 6LoWPAN***

6LoWPAN is an acronym ofIPv6 over low power wireless Personal Area Network. The low power wireless sensor devices which usually uses the low power wireless private area network (IEEE 802.15.4) standard are being widely deployed for various purposes and in different scenarios. But 6loWPAN is not restricted to IEEE 802.15.4 standard rather can use other layer two standards as well. The biggest challenges in the development of these sensor devices, also called as motes, are to efficiently use the low power and low bandwidth.

IPv6 makes communication to become more visible across various networks and various devices. IPv6 low power wireless private area network (6LoWPAN) was adopted as part of the IETF standard for the sensor devices so that it will become an open standard compares to other dominated proprietary standards available in the market.

A. ***6LoWPAN overview architecture***

Standard 6LoWPAN architecture consists of several entities, Fig 1 illustrates the typical 6LoWPAN architecture in which 6LoWPAN gateway is a primary source for outside the network IPv6 clients to communicate with 6LoWPAN sensor nodes. Whereas it also shows web servers data from the 6LoWPAN gateway and publishes on the Internet 6LoWPAN communicator is also depicted in Fig 1 which demonstrates communicating with sensor nodes.

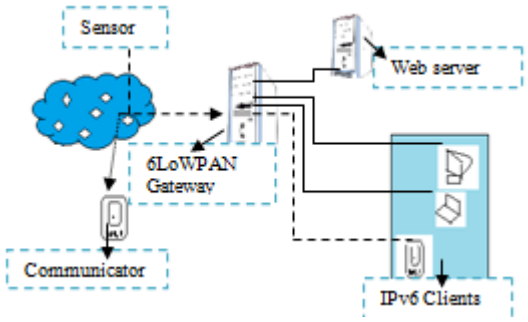

Fig 1 6LoWPAN architecture

In the above figure Sensor can send/receive data To/from gateway and communicator, Gateway

can allow clients and web servers to communicate with sensors. Web servers allow web service access of 6LoWPAN sensors through gateway. Communicator can send/receive data to/from the sensors and display it, and outside network clients (IPv6) can communicate with the sensors through 6LoWPAN gateway.

B. ***6LoWPAN Communicator Architecture***

The 6LoWPAN communicator is a platform independent system on a portable mobile device that has multiple communication interfaces including IEEE 802.154, Ethernet and IEEE 802.11x. It is capable of bidirectional wireless communication with 6LoWPAN sensor nodes. The communicator confirms to 6LoWPAN and IPv6 IETF standards and drafts [1] [2] [5]. It supports various application specific protocols for interpreting sensor data for example Sens node Nano SOAP and MIMOS MSCAN format. It has a graphical user interface which shows trace messages on screen. These messages are clustered into user friendly messages.

6LoWPAN communication architecture consists of three main modules as illustrated in Fig 2. The user interface module handles all the graphical user and developer friendly manner. Service modules are core system which is further divided into various components. Communication modules are responsible for handling low level communication protocols for transmission.

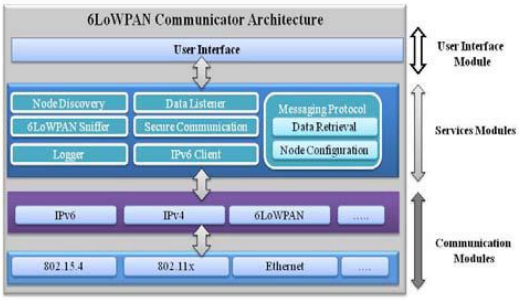

Fig 2 6LoWPAN communicator architecture

6LoWPAN communicator establishes packet transmission to 6LoWPAN sensor network by using IEEE 802.15.4 Nano-router interface device, as well as application specific components which uses sockets to interact with the sensor nodes.

B. ***ZIGBEE***

ZigBee is a specification for suite of high level communication protocols using tiny, low-power digital radios based on IEEE 802 standard for personal area networks. ZigBee has defined rate of 250 Kbit/s best suited for periodic or irregular data or a signal transmission from a sensor or input device. ZigBee based traffic management.

The ZigBee network layer natively supports both star and tree typical networks.

A. ZigBee network and architecture

The co-ordinator is responsible for starting ZigBee network. Network initialization involves the following steps:

1. Search for a Radio Channel-The Co-ordinator first searches for a suitable radio channel. The search can be limited to those channels that are known to be usable.
2. Assign PAN ID- The Co-ordinator starts the network, assigning a PAN ID (Personal Area Network identifier) to the network. The PAN ID can be pre-determined, or can be obtain dynamically by detecting other networks operating in the same frequency channel and choosing a PAN ID that does not conflict with theirs.
3. Start the Network-The Co-ordinator then finishes configuring itself and starts itself in Co-ordinator mode. It is then ready to respond to queries from other devices that wish to join the network.

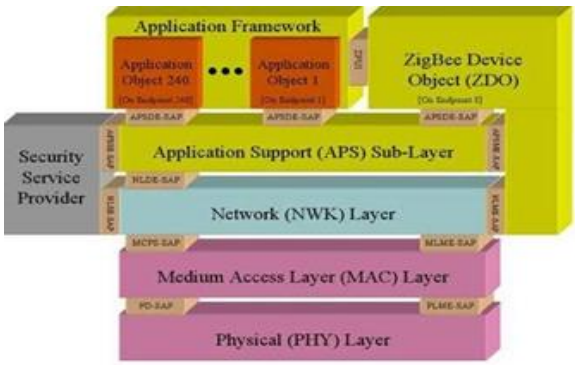

Fig 3 Layered Architecture of ZigBee

V. 6LOWPAN VS ZIGBEE

ZigBee and 6LoWPAN protocols are widely used for low power wireless sensor networks that are being deployed in factories for monitoring the status of their devices and the environment. Power consumption cloud be measured using these protocols.

Some of the most notable difference between ZigBee and 6LoWPAN is in its application and how it fits in the current Internet of Things (IoT) revolution.

1. ZigBee is most popular low-cost, low-power wireless mesh networking standard available today.
2. 6LoWPAN offers interoperability with IEE 802.15.4 physical link devices as well as with devices on another IP network such with bridge devices.
3. Another aspect of 6LoWPAN is its security. Unlike ZigBee where gateways are required hence order to connect the device over the internet two security process are required.
4. In the case with ZigBee, bridging between ZigBee and non ZigBee needs more complex gateways unlike 6LoWPAN. On the other hand, the greatest challenge to 6LoWPAN is the lack of application that utilizes 6LoWPAN because it require extensive training as it is complicated to work with and requires extensive knowledge of IPv6 protocol.

As shown in table 1 the technical parameters of both 6LoWPAN and ZigBee have similarities as well as differences.

TABLE II COMPARISON BASED ON TECHNICAL PARAMETERS

TECHNICAL PARAMETERS	6LoWPAN	ZigBee
Operating frequency	2.4 GHz	2.4 GHz, 915 MHz, 868 MHz
Max data rate	200 Kbps	250 Kbps
Average current consumption	Tx: 30-40 mA; Rx: 12-25 mA;	Tx: 25-35 mA; Rx: 20-30 mA;
Qualification cost	Low	Medium
Interpretability	Low	High
Energy Consumption	Low	Very Low
Reliability	Low	Low

CONCLUSIONS

In this battle among the internet of things protocols it is not about which protocol best rather it depends on the business model and infrastructure is used rather than the underlying technology and it is about which protocol supports internet of things the best. Among the low power wide area networks that are designed to carry less data in a very small rate it is suitable for sensors that operate on battery. It depends on specific scenarios as to which protocol must be used among sigfox and Lora. In an example if we want to design a smart grid or water management we would make use of LORA and this would be because the deploying is limited to a certain location. But if we would like to design smart automobiles and also want to specify that it would only work in certain countries we would choose SIGFOX.

Among comparison between the ZIGBEE and 6LoWPAN,clearly it is a fight between a veteran protocol zigbee and a newbie protocol 6lLoWPAN.Based on the communication and interoperability 6LoWPAN beats ZIGBEE as 6LoWPAN has an IP base and hence it can easily communicate around the world. But in the case of security Zigbee proves to be better and this is because of the long time it has been around .

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Vehicle speed based intelligent Traffic Light Control System

AKASH B R[1], ASHUTOSH[1], SWATHI A[1], THEJU S[1], MALATHI T V[2]

[1]UG Students, Dept. of CSE, SRS Institute of Technology, Bangalore, India

[2]Assistant Professor, Dept. of CSE, SRS Institute of Technology,Bangalore,India

ABSTRACT

Intelligent transportation is a typical case of cyber physical system (CPS). Due to the rapid increasing of the number of vehicles congestion and environment pollution, are increasing day by day. Traffic light control system is often used to control the passing of vehicles to avoid the congestion in the city. Presently used traffic control systems are static in nature. The aim of this paper is to propose a dynamical traffic light control system, i.e., change the traffic light signals in real time based on the speed of vehicles. This system is based on V2I(Vehicle to Infrastructure) communication model which deals with data transmission between vehicles and traffic lights. Vehicles send speed messages to the traffic light when passing an intersection, then the traffic light analyzes the information and adjusts the signal time in real time. Therefore, the traffic light is a kind of cyber-physical system. This traffic light control system can maximize the number of vehicles passing intersection, and as a result, minimize the congestion and pollution. A traffic light control algorithm based on speed of vehicles and its working is presented in the embedded environment to show accurate results.

Keywords—Intelligent transportation; Traffic light control system; embedded systems.

Introduction

Transportation is closely related to people's daily life, and people are strongly dependent on transportation. Intelligent transportation system has been developing, but in most countries and cities, the speed of traffic construction is far behind the speed of the increase of the number of motor vehicles. The imbalance between these two speeds leads to traffic congestion, traffic accidents, environmental pollution and other issues. One of the most serious problems is the traffic congestion. At present, most used traffic light control systems are static, i.e., traffic light signal changes in the designed time periods rather than following the real situation of vehicles passing intersections. Traffic congestion is now considered to be one of the biggest problems in the urban environments. Traffic problems will be also much more widely increasing as an expected result of the growing number of transportation means and current low-quality infrastructure of the roads. In addition, many studies and statistics were generated in developing countries that proved that most of the road accidents are because of the very narrow roads and because of the destructive increase in the transportation means. This idea of controlling the traffic light efficiently in real time has attracted many researchers to work in this field with the goal of creating automatic tool that can estimate the traffic congestion and based on this Variable, the traffic sign time interval is forecasted. Real time automatic vision based traffic light control has been recently the interest of many researchers, due to the frequent traffic jams at major junctions and its resulting wastage of time but this system is too costly. Since, density or vision system requires too many hardware like cameras. Instead of depending on information generated by costly hardware simple speed sensors would help to get accurate results in low cost. Thus, given a information from speed sensor, the task of speed based traffic light control

list: 1) analyze image sequences;2) estimate traffic congestion and
3) predict the next traffic light interval.

MOTIVATION

The traffic lights that are in widespread use today do not do much intricate reasoning when deciding when to change the lights for the various road users waiting in different lanes. How long the signal stays green in one lane and red in another is most often determined by simple timing that is calculated when the crossing is designed. Even though today's methods are robust and work well when the traffic load is distributed evenly across the lanes in the intersection, the systems are very inefficient because they are unable to handle various simple situations that arise throughout the day. Unnecessary waiting time in the signal can be avoided by determining in which side the green signal should be large during the traffic.

PROPOSED SYSTEM

To overcome the faced problems in static traffic light control system as well as vision based traffic light control system, speed based traffic control system can be implemented. In the proposed system, traffic light controlling system based on the vehicles speed which is more efficient and accurate. Here traffic light controller decides the time of the signal based on the vehicle motion like if it is slow moving traffic then it will allow more time for that direction and if there is higher speed traffic means there is less traffic and allows less time for that direction. This system is an instance of V2I(Vehicle to Infrastructure) communication model, realizing data transmission between vehicles and traffic lights. Vehicles send speed messages to the traffic light when passing an intersection, then the traffic light analyzes the information and adjusts the signal time in real time.

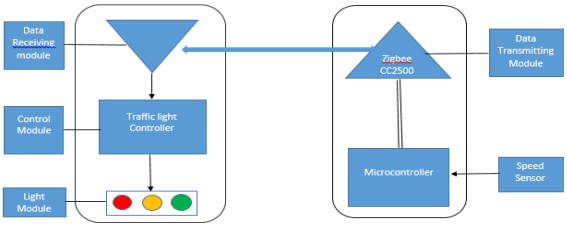

Fig:1 Architecture of speed based traffic control system

SYSTEM IMPLEMENTATION

Vehicle to Infrastructure (V2I) [5], [6] is a concept from Internet of Vehicles (IoV) . V2I means the communication between vehicles and the road infrastructure. Road infrastructure includes road, street lights, traffic lights, electronic barricades, etc. The system we design is a typical system of V2I mode.

Here, implementation is done on embedded environment which has two main sides;

1. Vehicle side
2. Traffic light side

Vehicle side includes speed sensors, data transmitting module [fig 1].

Traffic light side includes data receiving module, control module and a light module [fig 1].

Data transmitting module and Data receiving module

We use ZigBee module as the V2I communication module in this system. ZigBee is a short-range, low-power, low-cost wireless communication technology. ZigBee can spread 30-50 meters away in the room, and is able to reach about 100 meters outdoors. ZigBee has strong self-organizing, strong self-healing capabilities, big network capacity and good communication reliability, so it can meet the system requirements.

B. Control Module

Traffic light controller is the most important part of this system. The controller is responsible for executing the control algorithm and controlling the lights.

C. Speed sensors

IR sensor(Infrared sensor) are used to detect the speed of the vehicle. We make use of IR sensor to sense speed of the motor which is connected to the microcontroller. No of revolutions of the motor is taken as the data to the data transmitting module .

D. Light module

This is where the actual traffic light change takes place. Data from the vehicle side is received by data receiving module on traffic light side and analysed, controlled by the control module.

CONCLUSION

Software development, data acquisition, data analysis and management have been conducted for monitoring vehicle speed wirelessly in an embedded environment. A wireless sensor attached to a mechanical wheel can be used for measuring the wheel speed by using the sensor where the wheel acts as a vehicle in the speed monitoring simulation. Therefore, based on the performance of prototype system, it can be concluded that wireless sensor based vehicle speed monitoring and traffic light controlling system has great potential.

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We would like to thank our head of the department Mr. Vittal S and our guide Mrs. Malathi T V for motivating us in doing such kind of real time projects and thanks to the web source.

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BRAIN FINGERPRINTING TECHNIQUE

RAJESH S L[#1], SUSHMA S R[*2], SHALINI R[#3]

[#]Department of CSE, M S Engineering College, Navarathna Agrahara, off Intl. Airport Road, Bengaluru India,9008029810

[1]hod.cse@msec.ac.in; [3]shaliniyadav.raghu@gmail.com

[*]Department of CSE, M S Engineering College
Navarathna Agrahara, off Intl. Airport Road, Bengaluru India

[2]sushmasr2795@gmail.com

ABSTRACT

Brain fingerprinting is a controversial and questionable technique which uses Electroencephalography (EEG) invented by Lawrence Farwell to intellect if the specific information is stored in a subject's brain. It is a technology in which the response of brainwave to the words, pictures appeared on a computer screen related to the crime are measured to identify the enactment of crime precisely and scientifically. This technique records the culprits responses and their brainwaves when they are exposed to the crime relevant subject's. Polygraphy and the brain fingerprinting are the two techniques in which combination of both is used and assures the mixed consistent results and critically inflated benefits. This technique works on the principle that all human activities are stored and recorded in the brain, therefore the brainwaves would be the strong evidence as it always there for planning, executing and recording the crime.

I. INTRODUCTION

Brain finger printing is a decisive investing technique that measures familiar stimuli by measuring electrical brain wave responses to phrases, words or pictures which can be projected on computer screen. Brain finger printing was invented by Lawrence Farwell. This theory suspects reaction to the details of an activity or an event reflecting if the suspect had prior knowledge of event or activity. Farwell uses the test which he termed as MERMER ("Memory and Encoding Related Multifaceted Electroencephalographic Response") response to identify familiar reaction.

Farwell's brain finger printing originally used the well known P300 brain response. To detect the brain response. To detect the brains discussion of known information Farwell has Invented a new computer based technology used to identify the perpetrator of a crime accurately and scientifically by measuring Brain-wave responses to crime-relevant words or pictures presented of a computer screen. Brain finger printing technology used to determine significally the information stored in particular brain. Also measures Stimuli is the one which evokes a specific functional reaction in an tissue or an organ. Brain finger printing records how the brain reacts to the images and the words connected to crime. Here only the killer would recognize.

II. REQUIREMENT

The Basic Instrumental requirements are as follows

- Personal Computer
- A four channel EEG amplifier system
- Software developed by the brain fingerprinting Lab.
- A data possession board.
- Graphics card for driving two monitors from one PC.

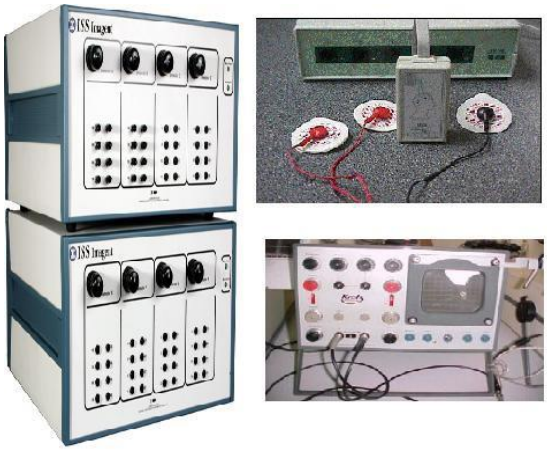

Fig.1. Devices used for brain fingerprinting

III. ELECTROENCEPHALOGRAPHY

Measurement of the electrical activity produced by the brain as recorded from electrodes placed on the scalp is called Electroencephalography. As Computer can understand the multilevel from the activity of individual transistors to the application. The same way activity of the brain can be described. The action of a single axon in a single dendrite of a single neuron is measured by the other end of the activity which aggregates the Electric voltage fields from millions of neurons by EEG.

EEG is collected on the surface of the head from so called scalp where 10's – 100's of electrodes are positioned on different locations. Signals of EEG are amplified and digitalized for processing the measurement of data obtained by the scalp. EEG are used for clinical and research purposes.

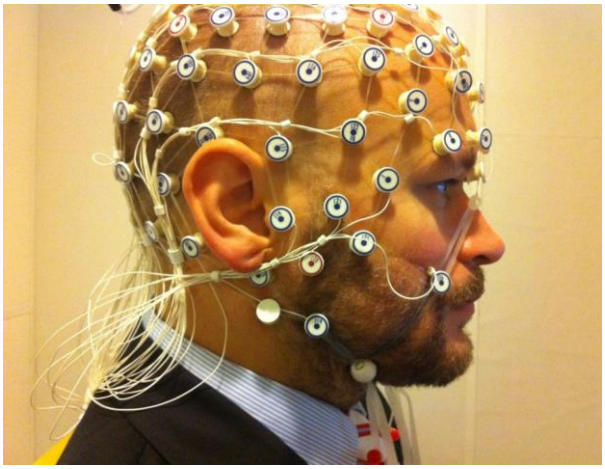

Fig.2. Electrographer

IV. TECHNIQUES

A Special headband should be worn by the person on whom the test is to be performed as shown in the fig.2, As its electronic sensors measures electroencephalography from various locations on the scalp. The test is presented with a series of irrelevant and relevant stimuli, words and pictures. Here the test subjects brain response for two different types of stimuli allows the tester to know the measured brain responses to test stimuli known as probes, they are more similar to the irrelevant or relevant responses.

Brain finger printing uses cognitive brain responses. It never depends on the emotions of the subjects nor affected by the Emotional responses. It is not as same as the polygraph in which physiological signals like blood pressure, heart rate and sweating, the emotions are measured. Unlike polygraph testing it does not attempt to detect whether the subject is telling Truth or lie.

V. SOURCE OF EEG ACTIVITY

At Multiple frequencies scalp EEG activity oscillates having different characteristics spatial distributions allied with different states of brain functions such as walking and sleeping. Oscillations obtained by the scalp EEG activity represents synchronized activity over a network of neurons. In EEG systems**,** after the signals passes through an anti-aliasing filter, the signal which is amplified is digitized to digital converter via an analogue converter.The difference between the voltages at two electrodes are represented by EEG voltage signal, the EEG display is setup in one of several ways to read the recorded activity of encephalography.

Volume conduction is a term which refers the tissues between the electrodes that is been recorded and the electrical generator where the current flows.It is important for the Electroencephalographer to have some understanding the effect of volume conduction on the original signal in order to create a mental picture of the original signal source. in this way the electroencephalographer can estimate the anatomical localization of a particular EEG activity.

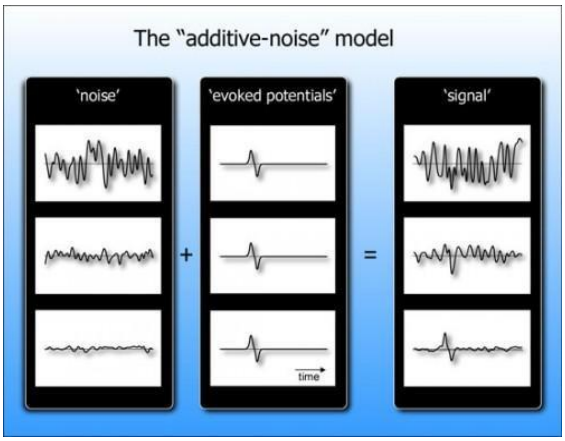

Fig.3. Additive noise module

VI. METHOD

Recording is obtained by placing electrodes on the scalp and each electrode is connected to one Input of a differential amplifier and a common system reference electrode is connected to the other Input of each differential amplifier.

The Voltage between the active Electrode and the reference electrode is amplified by the amplifier.

Typical adult human EEG signal is about 10 micro volt to 100 micro volt is amplitude, when measured from the scalp and 10 – 20 mv when measured from subdural electrodes.

The EEG display is setup in one of the several ways to read the recorded activity of Encephalography.

Fig.4. Culprit is been tested

A. BRAIN WAVES ARE USED TO DETECT THE CRIME

The following three kinds of information presented by colour lines represents whether the suspect is victim or innocent

Red: arises due to target type stimulus and the information. The suspect is expected to know.

Green: Irrelevant stimuli is responsible for the brain wave where the information is not suspect.

Blue: occurs due to probes and the information of the crime is known by only perpetrator.

B. MERMER METHODOLOGY

Procedure used is similar to the guilty knowledge test each of the stimuli are organized by the test giver to be a target irrelevant or a probe. The instruction is given to the subject for target to press on button and for all other stimuli to press on another button.

Irrelevant stimuli do not reduce a MERMER and so establish a baseline brain response for information that is important to the subject in this context.

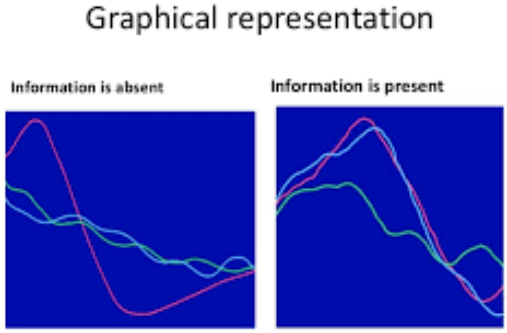

Fig.5.Waves representing the guilt and innocence

VI APPLICATIONS

. COUNTER TERRORISM

Brain fingerprinting helps to tackle the llowing grave elements in the fight against errorism.

- Influential suspect who assisted to participate in the terrorists activities, indirectly or directly.
- Helps in finding out the sleeper cells who are associated with the revolutionary acts, even if they are not active for years and also the trained activists with the prospective to commit future terrorist acts.
- Aid in identifying the people associated with terrorist teams and acts with the minimum knowledge of finance, or training in banking or communications.
- Help to determine if an individual is in a

leadership role within a terrorist organization.

Brain fingerprinting technology technique works on the principle that all human activities are stored and recorded in the brain, therefore the brainwaves would be the strong evidence as it always there for planning, executing and recording the crime. The activist would be trained in the organizations and has the knowledge of plans of terrorist act but an innocent person would not have exposed to such acts. There was no scientific way to detect his elementary difference until the brain fingerprinting was invented. Brain Fingerprinting testing provides a precise, cost effective and appropriate solution to fight against terrorism through this testing it is now possible to conclude scientifically whether the suspect is an activist or an innocent. A new era insecurity and intelligence gathering has begun. Now, terrorists and those supporting terrorism can be identified quickly and accurately. No longer should any terrorist be able to evade justice for lack of evidence. Therefore an innocent individual also should not be imprisoned or convicted of terrorist activity.Brain fingerprinting testing can determine who are involved with evolutionary activity and who are not with extremely high degree accuracy**.**

D. CRIMINAL JUSTICE

A critical task of the criminal justice system is to determine who has committed a crime. There is a difference between the guilty and the innocent suspect where the innocent does not have any stored information in his brain since he was not a part of a crime, but the perpetrator has a record of the crime starting from the planning till the execution of the plan in their brain. There was no scientific way to detect these fundamental difference until the brain fingerprinting testing was invented**.**

Guilt or innocence is not proved by brain fingerprinting testing. That is the role of a judge and jury**.** This technology gives only the evidence which is accurate to the judge and jury to help them arrive at their decision. In major crimes finger printing and DNA evidences are available only about 1% but the brain finger printing testing apply approximately in 60-70% of major crimes. The impacts on the criminal justice system will be profound**.** The possible results now extensively improve the accuracy and the speed of the entire system

VII CONCLUSION

Brain fingerprinting is a radical scientific technology which is specifically used in research agencies, crime board department to detect the actual perpetrator who involved in a crime. Testing's like Mermer ,polygraphy, electroencephalography and scientific testing are used in different stages of process to identify whether the suspect posses the knowledge of the relevant crime or, the information provided by the suspect is recorded naturally are identified through these testing's.

This technique gives 100% accuracy of detecting whether the suspect is innocent or a victim. Also, this is benefited for the government which is in urgent need and fulfills the information required for the investigators to save the falsely accused and innocent suspects.

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NCETAR - 17

CATEGORY: CSE

TAKING CARE OF A PERSON'S HEALTH CONDITION BY CAPTURING THE EXACT LOCATION OF THE PATIENT

PRASANNA B[1], KASHEESH KAMBLI MUTT[1], GANDHI NARAYANAN S[1], SWATHI V[2]

[1]UG Students, Dept. of CSE, SRS Institute of Technology, Bangalore, India

[2]Assistant Professor, Dept. of CSE, SRS Institute of Technology, Bangalore, India

ABSTRACT

Health monitoring systems have rapidly evolved recently and our proposed Smart Health Care System keeps medical records of past decade as the basis from which it is evident that blood pressure fluctuation is a crucial risk factor in heart diseases. Hence our system monitors blood pressure, body temperature of the patient and the gas inhaled by the patient.

In case of a fluctuation in parameters, the sensor alerts relevant people including hospitals and family doctor avoiding the need to initiate a call or the possibility of patient ignoring the symptoms. Data is secured through a cloud storage and system is also capable of alerting blood banks directly in case of a heart surgery.

Keywords— Cloud storage, sensors, cardio diseases, relevant actions, average values, surgery.

I. INTRODUCTION

Based on the analysis of worldwide data of the global burden of hypertension heart diseases, the project shows that the high blood pressure or hypertension affects more than 1 billion people worldwide. Rather than the hypertension heart diseases, the high blood can be a factor and attribute to cause many other disorders, such as stroke aneurysms, ischemic heart, and kidney disease. The risk of heart failure, due to Hypertension is almost increased by factor two or three-fold, and may accounts for about 25% of all heart failure cases. Hypertension was ranked 13th in the leading global causes of death for all ages. A world map shows the distribution of diseases caused by high blood pressure in Figure. In an era of laziness and lack of physical exercises, fat, sugar, meats, smoking, obesity, and the lack of eating fruit and vegetables.

Under the shade of difficult economic situation, physical fatigue, stress and to having dignified life the blood pressure disease has been the famous one in the last century due to poor eating habits. These neurological conditions are chief of this kind of illness, in many countries. Not only medical intervention is required to detract the effects but Smart and Innovative solutions should be adopted to increase the responsive actions quality in both time and level; and eight key aspects that define a smart city which depicts the smart city concepts are identified as: smart governance; smart building; smart infrastructure; smart energy, smart technology; smart citizen; smart mobility; and smart healthcare. In this project we propose a system architecture for smart healthcare based on GSM and GPS technologies. Based on visiting hospitals, it was approved of the effectiveness of this project and its ability to facilitate communication between the patient and his doctor. Utilizing the available services of GSM and GPS technologies to build a smart health monitoring system can improve and enhance the real-time monitoring, where: GSM services are used for global communications any-time and anywhere, GPS technology is applied for outdoor positioning. starting with reading the heart rate and body temperature by using specific sensors: pulse sensor and temperature sensor; the captured

data will be compared via microcontroller i.e. Arduino with a given threshold.

The Arduino also keep checking the position twenty times using the GPS module. The readings will be compared with the maximum and minimum stored values in the microcontroller, in the case that the measured values were out of the allowed threshold range a SMS will be sent immediately to the doctor. The message contains: the patient name, heart rate, body temperature, the patient's location and the corresponding UTC time-stamp.

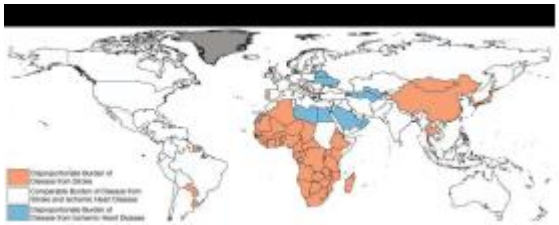

Fig. 1: Distribution of Diseases Caused by High Blood Pressure.

II. PROPOSED SYSTEM

To overcome the problem in the existing system (i.e., the user must have a smartphone and have switched on the location which acts a GPS to track the patient's location and the data collected is stored in the computer which can be tampered by unknown persons). Here we use Things-speak which is a non-payable IoT platform to store the data this platform is specially designed for students. We use Node MCU board to which all the sensors, the LCD, the GPS module is connected. Very minimal power-supply of 5v-10v. It establishes end-to-end communication. The data is secured because the data stored in cloud cannot be accessed any unauthorized person.

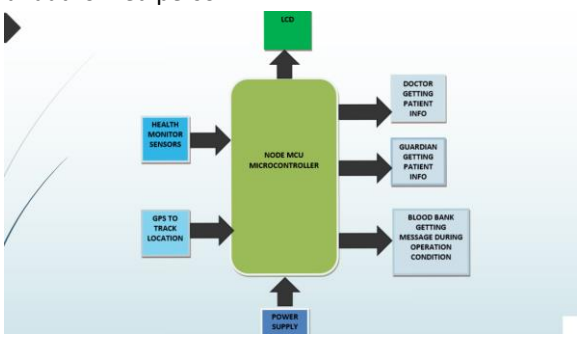

Fig. 2: Block Diagram

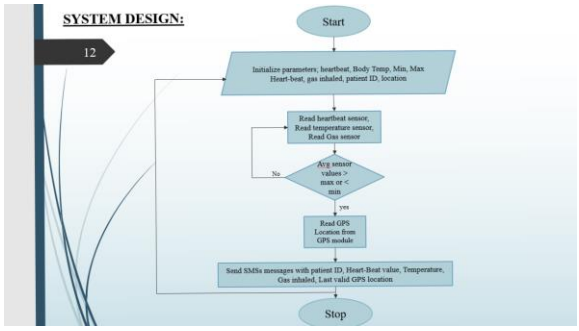

Fig. 3: System Design

A. Message sending Procedure

For message sending, we make use of the data received from the sensor and GPS.

i) Collect the values sensed by the sensors and the location.

ii) The values given to Node- MCU board and threshold values are verified.

iii) After verification the data is stored in the cloud.

iv) Message is sent to doctor, patients guardian and the blood bank in case of operation to be performed.

i) Collect the values sensed by the sensors:

The present values of the patient's heart-beat, body temperature and whether the patient is inhaled any gas or not can be detected and get the location of the patient and sent to the micro-controller board.

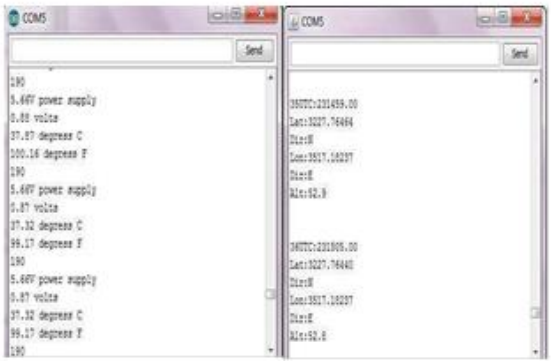

Fig: The sensor values and the location of the patient

The above figs shows the values obtained by the sensors and the location of the patient.

ii)The values given to Node-MCU and verified for threshold values:

The second process is to verify for the threshold values

a) Body temperature: The normal range for body temperature is 97 to 100 degrees fahrenheit or 36.1 to 37.8 degrees celsius.

b) Heart-Beat: For adults 18 and older, a normal resting heart rate is between 60 and 100 beats per minute (bpm), depending on the person's physical condition and age. For children ages 6 to 15, the normal resting heart rate is between 70 and 100 bpm.

iii) **The data is stored in cloud:** There are many platforms in the cloud they are either payable or non-payable the payable platform are individual company servers. But in the proposed system we are using a non-payable platform specially designed for students. Things-speak is the cloud platform which is used as database or storage memory.

iv) **Message sending to persons**: The data gathered, verified and stored is sent in the form of SMS to the family doctor, the patient's guardian so that checking the current condition accordingly action can be taken and in case of operation the blood banks get the SMS with the patient's blood group so that there is need to take a concern for blood availability.

B. Secured cloud storage: The data gathered and verified are stored in cloud non-payable patform in a secured manner. There is a account created with a user name and password only the authorised user have the permission to access the data. So there is no issue of data manipulation or data loss which would happen while stored in computer memory.

C. Technical Feasibility: This is to check the technical feasibility, i,e., the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being faced on the client. The developed system must have a modest requirement; as only minimal or null changes are required for implementing this system.

D. Social Feasibility: The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must no threatened by the system, instead must accept it as a necessity. The level acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. Their level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as they are the final users of the system.

II. CONCLUSION

Aim of Smart City concepts is to provide better life to society and provide innovative and creative solutions in each of the eight pillars of smart city. Human life is very precious. Healthcare field is one of most delicate and important fields to be developed and enhanced by Smart systems designed to present sustainable medical interventions at manner time where the smart system should be simple, low energy consumption, secured and real time feedback. The system designed experimented and shown in the project grantee to improve the quality of health services and to reduce the total cost in healthcare by avoiding unnecessary hospitalisations and ensuring that those who need urgent care get it sooner. It is a system which can measure heartbeat rate and body temperature and communicate them in cases of extraordinary behaviour to supervision medical entities using GPS and web technologies to deliver immediate actions to rescue patients life with potentiality.

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A REAL TIME SOFTWARE APPLICATION FOR MONITORING PLANTS, DETECTION OF WHITE FLIES AND PRESCRIBING PESTICIDES FOR THE SAME.

DR. RAJESH S L[1], ARCHANA RAJAN BABU[2], HARSHITHA M R[3], NAYANA S[4]
[1,2,3]Department of Information Science and Engineering
[1]Professor and Head of Department, M S Engineering College, Bangalore, India, +919008029810
[2,3,4]Student, 8th Semester, Department of Information Science and Engineering
[1]*hod.cse@msec.ac.in;* [2]archana.rajan179@gmail.com; [3]harshithamr29@gmail.com;
[4]nayanasavithri18@gmail.com

ABSTRACT
Pest detection and controlling the same has become one of the major problems faced by the farmers. Currently, the farmer analysis the pest infestation in the field and sprays the pesticides manually in order to control the pest. This measure has adverse effects on his health and his families' health. Thus automation of the same can help the farmer safeguard his health and at the same time his time.

I. INTRODUCTION

Agriculture stands as a major support for Indian Economy. What we fail to realize is the various occupational hazards faced by the farmers due to the prevention of pests. Not only the farmers but also the consumers who consume it also face major health issues. A real time system to monitor pests(whiteflies) and prescribe pesticide for the same based on its count. One of the major sectors that exhibit continuous growth is the agriculture sector. It has to be sustained this way due to the demand of food and increase in population.

Agriculture being the topic of interest we must look into the major challenges such as storage problem, transportation problem, climatic conditions and attack from pests.

Hand dermatitis is seen among 30% of farmers who use pesticides to get rid of the pests.2/3rd of the workers in the farm has been diagnosed with pigmentation and thickening of hand. this is considered to be one of the sides of a coin. The consumers being on the other side. The residues from these pesticides has a drastic effect on health such as immune-suppression, harmone-disruption, diminished intelligence, reproductive abnormalities and cancer.

The use of chemical pesticides cannot be eradicated at stretch but it can be reduced in such a way that it is prescribed accordingly to the count of the pests. Controlling of pests has been a major challenge to farmers. pest infestation should be stopped as the farmers are not able to detect it or they are detected at very latter stage where no rescue can be done.

II. PROCEDURE

A setup has to be created such that the web camera captures only the white flies which is present on a leaf. The incoming video frame from the web camera that has to be focus on a plant where the selection of the colour model will be taken place based on the video.

The intensity sampling for proportion of plants infested with pests could be the most useful procedure while performing segmentation.
Morphological processing may be employed to reduce noise typically for binary and grayscale images and we count the number of pest affected to a plant and display the same with amount of pesticides to be sprayed.

The methodology for the procedure of the proposed system can be categorised into five major steps: image acquisition, select suitable colour

models, segmentation, noise removal, feature extraction.

A. Image Acquisition

A setup has to be created such that the web camera captures only the white flies which is present on a leaf. The incoming video frame from the web camera that has to be focus on a plant where the selection of the colour model will be taken place based on the video.

B. Select suitable color models

The various colour models available are

RGB

CMYK

Gray scale

YCbCr

HSV

C. Segmentation

Fig1.Before and after segmentation

Division into separate parts or sections.

Op(x,y) = white, cr(x,y)>= threshold

black, cr(x,y)<= threshold

D. Noise Removal

We perform erosion to remove noise but while performing erosion, even the objects get removed with the noise .

To overcome erosion we use dilation which is opposite to erosion.

Dilation adds pixels to the boundaries of objects in an image, while erosion removes pixels on object boundaries.

Fig2. Before and after erosion and dilation

E. Feature Extraction

To count the number of pests on a plant, we use Moore's algorithm where the count gets incremented.

III. RESULTS

From the data that is obtained the extended region grow algorithm is applied and we obtain these certain results using the matlab and image processing toolbox.

Filtering is a process of cleaning up the appearance of the image from noise caused by different lighting conditions. Digital image processing required filtering to yield a usable and attractive end result. There are different techniques available and the best options depend on the image and how it will be used. In this we use median filter. Median filter looks at its nearby neighbor's pixel values to decide whether or not it is representative of its surrounding pixels and replaces with the median of those values.

IV.FIGURES AND TABLES

Table.1 shows the minimum and maximum saturation values for various observations of flies on leaves based on their intensity differences.

Table1. Saturation values

Saturation	min	max
1	0.02	0.13
2	0.02	0.31
3	0.03	0.27
4	0.01	0.08
5	0.01	0.08
6	0.02	0.07
7	0.02	0.12
8	0.02	0.13
9	0.06	0.28
10	0.01	0.07

Fig3. Represents the flow chart of saturation process. It briefly explains the flow of control and the conversion of image from black to white if condition satisfies.

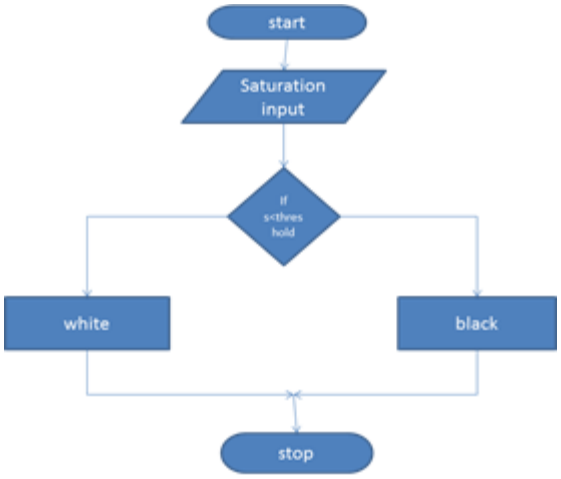

Fig3. Flowchart for saturation

Table2. Percentage of white flies w r t each crop

Crops	Percentage
Paddy	41
Wheat	21
Bajra	5
Maize	4
Gram	4
Sugarcane	2
Soybean	2
Cotton	3
Other	18

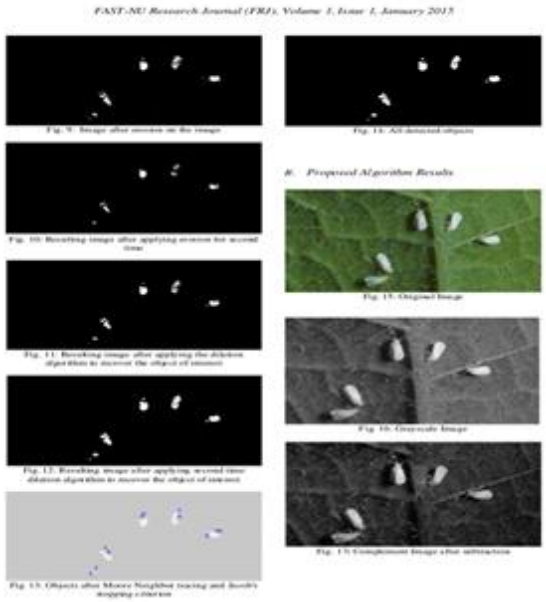

Fig4.show step by step process of the image processing algorithm

V. CONCLUSION

The image processing based pixel growing algorithm is implemented in the crop which has the pest. It results in the best identification of the pest and also the counting of the number of pest in the crop. Using this method we can improve the production of crop by predicting the pesticide amount. In the experimentation that we did provided the identification and counting in 95% .Both the Identification and counting is implemented. In future we have decided to integrate the data mining technique in the process of identifying the pest in the crop and also counting of the pest then predict the amount of pesticide to be sprayed in the field.

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Analysis of Profiling Tool – HIVELYTICS

ASTHA YADAV, DIVYA K N, KAVITHA A R, MADHU KV.
Dept of CSE, Vivekananda Institute of Technology, Bangalore, India
asthayadav.11@gmail.com, divyakn202@gmail.com,
kavithaar2208@gmail.com, m1631995@yahoo.com.
Prof R CHANDRAMMA.
HOD, Dept of CSE, Vivekananda Institute of Technology, Bangalore, India
rchandramma.vkit@gmail.com

ABSTRACT
Apache Hive is used for data warehousing and analysis tool. Developers write HIVE queries similar to SQL, these HIVE queries are converted into MapReduce programs to runs on a cluster. Research on performance comparison and diagnose are became more popular now-a-days. The generated MapReduce code is hidden from developers so instrumentation techniques cannot be applied to intermediate MapReduce code generated from Hive query. Run time logs are the only place where a developer can get to know about the actual execution. Usage of automatic tool to extract information and to generate report from logs will help in understanding the execution behavior of query.
We designed a profiling tool called HIVELYTICS for the execution of individual Hive queries by extracting information from HIVE and Hadoop logs. The profile consists of detailed information about the queries like Map Reduce jobs, tasks and attempts belonging to it. It will be stored in JSON format and later can be retrieved to generate reports in charts or tables. To demonstrate that our profiling tool will allow developers in comparing HIVE queries written in different formats, running on different data sets and configured with different parameters, we run numerous of experiments on AWS with TCP-H data sets and queries. It is also able to compare tasks/attempts within the same job to diagnose performance issues.
Keywords—Hive, hadoop, JSON, Map Reduce, Profiling tool, HiveQL

INTRODUCTION

Analysis is the process of breaking a complex topic or substance into smaller parts to gain a better understanding of it. Analysts in the field of engineering look at requirements, structures, mechanisms, and systems dimensions. Analysis is an exploratory activity.The Analysis Phase is where the project lifecycle begins. The Analysis Phase is where you break down the deliverables in the high-level Project Charter into the more detailed business requirements. The Analysis. Phase is also the part of the project where you identify the overall direction that the project will take through the creation of the project strategy documents.
Gathering requirements is the main attraction of the Analysis Phase. The process of gathering requirements is usually more than simply asking the users what they need and writing their answers down. Depending on the complexity of the application, the process for gathering requirements has a clearly defined process of its own. This process consists of a group of repeatable processes that utilize certain techniques to capture, document, communicate, and manage requirements.

PRELIMINARY

Hive supports a high level programming language called Hive Query Language (HiveQL) which is similar to Structured Query Language (SQL). Queries written in HiveQL will be analyzed and converted into Hadoop MapReduce jobs. These jobs are then submitted to Hadoop cluster to process. A MapReduce job consists of a *map* and a

reduce phase. if a reduce phase is present, a shuffle phase is required to synchronize these two phase. *Map* phase- a number of map tasks run in various nodes to process different partitions of the job input data. Intermediate results sorted by key and stored temporary in the local file system. They are partitioned and transferred to nodes- *Shuffling* phase. When reduce task receives all intermediate data in its key space, it starts to run a reduce function on each key value list pair- *Reduce* phase. Task is the basic execution unit and each execution of a task is called an *attempt*. In summary, we are able to extract three types of logs such as hive log, jog log and attempt log. The hive log is generated by HIVE. The other two are generated by YARN framework containing detailed MapReduce job execution information. This framework allows users to configure a log directory in HDFS. All logs of jobs will be stored in sub-directories identified by user name and jobID.

RELATED WORKS

A Kavitha et.al (2013): This paper explains us Big Data in simple language. What do you mean by Big Data? What are the traits of big data? It gives brief up of MapReduce model and oracle database. They mentioned case of Patient health information system on cloud. The real tie application of Big Data can also be in patient health information (PHR).

They mentioned three aspects of the system. This application using finger print or iris pattern or face pattern of patient.

Albert Yu et.al (2012): We study the problem of assigning subscribers to brokers in a wide-area content-based publish/subscribe system. Arnab Nandiet.al (2012): Computing interesting measures for data cubes and subsequent mining of interesting cube groups over massive data sets are critical for many important analyses done in the real world.

Bhandarkar, M. (2010, April): Summary form of only given: Apache Hadoop has become the platform of choice for developing large-scale data-intensive applications.

Borthakur et.al (2011): Apache Hadoop platform is the first user-facing application of Facebook which is built on Apache HBase is a database-like layer built on Hadoop designed to support billions of messages per day.

ARCHITECTURE

The design of the system is perhaps the most critical factor affecting the quality of the software. The objective of the design phase is to produce overall design of the software. It aims to figure out the modules that should be in the system to fulfill all the system requirements in an efficient manner. The design will contain the specification of all these modules, their interaction with other modules and the desired output from each module. The output of the design process is a description of the software architecture.

The design phase is followed by two sub phases- High Level Design, Detailed Level Design

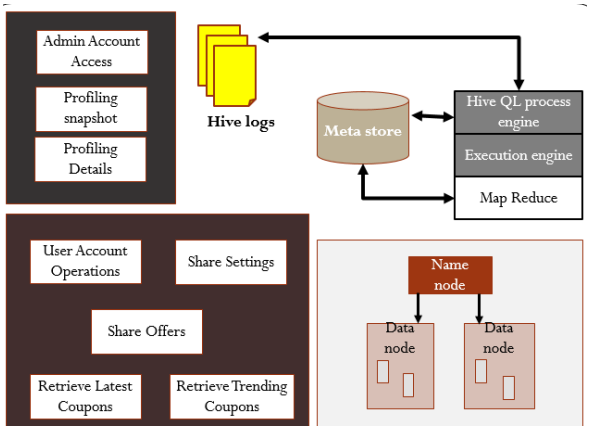


Fig. 1: System architecture.

The above figure shows a general block diagram describing the activities performed by this project. The entire architecture has been implemented in nine modules which we will see in high level design and low level design.

Data Access Layer

Data access layer is the one which exposes all the possible operations on the data base to the outside world. It will contain the DAO classes, DAO interfaces, POJOs, and Utils as the internal components. All the other modules of this project will be communicating with the DAO layer for their data access needs.

Account Operations

Account operations module provides the following functionalities to the end users of our project.

- Register a new seller/ buyer account
- Login to an existing account
- Logout from the session
- Edit the existing Profile
- Change Password for security issues
- Forgot Password and receive the current password over an email
- Delete an existing Account

Account operations module will be re-using the DAO layer to provide the above functionalities.

Coupons Retrieval

Here, the user will be able to retrieve the coupons from various online stores. Our service layer will be invoking Rest API call which communicates with various stores online and provides us the coupons information along with the coupon code and the expiry date for retrieving the coupons. The user will have to register / create their account in the coupons applications before they can retrieve these coupons. The coupons has been categorized into Trending and Latest coupons. Trending coupons are those which will be accessed by most number of users. Latest coupons are those which are recently uploaded by the online stores.

Coupons Sharing

Here, the user will be able to share the coupons they obtained from the previous component with their friends/ relatives. The users will have to provide the email address of the person with whom the user must share the coupons with. Our coupons application will be triggering an email to the specified recipient and sends the details like the coupons code, title, description, expiry date, and the link from where the offer can be retrieved from.

Admin Account and Logs Path Configuration

Here, the admin of the coupons application will be able to access the Hive Analysis component by providing his/her access details. We are not providing the registration module for the Hive Analysis application, because the Hive analysis application is secured and only the admins of the Coupons application must be accessing the Hive analysis application. The admin after logging in to the Hive Analysis application, will be able to configure the path where the hive logs file are present. Hive logs files will be generated upon continued access to Coupons Application.

Hive Analysis

Here, the admin of the coupons application, after logging into the Hive analysis application, will be able to analyze the log files generated by the coupons application. We are providing two sub types of analysis here: Dashboard and Details. In the dashboard page, the admin will be viewing the summary of the logs files generated, like total log files found, total number of successful queries, total number of failure queries, query which took maximum time, and the query which took minimum time. In the details page, the admin will be able to access the profile of individual hive query in detail. Each query will have its own profile. The profile information includes command, command type, start time, end time, total time, result, and the error details if any.

EXPERIMENTAL RESULTS

Below fig 2, shows the Hive log format. Each time when log file is created it will be in below format, which is not easily understandable, So our tool is used to make it understand. There are two formats-Profiling Dashboard and Profiling Details.

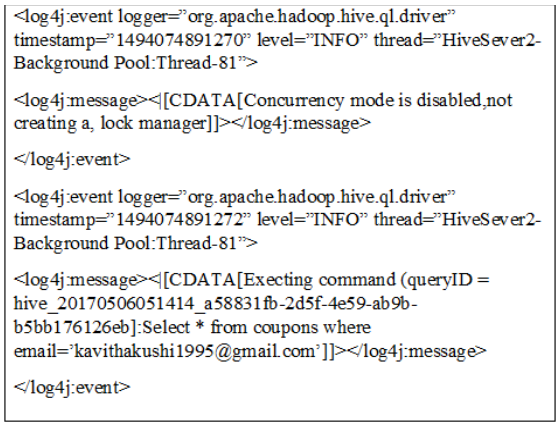


Fig. 2: Hive Log.

PROFILING DASHBOARD

To know about multiple queries we make use of profiling dashboard option, So total number of queries executed, which query took maximum time, number of failure and success queries will be known easily by our tool.

Below snapshots shows the view of profiling dashboard.

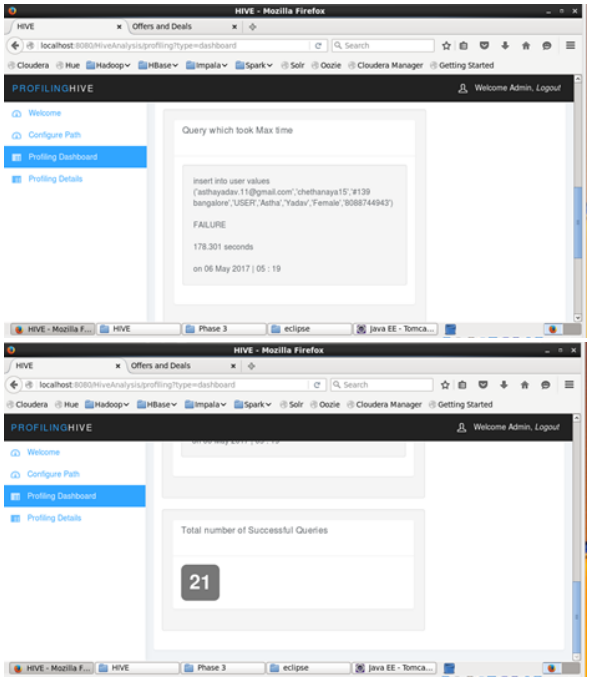
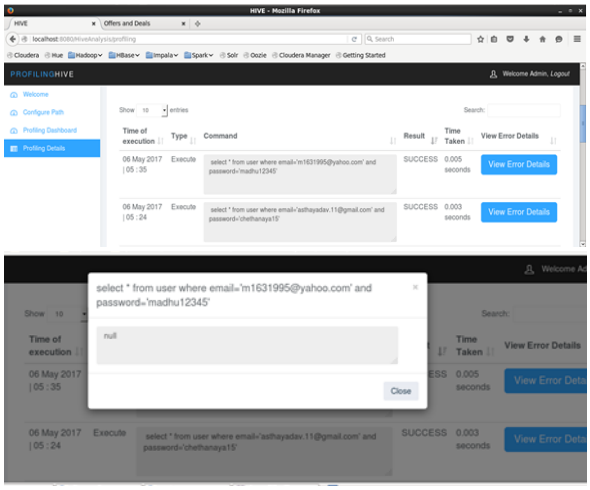


Fig. 3: Profiling Dashboard Option.

PROFILING DETAILS

To know the information of one particular query we make use of profiling details option, and we also have a option of view error details to get to know which query actually failed and for what reason it failed. It also shows time taken by particular query.

Below snapshots shows the success and failure of queries and reason for failure which is easy to understand.



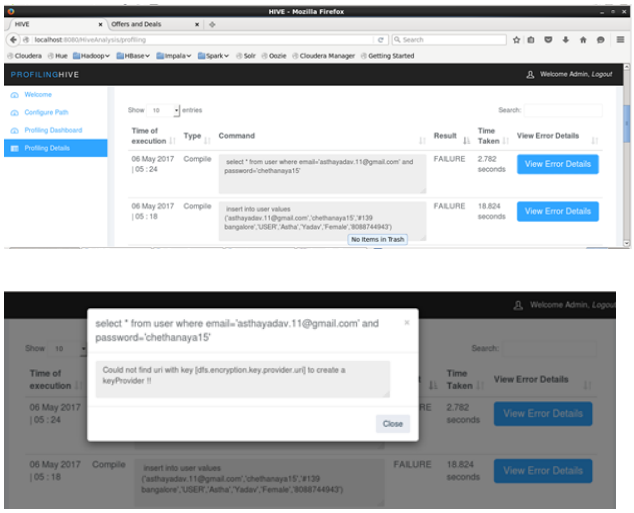


Fig. 4: Profiling Details Option.

CONCLUSION

We presented a HIVE profiling tool based on log analysis. This profiler is able to extract information from various log files to build profiles of individual queries. It also provides visualization tools to help developers show details of a particular query, job or task and to compare profiles of multiple queries against each other on various aspects. Our experiment shows that it can be used in performance analysis, diagnose and parameter selection. Though not presented in the experiment, our profiler can be a useful tool to test the impact of new software features. It can effectively replace the hand drawn charts and tables in reports of new feature and new improvements.

Future work of this project includes the integration part with the cloud service provider to make this project available online in real time.

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CATEGORY: CSE

DESIGN AND DEVELOPMENT OF COST-EFFECTIVE TOUCHSCEEN USING REALTIME VIDEO PROCESSING

NARAYANA HM, NETHRA N, DHANYA NA, CHINMAYI AATREYA, VIKRANTH RANA
Information Science and Engineering, Visvesvaraya Technological University
Bengaluru, India
narayana.hm@gmail.com;nethra.nm14@gmail.com; nadhanya17@gmail.com;
chinmayiaatrey44@gmail.com; vikranth023@gmail.com

ABSTRACT

In this paper, we design and develop cost-effective touchscreen using realtime video processsing. This consists of home made projector , web camera, android phone, magnifying glass and a laptop with matlab software. The application we are using here is simple calculator. We are projecting the calculator on the wall , by enabling tactile sensation we enter the numbers and the mathematical operations are performed in matlab using video processing. The result will be displayed in matlab and as well as announced through the speakers.

I. INTRODUCTION

The interaction with computers has evolved from punch cards to keyboards to touchscreens. These input modules have been gaining importance due to case of use, but at the same time, they are expensive and can create e-waste.

Thus, the new technology for human-computer interaction (HCI), which is gaining limelight now a days is natural user interface. Natural User Interface (NUI) – Is a user interface that is effectively invisible as the user continuously learns increasingly complex interactions.Here, non-interactive objects such as tables and walls can be converted into touchpads, for easy interaction with computers.

II. WORKING

In this paper, we develop an algorithm to identify the touch made on the projected area and identify its coordinates.

Figure. 1 shows the setup for "Design and development of cost effective touch screen using real time video processing " consists of a medium (any),camera,projector and a video processor.

The image is stored in the input frame which in turn under goes color processing.

For example,to use a calculator,extraction of hand and postion of hand is used to add the numbers example 2+2=4 this result will be returned back to the projector displays the result on the wall. We can use the walls,tables or any medium can be converted into touch pad for easy interaction with computer or android phone.

III. SYSTEM DESIGN

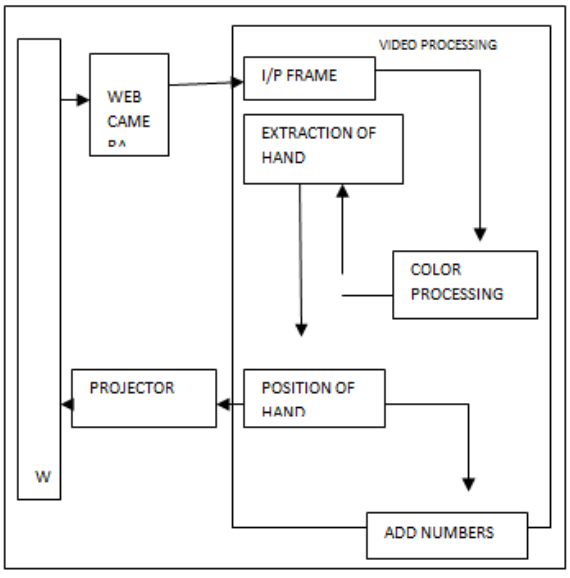

Fig. 1 System Architecture

The diagram in Fig. 1 describes system architecture of the system and Fig. 2 illustrates functionality of the system.

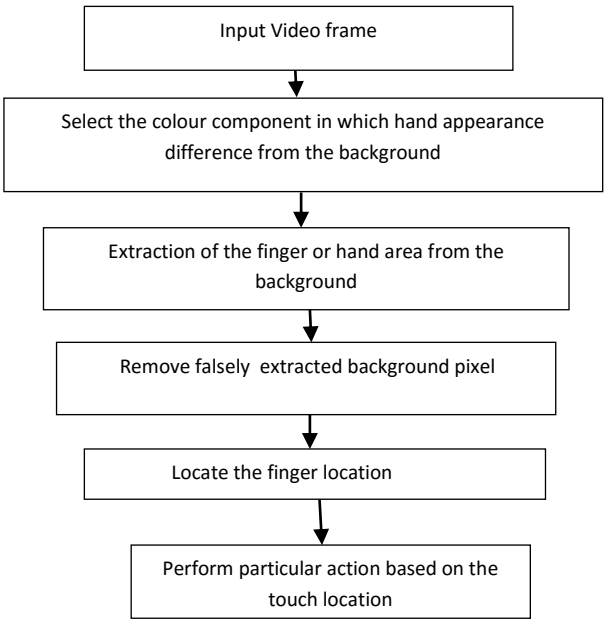

Fig. 2 Functionality of the system

Figure. 2 shows the Implementation which is the stage of project when the theoretical design is turned into working system. Thus it can be considered to be the most critical stage in achieving a successful new system and in giving the user confidence that the new system will work and be effective.

IV. RESULTS

The proposed system implements design and development of cost-effective touch screen using real time video processing.

V. CONCLUSIONS

The proposed project has various application. It can be used for applications such as calculator , piano, gaming, railway stations, movie theatres ,painting applications etc.

This paper allows us to use a cost-effective touch screen.

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AUTHOR PHOTOS AND BIOGRAPHY

[1]. Prof. NARAYAN H M is currently Associate Professor in the Computer Science & Engineering Dept. at M S Engineering College, Bangalore.

[2]. Ms. Nethra N is BE 8th sem student of Information science & Engineering Dept at M S Engineering College, Bengaluru.

[3]. Ms. Dhanya N A is BE 8th sem student of Information science & Engineering Dept at M S Engineering College, Bengaluru.

[4]. Ms. Chinmayi Aatreya is BE 8th sem student of Information science & Engineering Dept at M S Engineering College, Bengaluru.

[5]. Mr. Vikranth Rana is BE 8th sem student of Information science & Engineering Dept at M S Engineering College, Bengaluru.

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CATEGORY: CSE

A GRAPHICAL AUTHENTICATION SYSTEM TO RESTRICT SHOULDER SURFING ATTACK

NITISH SINHA, PRASHANT SHARMA
Computer Science and Engineering Department, M.S engineering College navrathna agrahara, Bangalore, India
nitish6514@gmail.com;sonyprashant48@gmail.com

ABSTRACT

Password based authentication are used to provide computer security. We have used alphanumeric strings, as passwords. Sometimes we choose bad passwords, and inputting these password in an insecure way, i.e in public may lead to shoulder surfing attack. Shoulder surfing attack is looking over someone's shoulder to get the authentication detail. Here an attacker can directly observe the password through naked eyes, or can use external recording devices like "video camera" to collect user data.

To overcome this, we proposed a new authentication system i.e Pass Matrix. Pass Matrix is based on graphical password to avoid shoulder surfing attacks.

I. INTRODUCTION

Through several studies, it is found that we humans are much more capable of remembering image-based password than the textual password for long term memorization. It is easier to recollect image-based password, as a result we user can setup a complex authentication password and are capable of recollecting it after long time even if the memory is not activated periodically.

However, most of these image-based passwords are vulnerable to shoulder surfing attacks (SSAs).

In this paper, we present a secure graphical authentication system named PassMatrix that protects users from becoming victims of shoulder surfing attacks when inputting passwords in public through the usage of one-time login indicators.

II. PROCEDURE

We will carry out the usability study in two sessions an initial session and a follow-up session. In the first session, We have to create an account in PassMatrix. The following descriptions show how the first session was conducted in detail.

1) Introduction phase: We explained the basic idea and purpose of PassMatrix with a presentation and showed participants how to use the system with some simple animations.

2) Registration phase: We will create an account consisting of a username and a password in PassMatrix. In the introduction phase, participants were educated by our tutorial so that

a) We know that we have to register our account in a private place. Hence it is safe to choose pass-squares by simply clicking on them during the registration phase.
b) Then we have to choose the pass squares that do not contain light objects but are meaningful to us.
c) Then we should re-choose the chosen square in each pass-image for confirmation.
d) Then we have to set three or rmore pass-images.

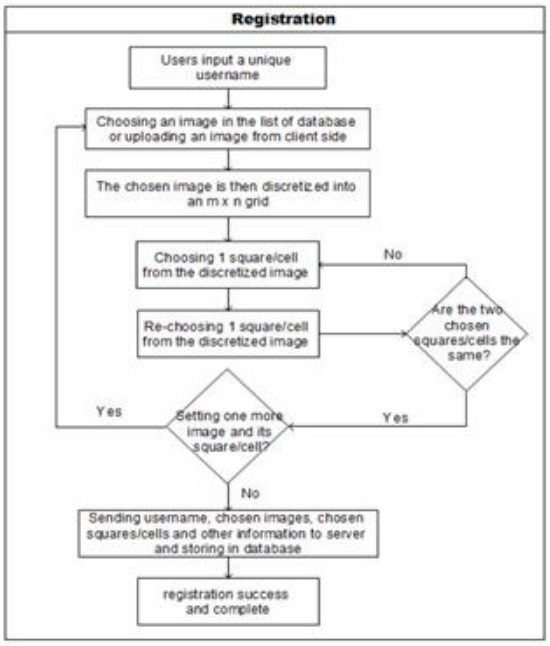
3) Practice phase: We must log into our account in a practice mode. Then we will repeate this step until we know how to control the horizontal and vertical bars. The PassMatrix system gives the authentication feedback to users only after the whole password input process is completed, not in between each pass-image.

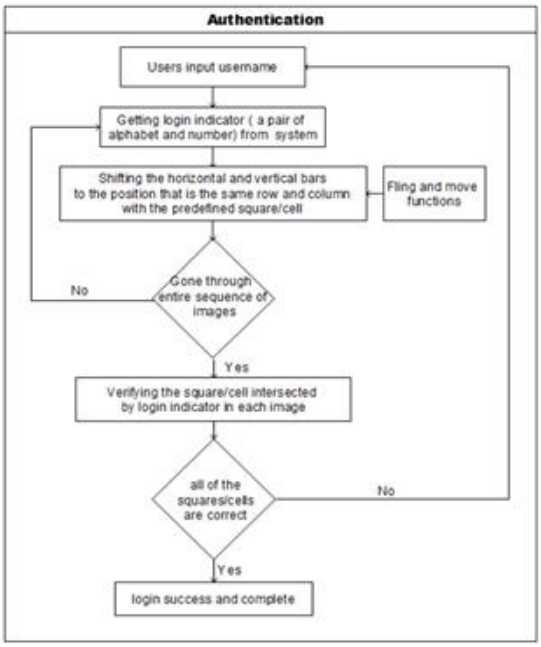
4) Login phase: After practicing, we will log into our account formally in a login mode.

5) Then we will be asked to answer a short demographic questionnaire about some simple personal data and our personal experience on mobile phones or authentication systems.

6) Then we will be then given an answer sheet, containing the information of a third person's two previous login records. We will be asked to figure out the third person's pass-squares from the two given login records. An incentive gift will be provided if any one will be able to successfully crack the password in ten tries (i.e., ten guesses on the answer sheet). Two weeks were given to crack the password. In the follow-up session (two weeks later), we have to

1) log into PassMatrix repeatedly until three successful logins,
2) answer another questionnaire sheet about their user experience on PassMatrix, and
3) turn in their answer sheet for the pass word cracking experiment.





Registration phase

At this stage, the user creates an account which contains a username and a password. The password consists of only one pass-square per image for a sequence of n images. The number of images (i.e., n) is decided by the user after considering the trade-off between security and usability of the system. The only purpose of the username is to give the user an imagination of having a personal account.

The username can be omitted if PassMatrix is applied to authentication systems like screen lock. The user can either choose images from a provided list or upload images from their device as pass-images. Then the user will pick a pass square for each selected pass-image from the grid, which was divided by the image discretization module. The user repeats this step until the password is set.

Authentication phase

At this stage, the user uses his/her username, password and login indicators to log into PassMatrix. The following describes all the steps in detail:

1) The user inputs his/her username which was created in the registration phase.

2) A new indicator comprised of a letter and a number is created by the login indicator generator module. The indicator will be shown when the user uses his/her hand to form a circle and then touch

the screen. In this case, the indicator is conveyed to the user by visual feedback. The indicator can also be delivered through a predefined image or by audio feedback that we have mentioned in the previous section.

3) Next, the first pass-image will be shown on the display, with a horizontal bar and a vertical bar on its top and left respectively. To respond to the challenge, the user flings or drags the bars to align the pre-selected pass-square of the image with the login indicator. For example, if the indicator is (E,11) and the pass-square is at (5, 7) in the grid of the image, the user shifts the character ”E” to the 5th column on the horizontal bar and ”11” to the 7th row on the vertical bar (see Figure 12).

4) Repeat step 2 and step 3 for each pre-selected pass image.

5) The communication module gets user account information from the server through Http Request POST method.

6) Finally, for each image, the password verification module verifies the alignment between the pass square and the login indicator. Only if all the alignments are correct in all images, the user is allowed to log into PassMatrix.

III. RESULT

The results are presented in two perspectives: accuracy and usability. The accuracy perspective focuses on the successful login rates in both sessions, including the practice logins. The usability perspective is measured by the amount of time users spent in each PassMatrix phase. The results of these two analyses strongly suggested that PassMatrix is practical to use. At the end of this section, we also presented the statistics of the survey data from participants about their personal background and user experience on smart phones and PassMatrix.

IV. CONCLUSION

With the increasing trend of web services and apps, users are able to access these applications anytime and anywhere with various devices. In order to protect users' digital property, authentication is required every time they try to access their personal account and data. However, conducting the authentication process in public might result in potential shoulder surfing attacks. Even a complicated password can be cracked easily through shoulder surfing. Using traditional textual passwords or PIN method, users need to type their passwords to authenticate themselves and thus these passwords can be revealed easily if someone peeks over shoulder or uses video recording devices such as cell phones.

To overcome this problem, we proposed a shoulder surfing resistant authentication system based on graphical passwords, named PassMatrix. Using a one-time login indicator per image, users can point out the location of their pass-square without directly clicking or touching it, which is an action vulnerable to shoulder surfing attacks.

Because of the design of the horizontal and vertical bars that cover the entire pass-image, it offers no clue for attackers to narrow down the password space even if they have more than one login records of that account. Furthermore, we implemented a PassMatrix prototype on Android and carried out user experiments to evaluate the memorability and usability. The experimental result showed that users can log into the system with an average of 1:64 tries (Median=1), and the Total Accuracy of all login trials is 93:33% even two weeks after registration. The total time consumed to log into PassMatrix with an average of 3:2 pass-images is between 31:31 and 37:11 seconds and is considered acceptable by 83:33% of participants in our user study.

Based on the experimental results and survey data, PassMatrix is a novel and easy-to-use graphical password authentication system, which can effectively alleviate shoulder-surfing attacks. In addition, PassMatrix can be applied to any authentication scenario and device with simple input and output capabilities. The survey data in the user study also showed that PassMatrix is practical in the real world.

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THE AUTOMATION TECHNOLOGY SUCH AS CUCUMBER

SHIVAM KUMAR, ASHOK GOWDA C.R, AMEER KHAN, CHAITANYA GOWDA C, MADHUSUDHAN REDDY GR

[#]Computer Science &Engineering, M.S Engineering College
NavarathanaAgrahara, Sadahalli Post, Bangalore-562110, India &7406257516
[1]ShivamKumar7k@gmail.com, [2]ashokcr1994@gmail.com, [3]akhan5352@gmail.com,
Chayagowda1997@gmail.com,[5]michelmadhu@gmail.com

ABSTRACT

In the software industry, A Behaviour -Driven Development (BDD) tool, Cucumber, has been widely used by practitioners. Usually product analysts, developers, and testers manually write BDD test scenarios that describe system behaviours. Testers write implementation for the BDD scenarios by hand and execute the Cucumber tests. Cucumber provides transparency about what test scenarios are covered and how the test scenarios are mapped to executable tests. In the present era, where most of the projects are migrating to agile methodology, it is often required to implement good testing practices so as to deliver quality product to the customer in shorter cycles/sprints. Test Automation as such has gained lot of importance and is part of Agile and Traditional projects. However with the changing trends, it is equally important to transform from the traditional automation approach to agile test automation. This paper explains about one such automation approach that can be effectively implemented as part of agile process. This paper describes key problems in today's software life cycle where delivering software to the market at a faster pace has become a challenging task. With QA being a separate testing phase, there is always a time gap between development and deployment. This paper first explains on the problem statement and the proposed solution to meet the changing customer demands by delivering the software at a faster rate to the market by reducing the overall QA cycle time. The remainder of the paper focuses on using the automation framework, its implementation in an agile methodology, advantages, future road map and the conclusion.

I. INTRODUCTION

Behavioural Driven Development (BDD) testing uses natural language to describe the "desired behaviour" of the system that can be understood by the developer, tester and the customer. It is a synthesis and refinement of practices stemming from TDD and ATDD. It describes behaviours in a single notation that is directly accessible to domain experts, testers and developers for improving communication. It focuses on implementing only those behaviours, which contribute most directly to the business outcomes for optimizing the scenarios.

II. PROCEDURE

Step 1: Create a blank maven project

Step 2: Add dependencies to your maven project

Step 3: Create /src/test/resources

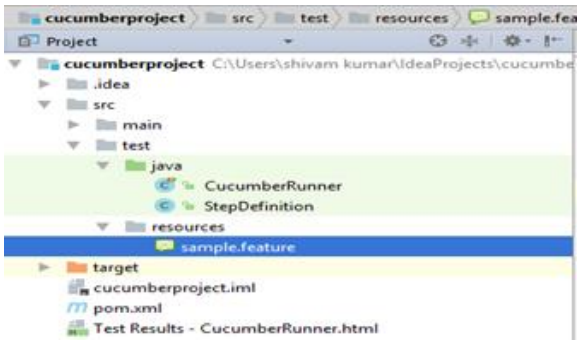

Fig 1: src/test/resources

Step 4: Create /src/test/resources folder.

Step 5: Create a feature file inside the resource folder. Feature file contains one or more test

scenarios in the human readable English language. (in BDD style)

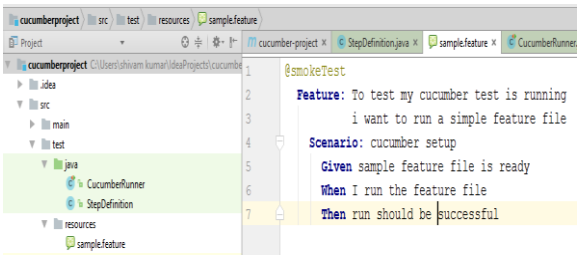

Fig 2: Feature file

Step 6: Create a JUnit Runner class that executes the test scenarios in the feature file. Cucumber reads all the feature files from the src/test/resources/ folder and its sub-folders and executes.

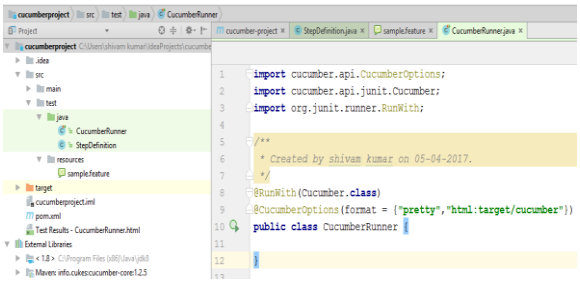

Fig 3: JUnit Runner

Note: If you want to run only the feature files from a specified package in the resources directory, you can do by adding another option.

@Cucumber.Options(format={"pretty", "html:target/cucumber"}, feature = "com/learn")

Step 7: Run the JUnit Runner file. (CucumberRunner.java). This will result in skipping all the test steps. Because the program don't know what each step means. Say it doesn't know to interpret "I run the feature file". So, we need to define what each step means. The file that is used to achieve this is called step definition file.

Step 8: Write a step definition java file. You can refer each method to a step and each step belongs to either "Given", "When" or "Then" category. Take a closer look at the step definition and the code inside that method. They will match. This is where the bridge is layed out. Eg. "Sample feature file is ready" is step definition. They are core classes of your project that is present in the scr/java/… package.

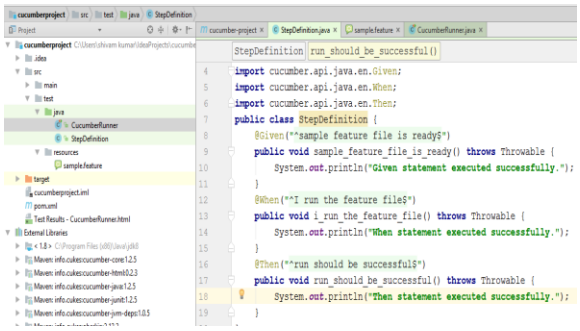

Fig 4: Junit Runner Output

Step 9: Run the JUnit runner file again. It results as below.

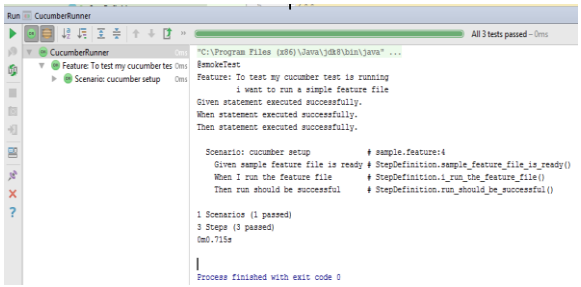

Fig 5: JUnit Runner Output again

III. RESULTS

To get the result of the program, we need to run the JUnit runner file again and we will get the output as shown below:

The green colour buttons on left side of the snapshot shows that our test cases runs successfully. If we did not get the green colour button on the left side of snapshot i.e if we get Red colour button it indicates that our test cases did not run successfully then further we need to check our test cases.

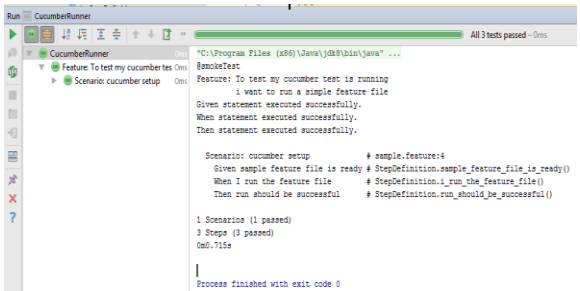

Fig 6: Output of Runner Class

Now once we got the test cases successfully executed then we can export to the browser by "Export test results" button showing left-right corner as shown in below figure:

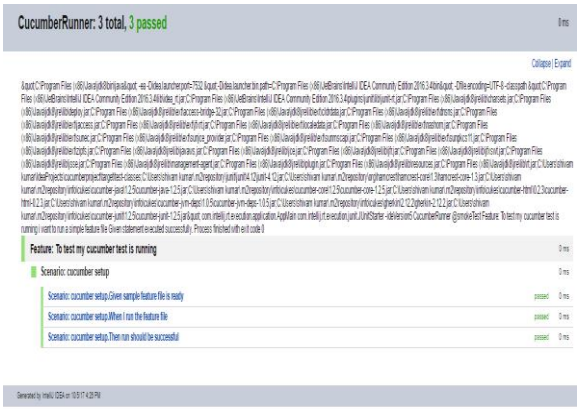

Fig 7: Output In Browser

In right side of the browser it will show time taken to pass the particular scenario. At the top it states total three scenarios are there and three scenarios passed.

IV. CONCLUSIONS

In this report we have covered most of the cucumber concepts which includes cucumber features and its usages along with web drivers.

This reduces time complexity of code which is written to design the traditional framework. Cucumber is used in most of the projects where people follow agile methodology as Behaviour Driven Development is an agile software practice. Cucumber is most favourite tool for many projects as it is easy to understand, readable and contains business functionality.

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AUTHOR PHOTOS AND BIOGRAPHY

1. Shivamkumar, Computer Science& Engineering, M.S Engineering College(MSEC), Bangalore

2. Ashok Gowda CR, Computer Science& Engineering, M.S Engineering College(MSEC), Bangalore

3. Chaitanya C, Computer Science& Engineering, M.S Engineering College(MSEC), Bangalore

4. Ameer Khan, Computer Science& Engineering, M.S Engineering College(MSEC), Bangalore

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MONITORING, TRACKING AND RESPONDING WITH VOICEREMAINDER FOR DUMP AND DEAF PEOPLE

SHIVAMKUMAR, ASHOK GOWDA CR, AMEER KHAN, CHAITHANYA C, MADHUSUDHAN REDDY G.R

[#]Computer Science & Engineering, M.S Engineering College
NavarathanaAgrahara, Sadahalli Post, Bangalore-562110, India &7406257516
[1]ShivamKumar7k@gmail.com, [2]ashokcr1994@gmail.com, [3]akhan5352@gmail.com,
Chayagowda1997@gmail.com,[5]michelmadhu@gmail.com

ABSTRACT

One of the most popular handicaps is the deaf and dumb type, which prevent person from listening and talking. The number of deaf and dumb in the world continuously increasing and they are introverted closed society. Therefore, Deaf-Dumb people do not have normal opportunities for learning. Uneducated Deaf-Dumb people face serious problem in communication with normal people in their society. It is notable, however, that most available application focus only on learning or recognition of sign language. In this paper, we introduce an integrated android application to blend uneducated Deaf-Dumb people within society, and help them to communicate with normal people. The introduced application proposes an easy translator in keyboard form that can translate any word from sign language to Arabic or English language and vice versa. This application also contains most daily words for teaching deaf and dumb kids in attractive way (colors, pictures, animations, quiz …etc). Moreover, it introduces some games that help them to communicate and entertain.

I. INTRODUCTION

Deaf and dumb is a term means a person who could not either hear or both hear and speak [1]. The number of deaf and dumb in the world continuously increasing and they are introverted closed society. The education of the deaf is only about one century old [2]. Since sign is the earliest way of communication in the world when there is no appropriate language, so the sign language is preferred among the deaf-dumb people for education. As with other forms of manual communication, Sign language depends on finger spelling. The simplest visual form of finger spelling is simulating the shape of letters in the air, or tactually, tracing letters on the hand. Finger spelling can use one hand such as in American Sign Language, French Sign Language and Irish Sign Language, or can use two hands such as in British Sign Language [3]. Uneducated Deaf-Dumb people can communicate with other people (normal or handicaps) with sign language only, so they face serious problems in their daily life. For example: restaurants, transportation, hospitals, government offices...etc. Therefore, they need an effective tool to translate their words from sign language to Arabic or English language directly. This tool can facilities their communication with normal people and encourage them to learn both Arabic and languages. Also, Deaf-Dumb kids needs to learn sign, Arabic and English languages in an interesting way. For the above reasons, the motivation of our application is to offer a service to the society in general and to Deaf-Dumb people in particular. This work is an integrated system that can easily solve most of their problems in one application. Therefore, the present work aims to:

- Help deaf and dumb to interact more with normal people
- Offer a great tool for parents to teach their deaf and dumb kids
- Introduce Sign language keyboard. - Introduce quizzes and games for training deaf and dumb to identify Arabic and English words.

II. WORKING

The primary working of Application consist of Setting up the things like threshold, first no,second No and third no are the phone number of

the guardian And the guardian email id for sending the images captured by the victim side application

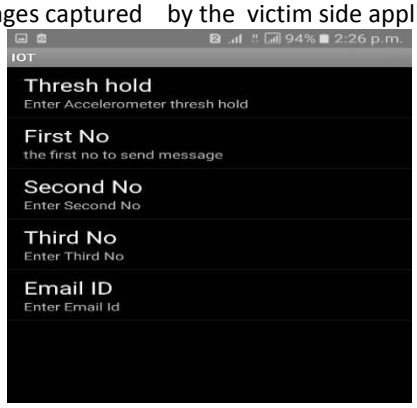

Fig. 1: Configuring The App

The victim side Application consist of iot and the voice commands to produce the voice message

Fig.2: Victim Side App Look

The Guardian side Application consist of location tracking system,getting the images of the victim from his Application

To the guardian email id given in the email id box, For tracking of the victims nearest emergency system we are making use of the nearest ambulance tab in that you should specify the victims location co-ordinates it will give you the nearest ambulance and the police information

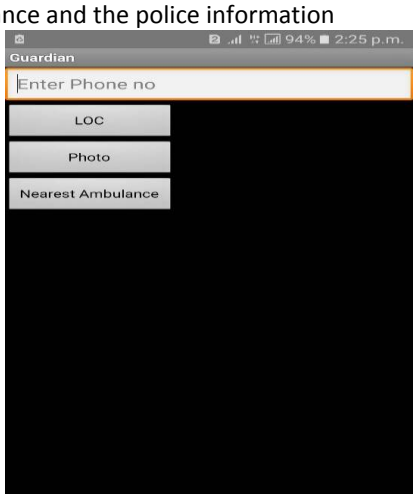

Fig. 3: Guardian Side App Look

III. RESULTS

We should have two devices with minimum 3G internet connection. We install one Guardian side application and one victim side application on respective device. Once the disabled person wants to ask something to their guardian such as he wants water then he should press button 1 and button 2. once these is pressed the voice recording will announce to the guardian side that he wants water, even though guardians phone is switched off.

If the guardian wants to know the location if his physically disabled child then he can track by using the "track location". If the victim got meet an accident then once he will shake the device twice then his parent will get a message that he is in trouble. If the guardian wants to see that in what condition his child is in then he can take the photos of his child by clicking "get photo" and he will get his photo in his mail.Even the parent can track his location, can call the nearest ambulance and can track nearest police station for help.

IV. PROCEDURES

A. System Architecture

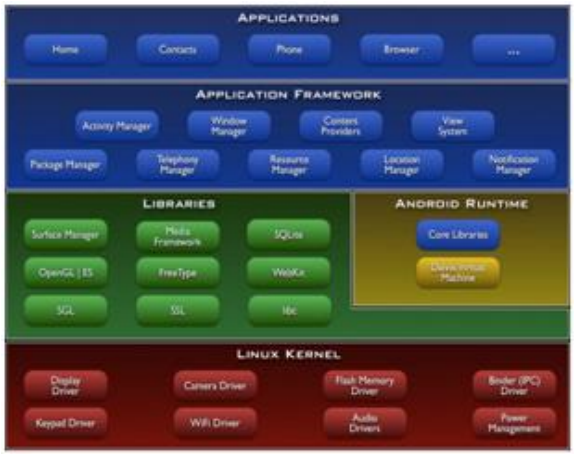

Fig. 4: System Architecture

B. System Design

At sender's side

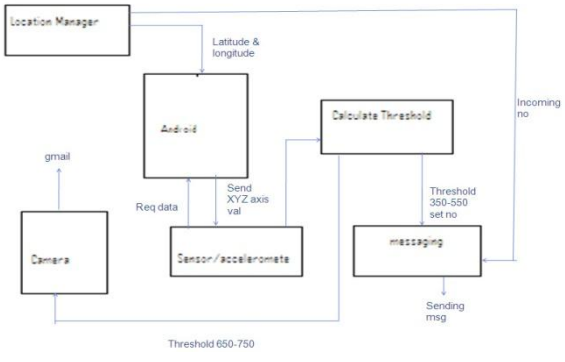

Fig 5: Senders side block Diagram

At receiver side

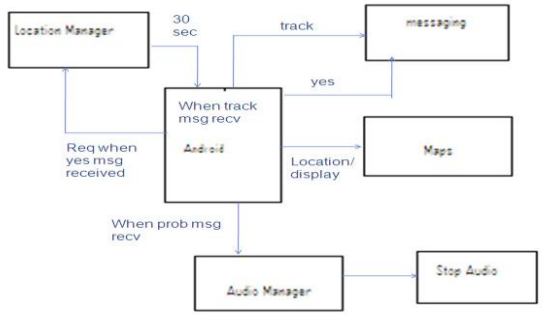

Fig 6: Receiver Side Block Diagram

V. CONCLUSION

The aim of this system is to reduce the communication gap between Deaf or dumb people and normal people. This system will improve deaf/dumb person's lifestyle. Overall system effective and efficient because of the use of android Phone. This paper is an excellent exposure for the people working in the area of designing system based on android application.

In this way, we have completed the design part of the project with the requirement specification. Modules of the project are designed and are well studied in order to fulfil the requirements of the project. Moreover, the testing part with all the test cases of the modules of the project is being carried out. Thus, the completion of partial report is being completed with full hard work and complete support and guidance of our guide and project plan is made to ensure the proper planning of the project.

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AUTHOR PHOTOS AND BIOGRAPHY

1. Shivamkumar, Computer Science& Engineering, M.S Engineering College(MSEC), Bangalore.

2. Ashok Gowda CR, Computer Science& Engineering, M.S Engineering College(MSEC), Bangalore

3. Chaitanya C, Computer Science& Engineering, M.S Engineering College(MSEC), Bangalore

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Intrusion Detection and Automation Based IOT System for Home

MALATESH S H, PUNEETH KUMAR R, ANUSREE PRAKASHAN
Computer Science and Engineering, Visvesvaraya Technological University
Bengaluru, India
mhavanur@gmail.com;puneethkumar.r950921@gmail.com;anusreeprakashan94@gmail.com

ABSTRACT
In this modern era home security and automation plays a significant role. In this paper, we present the idea of incorporating intrusion detection with automation using internet of things. Here we focus on building wireless sensor for intruder detection that sends alerts to owner smartphone via internet, also making use of the same sensors home automation can be provided where owner can manage home inside environment through smartphone app via internet. Therefore minimizing false alarm rates and minimizing human interactions.

I. INTRODUCTION

The need for home security has spiralled up significantly. In today's busy world the house owners lead inherently a busy lives, in during the absence of owner this proposed system can monitor the home under the guidance of house owner. This system deals with intruders and creating automated environment to the owner over internet.

The system uses wireless sensors that detects human and makes use of different biometric techniques for identification of human whether he is a known person or intruder then alerts the owner where house owner can take further action. The system enables automated environment when owner requires therefore he can manage anything inside his home.

II. WORKING

The system makes use of wireless sensors(OMRON D6T thermal sensor or PIR motion sensor) to detect human presence and uses biometric techniques which will be DNA matching, Face recognition, Visual biometric, Finger print recognition so to differentiate between known person as well intruder. The result is then analysed and provide access if known person is near the entrance or deny if intruder and alert the owner with the details over internet.

The system enables automated environment when owner requests for it through his smartphone application. This automated environment will comprise of different automation sensors which will be door sensor, water and gas leak sensor, Insteon sensors to manage inside environment of house through the application.

III. SYSTEM DESIGN

Working The diagram in Fig. 1 describes system architecture of the system and Fig. 2 illustrates functionality of the system

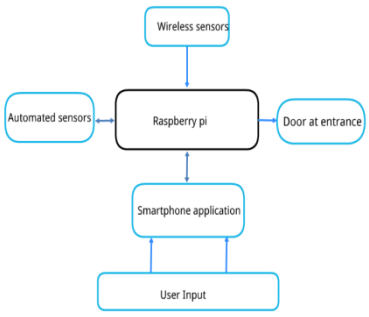

Fig. 1 System Architecture

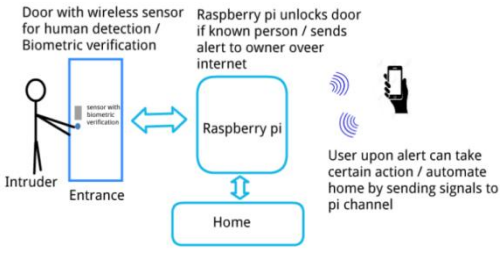

Fig. 2 Functionality of the system

IV. RESULTS

The proposed system implements detecting intruder with wireless sensors and provides automated environment over IOT.

A. Home Security: The system also capable of differentiating between known person and intruder and sending alerts to the owner(seen in Fig. 3).Upon intruder detection alert he can alert the police or neighbour through call or take actions preferably.

Fig. 3 Alert notification sent to owner

B. Home Automation.

The system also enables automated environment upon owner request through application(seen in Fig. 4). For example if owner forgets to turn off fan or any electrical appliances and leave the place, he can check the status of appliances using application and switch it off.

Fig. 4 Mobile application showing different options for home automation

V. CONCLUSIONS

The system incorporates security along with automation using IOT. The security module successfully sends alerts upon detecting intruder using wireless sensors and biometric techniques where owner further can take necessary actions also owner can successfully automate environment through app thus enabling owner to simplify complex tasks, enhance convenience and comfort, save energy efficiently, access and use home systems anywhere and enjoy completely security.

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AUTHOR PHOTOS AND BIOGRAPHY

1. Prof. MALATESH S H is currently Associate Professor in the Computer Science & Engineering Dept. at M S Engineering College, Bangalore. He received M.Tech & B.E. degree from Kuvempu University and Currently pursuing PhD. his area interest are IDS, Soft computing, Data Mining.

2.Mr. Puneeth Kumar R is BE 8th sem student of Computer science & Engineering Dept at M S Engineering College, Bengaluru.

3. Ms. Anusree Prakashan is BE 8th sem student of Computer science & Engineering Dept at M S Engineering College, Bengaluru.

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ANOMALY DETECTION TECHNIQUE FOR IOT

[1]MALATESH S H, [2]AJITH K M, [3]SIDDHARTH S NAYAK

[#]*CSE Dept., M S Engineering College*
Bengaluru, India

[1]*mhavanur@gmail.com;*[3]siddharthnayak049@gmail.com;[2]ajithgowdakm6042@gmail.com

ABSTRACT

The Internet of Things (IoT) is an ever-growing network of smart objects. It refers to the physical objects capable of exchanging information with other physical objects. Nowadays Security plays an important role so as to prevent intruders from entering home and provide access only to legitimate person. Hence, the Intrusion Detection System (IDS) is needed. Whereas, the current/existing prototype of the system sends alerts to the owner over voice calls or text message using the internet, if any sort of human movement is sensed immediately and raises an alarm resulting false alarm rate, also owner must come home and check the recorded database of the camera, to know what happened in the absence of him/her, and also the system has limited memory capacity.In this paper we implement one of its kind of IDS techniques that includes Anomaly Based Technique using Pyro Electric Sensors. If any motion is detected then PIR sensor detects the motion and the output of PIR node is given to PI camera. As soon as PI camera gets activated, captures the image of surrounding environment. The owner of house can monitor his home through an application with live feedback. This project proposed for security using IDS and which is cost effective, easily verifiable, energy efficient and does autonomous monitoring.

Keywords: Intrusion Detection System (IDS), Internet of Things (IOT);

INTRODUCTION

Pyroelectric Infrared (PIR) sensors are made of pyroelectric materials which can produce an electric potential by means of a very small change in temperature. The heat variation of a human or animal from several feet away is enough to generate a difference in charge. Hence, PIR sensors are quite fit for detecting moving targets. PIR sensors are largely accepted in indoor security systems for its low-cost, low-power, reliable performance and convenient operation.

Beyond these characteristics, it provides accurate information for target presence and even the number of targets. Nowadays, many security systems have made PIR sensors to be a good alarm of intrusion and a precise counter for targets who are people or animal. Moreover, our PIR nodes are not deployed in an indoor environment where the detecting range is confined in several meters.

They are used to detect targets within 20 meters in an environment. In this paper, we design a detecting system to monitor the surroundings using PIR sensors and Targets such as people or animals and incase of any detection PIR sensor activates the PI camera and the camera captures the image within its desired range and the captured image is been sent to the Administrator. In the further section we include the Working in (II), Flowchart in (III), Implementation in (IV), Results (V), Screenshot (VI), and Conclusion (VII).

WORKING

The system makes use of sensors i.e. PIR sensors to detect any movement in a surrounding environment. Whenever it sense any kind of human or animal movement the PIR node gets activated and immediately activates the pi camera. Once the pi camera gets activated, it captures the image of the surrounding where the camera is been mounted on to the wall.

Once the image is been captured it is sent to the user and he can also opt for live feedback if necessary. Though the administrator or the user can opt for live feedback they cannot have the audio connectivity because we do not have the connectivity of microcontroller over the pi camera which acts as a major drawback.

III. SYSTEM DESIGN

System Architecture

The diagram in Fig. 1 describes the system architecture and Fig. 2 illustrates functionality of the System.

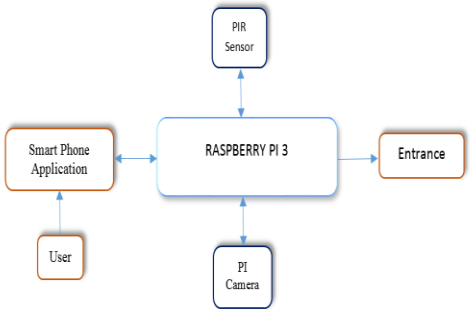

Fig. 1 Physical data flow diagram

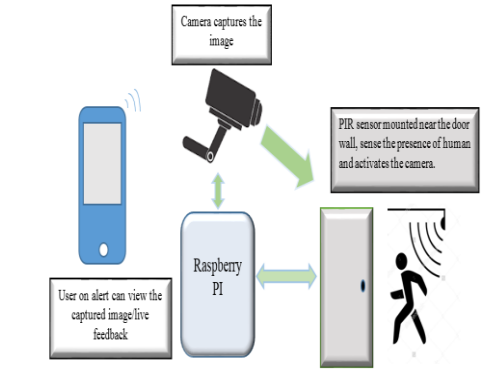

Fig.2 Functionality of the System

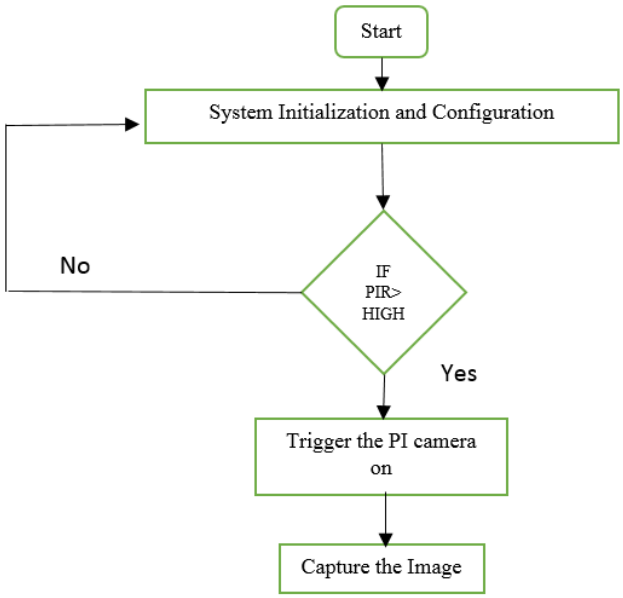

Fig 3: Flowchart

IV IMPLEMENTATION

Step 1: At the beginning of the program, the variables must be declared using suitable function for each one.

Step 2:A Suitable Python programme is written on Raspberry with the necessary libraries which are used with that function.

Step 3: Set Pin No 3 as output pin and Pin No 11 as the output pin of the PIR sensor over Raspberry PI. The function (PIN mode) is used to input digital inputs.

Step 4: The output of PIR is given to the PI camera which gets activated immediately.

Step 5: The PIR sensor and the PI camera is been connected to Raspberry pi board

Step 6: The captured image is been sent to the user and the user has the option of live feedback through the mobile application.

V. RESULTS

The proposed system implements detecting motions with sensors and provides secured environment over IOT.

Security

The system is capable of detecting motion that may be human or animal and sending alert message to the administrator or the user.

Live Feed

The PI camera is capable of giving the live feedback to user or an administrator if necessary over the smart phone.

VI SCREENSHOT

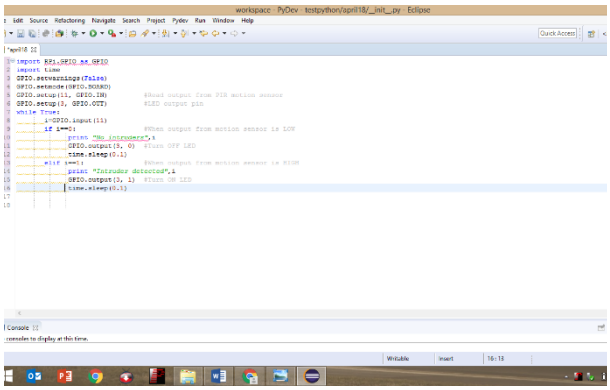

Fig 4: Code for Anomaly Detection

The above screenshot represents the code for the PIR sensor setup with Raspberry Pi.

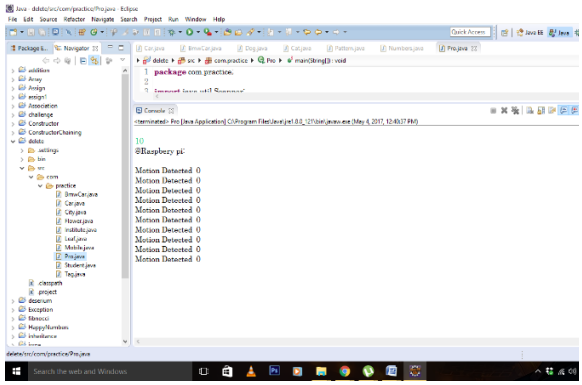

Fig5: Motion Detected when movement is observed

The Above Screenshot represents the output PIR sensor when the motion is been detected.

Conclusions

The system successfully in cooperates security with IOT. The security module will send the alerts upon detecting movement using PIR sensor and PI camera. The user or the administrator can further choose the option of live feedback and monitor the surrounding environment.

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AUTHOR PHOTOS AND BIOGRAPHY

1.Prof. MALATESH S H is currently Associate Professor in the Computer Science & Engineering Dept. at M S Engineering College, Bangalore. He received M.Tech & B.E. degree from Kuvempu University and currently pursuing PhD. his area interest are IDS, Soft computing, Data Mining.

2.Ajith K M Ris BE 8th sem student of Computer science & Engineering Dept at M S Engineering College, Bengaluru.

3. Mr.Siddharth S Nayak is BE 8th sem student of Computer science & Engineering Dept at M S Engineering College, Bengaluru.

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NCETAR - 17

CATEGORY: CSE

Elective Course System Developed Using Fuzzy Logic

CHANDANA B.S, SWATHI N, MALLIKARJUN J.P, KUMAR SUYASH
Computer science & Engineering
Bangalore, India

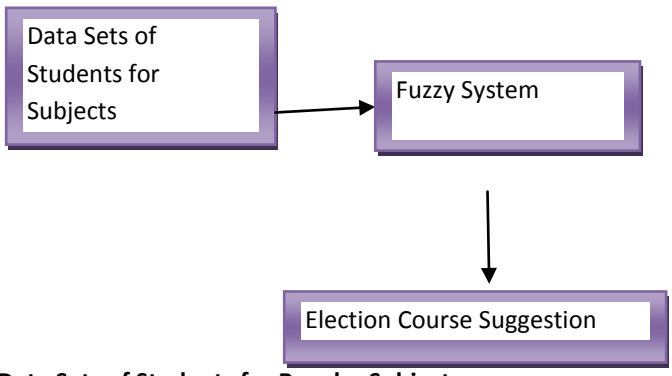
ABSTRACT

Besides required courses which are compulsory for each student to be taken, universities also offer elective courses chosen by the students themselves. In their undergraduate study, since students are not guided about the elective courses, they lack information about the description and content of the course and generally fail to take the appropriate ones for their course of study. As a solution, using the knowledge of the previous required courses taken by the student it is possible to guide the student about elective courses appropriate for him/her. In this study, information from the transcripts of students are analysed, and using this information a relationship is conducted between the required courses and the elective courses taken previously by the student. Rules are extracted by the help of data mining and an elective course suggestion system is developed using fuzzy logic. Successful results are obtained from the tests; it is observed that the students successful from the required courses are also successful in the related elective ones

I. INTRODUCTION

University includes elective courses, as well as the required ones, offered in an elective course group and to be taken by the student. Elective courses are offered in the last year of the program, and the elective course poll does not include much courses. The students are neither very well informed about the content of the elective courses nor guided about which course to take hence they choose the courses themselves with a limited. The knowledge about the course and as mentioned in researches, the Administration is a barrier to adoption in learning courses which means there is lack of guidance for students. Instead, if the student would take an elective course appropriate with his field of interest that would be better for his course of study. Analysing the courses the student has completed successfully, it is possible to determine the student's capabilities and interests. The technical elective and the required courses that the student has previously taken and been successful can be analysed and rules can be extracted.

II. Methodology



Data Sets of Students for Regular Subjects

This module takes the results of the students of the semester for the following subjects in the following format

REGISTER	WEB TECLY	PROBALITY.S	ALG& PGM	Differential Equations	D.C	Numerical Analysis	C.O	SIG .SYS	ELECTIVE
X	3	3.5	4	4.5	2	2	5	6	Y
X	-	-	-	-	-	-	-	-	N
X	-	-	-	-	-	-	-	-	

Algorithm

1. Let us consider that there are 2 classes namely yes or no . Yes indicates student will choose it has elective and No indicates student will not choose the subject as elective
2. We need to compute the information gain for each of the regular subjects
3. After that we need to find the information gain for attribute values of each regular subjects
4. In above 3 steps will generate the rules and those rules will fall The above values of the sets must be converted into a range of 0-4

Fuzzy Logic

Fuzzy Logic is an approach based on degrees of truth rather than the usual true or false Boolean logic on which the modern computer is based

In the project unlike traditional logic where in we can just say the student will select the elective or not select the elective. By using fuzzy logic one can say very weak(0.1), weak(0.2), lower medium(0.3), medium(0.4), higher medium(0.5), strong (0.6),very strong(0.7) for selection of an elective.

The degree of truth is the following

Type	Degree
Very	0.1
Weak	0.2
Lower Medium	0.3
Medium	0.4
Higher Medium	0.5
Strong	0.6
Very Strong	0.7

The Membership Function is this context is

Will Student Select this Elective?

The Membership Values are

weak(0.1), weak(0.2), lower medium(0.3), medium(0.4), higher medium(0.5), strong (0.6),very strong(0.7)

we consider that there will be 3 possible values of the electives L,H and M based on 3 dependent electives

Subject1 Subject2 Subject3 Elective One Chance

Less (0)	Low (0)	Close (0)	Very Weak (-1)
Less (0)	Low (0)	Adequate (1)	Weak (0)
Less (0)	Low (0)	Far (2)	Lower Medium (1)
Less (0)	Moderate (1)	Close (0)	Weak (0)
Less (0)	Moderate (1)	Adequate (1)	Lower Medium (1)
Less (0)	Moderate (1)	Far (2)	Medium (2)
Less (0)	Frequent (2)	Close (0)	Lower Medium (1)
Less (0)	Frequent (2)	Adequate (1)	Medium (2)
Less (0)	Frequent (2)	Far (2)	Higher Medium (3)
Medium (1)	Low (0)	Close (0)	Weak (0)
Medium (1)	Low (0)	Adequate (1)	Lower Medium (1)
Medium (1)	Low (0)	Far (2)	Medium (2)
Medium (1)	Moderate (1)	Close (0)	Lower Medium (1)
Medium (1)	Moderate (1)	Adequate (1)	Medium (2)
Medium (1)	Moderate (1)	Far (2)	Higher Medium (3)
Medium (1)	Frequent (2)	Close (0)	Medium (2)
Medium (1)	Frequent (2)	Adequate (1)	Higher Medium (3)
Medium (1)	Frequent (2)	Far (2)	Strong (4)
High (2)	Low (0)	Close (0)	Lower Medium (1)
High (2)	Low (0)	Adequate (1)	Medium (2)
High (2)	Low (0)	Far (2)	Higher Medium (3)
High (2)	Moderate (1)	Close (0)	Medium (2)
High (2)	Moderate (1)	Adequate (1)	Higher Medium (3)
High (2)	Moderate (1)	Far (2)	Strong (4)
High (2)	Frequent (2)	Close (0)	Higher medium (3)
High (2)	Frequent (2)	Adequate (1)	Strong (4)
High (2)	Frequent (2)	Far (2)	Very Strong (5)

II RESULTS AND .CONCLUSIONS

The current approach takes information from the transcripts of students and using this information a relationship is conducted between the required courses and the elective courses taken previously by the student. An elective course suggestion system is developed using fuzzy logic which helps students to acquire capacity to face real world placement hiring challenges.

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NCETAR - 17

CATEGORY: CSE

TECHNIQUES TO IDENTIFY THE ANALOGOUS CONTENT IN SOFTWARE ENGINEERING FIELD

C M MANASA, SADHNA, PRIYA KATOCH, ANICE BHOWMICK
Computer science & Engineering Department
Bangalore,INDIA.
maanasa.manjunath@gmail.com,sadhnasingh963@gmail.com.katochpriya2@gmail.com,
anice10bhowmick@gmail.com.

ABSTRACT

This paper presents the findings of a research project key features within the Software Engineering field by automatically dealing out a collection of papers till 2016. Natural Language Processing techniques have been applied to extract the key features of each publication, with publications then being clustered with similar papers to identify their common themes and highlight the key features currently being researched within the Software Engineering domain. It also includes various techniques to identify the contents in the researched published paper academically.

I. INTRODUCTION

Software Engineering is a field that investigates the application of engineering methods and principles to the design, production and maintenance of software. While writing software began in the 1940s, the term software engineering stems from the 'Software Crisis' of the 1960s, 70s and 80s, with the objective of tackling the many software development projects that over ran budget and schedule. While the objective of improving software development results has remained the same, the approaches have evolved over the past few decades. Various new approaches have appeared within Software Engineering literature, including; Formal methods, CASE tools, Object Oriented Programming, Structured Programming, Process analysis such as the Capability Maturity Model. As yet none of these themes have proved to be a 'silver bullet', although improvements have been made. The latest editions of Software Engineering textbooks add focus to themes like agile methods such as scrum, aspect oriented engineering and service oriented software

II.METHODOLOGY

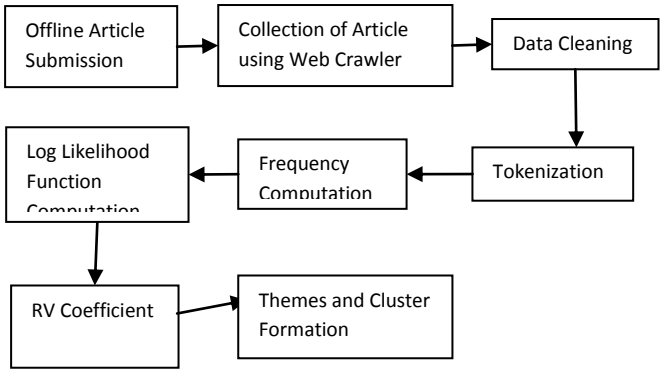

Fig: Methodology of Project

Offline Article Submission

This is a process in which the user will be able to submit the article abstract related to software engineering field. The article module is responsible for storage of articles. Article name and article description acts as an input

Collection of Article using Web Crawler

In the process user will be allowed to give Article Name and Web URL from where data has to be retrieved.

Tokenization

Tokenization is a process of converting the clean data into a set of words known as tokens. Each

of the token can be represented as *Token Id, Token Name and Article ID*

Token ID	Article ID	Token Name

Frequency Computation

This is a process in which the frequency computation is performed. For each of the articles the frequency is computed. Frequency is number of times a i^{th} token appears in article j^{th}. The frequency matrix is computed in the following format

Freq ID	Article ID	Token Name	Frequency

RV Coefficient Similarity

1. Select the two articles to be compared
2. Find the List of unique words in Article A1
3. Find the List of unique words in Article A2
4. Find the intersection set between the two lists
5. Compute the mean of the values of frequency for the words in article1
6. Compute the mean of the values of frequency for the words in article 2
7. Compute the standard deviation for the words in article1
8. Compute the standard deviation for the words in article2
9. Compute the RV Coefficient value for the 2 articles

Clustering Process

Clustering is an approach by which each of the articles are compared and then if they the value is higher than a certain threshold then they are grouped into one cluster. The process is repeated until all articles are scanned and grouping is performed.

Themes

These are set of words whose frequency is highest.

Data Cleaning Algorithm

The process of removing the stop words from the articles is referred as data cleaning The Data Cleaning algorithm is responsible for removal of stop words. Each of tweet is cleaned by removing the stop words from tweet.

These are the set of words which do not have any specific meaning. The data mining forum has defined set of keywords. Stop words are words which are filtered out before or after processing of natural language data (text). There is not one definite list of stop words which all tools use and such a filter is not always used. The list of stop words used in the algorithm are as follows

a,able,about,across,after,all,almost,also,am,among, an,and,any,are,as,at,be,because,been,but,by,can,ca nnot,could,dear,did,do,does,either,else,ever,every,fo r,from,get,got,had,has,have,he,her,hers,him,his,how ,however,i,if,in,into,is,it,its,just,least,let,like,likely,ma y,me,might,most,must,my,neither,no,nor,not,of,off, often,on,only,or,other,our,own,rather,said,say,says,s he,should,since,so,some,than,that,the,their,them,th en,there,these,they,this,tis,to,too,twas,us,wants,was ,we,were,what,when,where,which,while,who,whom, why,will,with,would,yet,you,your

Data Cleaning is used for removing the stop words from each of the tweets and clean them. After the data cleaning process is completed the clean data can be represented as a set *(CleanId, Clean Data, and Articled)*. *CleanId* is the unique Id associated with the Tweet, *CleanData* is the clean data after removal of clean data and Article Id is the unique Id associated with the article.

III.Discussion of Results

The system first collects the abstract of the articles offline or collects the abstract of the articles by parsing the web pages online. After collecting the articles data a sequence of process namely data cleaning, tokenization and frequency computation and log likelihood function is performed on all the articles. After that the RV Co-efficient is applied in order find the articles having the similar profile. Finally the articles are clustered based on closeness factors or themes of the most significant words from the article.

IV. Conclusion

In this paper, we tried to develop a vision of combining SE and NLP.. The future work entails studying each artefact of SE process models in generating more useful information. The textual specification can be a key in providing the requisite amount of information for carrying out automation.

However care needs to be taken to ensure that varying degree of interpretation does not affect the performance of the system. Natural Language processing and Software engineering although divergent, can still be combined with a view of developing a better software

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NCETAR - 17

CATEGORY: CSE

COMFORT BOX

MONICA B, KOKILA J M, STEFFY VERONICA ALMEDA, SWATHI L, DIPTI PATNAYAK
[#]Computer Science &Engineering, M.S Engineering College
NavarathanaAgrahara, Sadahalli Post, Bangalore-562110, India &7406257516
[1]monicamoni124@gmail.com,[2]kokilajm45@gmail.com,[3]steffyveronica30695@gmail.com,
swathi22sss@gmail.com,[5]diptipatnayak4@gmail.com

ABSTRACT
The Internet of Things (IOT) is the Inter-networking of physical devices(Smart Devices) embedded with electronics, software, sensors, actuators and network connectivity that enable these objects to collect and exchange data, through Internet all over the world. In early days, concepts for automations were around for decades before becoming reality and featured in the writing of 19th century. There were transmitters which were used for transmitting and receiving the electrical signals such as 'ON' and 'OFF' radio frequency. So, here we present a low-cost IOT based system, which is used to detect the Fire,Smoke and Light Intensity parameters using the respective sensors. After detection of these parameters we would get the alert messages through Internet connection. We are also providing free text messages in case of no Internet connections. If Fire,Smoke and Light Intensity parameters range exceed certain value necessary precaution are taken care automatically.

INTRODUCTION

During last year's there has been an increasing demand by buildings occupants for the continuousmonitoring of all indoor comfort related parameters. In this context the Internet of Things(IOT) promises a new era in ambient monitoring since the amount of smart devices and accessible data is constantly growing. [1].The Internet of Things(IOT) is the Inter-networking of physical devices(Smart Devices) embedded with very vast and efficient devices like electronics, software, sensors, actuators and network connectivity that enable these objects to collect and exchange data, through Internet all over the world.

In early days, concepts for automations were around for decades before becoming reality and featured in the writing of 19th century. [2]. There were transmitters which were used for transmitting and receiving the electrical signals such as 'ON' and 'OFF' radio frequency. [6]. Although comfort is a subjective concept composed by many factors most of the recent works focus on detection of harmful gases, flame and light intensity aspects and assess comfort condition. The proposed system has a great flexibility by using IOT technology to interconnectits distributed sensors to home and environment automation server. This will decrease deployment cost and will increase the ability of upgrading and system reconfiguration.

PROCEDURE

The whole system is composed by a low cost programmable small single-board computer, namely arduino and different environmental sensors. The sensors integrated in the Comfort Box are: a digital temperature and humidity sensor, smoke sensor, light sensor.The software platform is built using server,android 2.3,pda.net. Here, the server acts as both cloud and database to store data as shown in Fig.1 Hence, with the communication module, any object equipped with Internet can be connected to create a mesh network.Since the Comfort Box is connected to the internet,where proposed the monitoring of light in order to control appliances.The proposed system is a distributed home and environment Comfort system, consists of server, sensors. Finally we developed a Wireless

Sensor Networks (WSNs) to monitor concentration of gases, flame, light intensity,temperature and humidity.

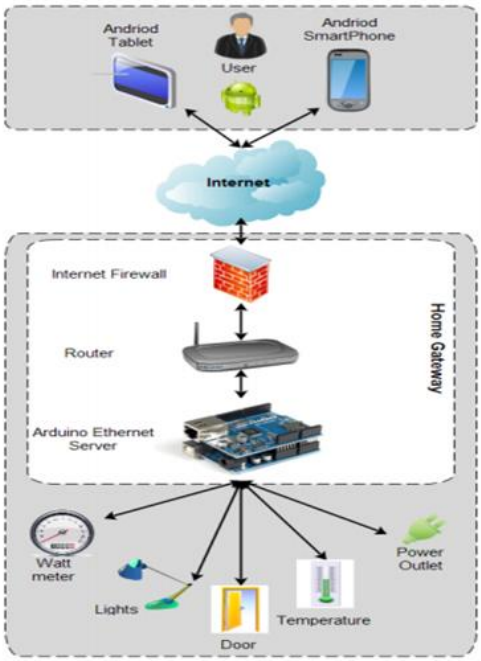
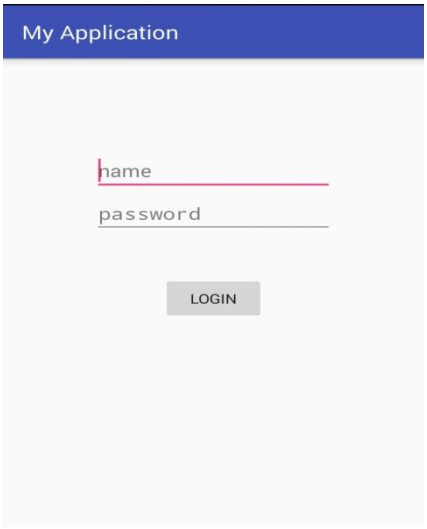


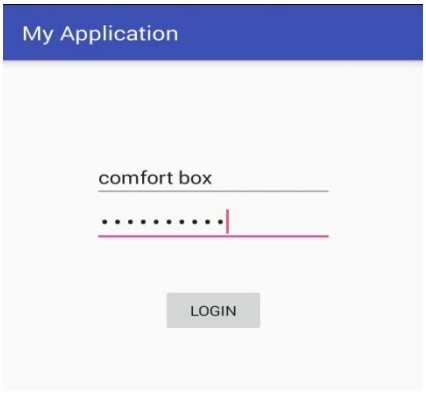
Fig: 1: System Architecture

The output of the Comfort Box would be seen in an app, with the graphical user interface. This graphical user interface is very convinient and quite efficient for the common people to use and get alerted when fire accidents happen and take necessary precautions, so that people can save their life.

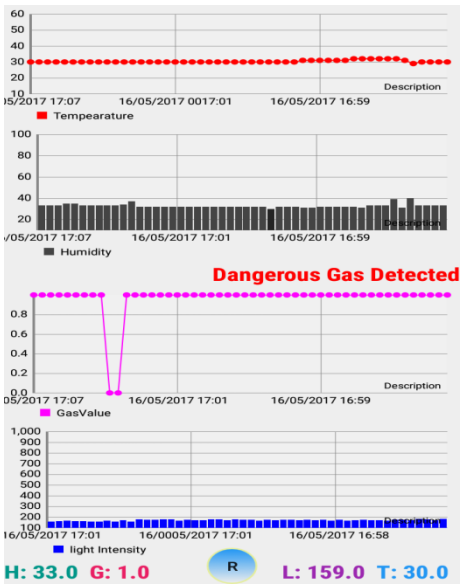
Step 1: Click on My Application App of Comfort Box and you would get a login page.



Step 2: Login with the User name and Password.



Step 3: This shows the data that is updated.



Step 4: We also would get free alert text messages as shown.

RESULTS

When fire accidents takes place, the temperature would raise and flames would occur which is detected by temperature and flame sensor.

Even the poisonous gases emmited from the flame would be detected by the gas sensor. All these parameters which are detected by the sensors are received and monitored by the microcontroller and is sent to the server. Then the respective user would receive a notifications through app which is connected to the Internet, if there is no internet connection the respective user would receive a free text message and necessary precautions would be taken care. Here automatically the light would be switched off when the light intensity increases.

CONCLUSION

The application of the IOT technology, in home automation means combination of all electrical devices like smart mobile phone, personal computer, tablet and their monitoring, controlling and alerting in ways not possible before. This proposed system provides many advantages including, safety, improved comfort, energy and cost savings. Instead of naming it as a Comfort Box we would specify it as a life saving system because there are many people who have lost their lives through fire accidents and as we are facing power supply problems, we are also providing automatic "on" and "off" the light, based on the increase and decrease of the light intensity.

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AUTHOR BIOGRAPHY

1. Monica.B Computer Science& Engineering, M.S. Engineering College(MSEC), Bangalore
2. Kokila.J M, Computer Science& Engineering, M.S. Engineering College(MSEC), Bangalore
3. Steffy Veronica Almeda, Computer Science& Engineering, M.S. Engineering College(MSEC), Bangalore
4. Swathi.L,Computer Science& Engineering, M.S. Engineering College(MSEC),Bangalore

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AUTOMATED WASTE SEGREGATIN USING SMART DUSTBIN

DIVYA K. S[1], PRARTHAN B[2], YOGESH KUMAR[3]
Assistant Professor,Dept.Computer science and Engineering, MSEC, Bengaluru [1]
8th sem Students, Dept.Computer science and Engineering, MSEC, Bengaluru[2]
Email-divyaadheena@gmail.com[1],prathanb1993@gmail.com[2],kumaryogesh7733@gmail.

ABSTRACT

The increase in volume and types of solid and hazardous waste as a result of continuous economic growth, urbanization and industrialization, is becoming a major problem for national and local governments to ensure effective and sustainable management of waste. It is estimated that in 2006 the total amount of municipal solid waste generated globally reached 2.02 billion tones, representing a 7% annual increase since 2003 (Global Waste Management Market Report 2007). The segregation, handling, transport and disposal of waste are to be properly managed so as to minimise the risks to the health and safety of patients, the public, and the environment. Currently there is no such system of segregation of dry and wet wastes at a household level. This paper proposes an Automated Waste Segregator (AWS) which is a cheap, easy to use solution for a segregation system at households, so that it can be sent directly for processing. It is designed to sort the refuse into wet waste and dry waste. The AWS employs and capacitive sensors to distinguish between wet and dry waste. Experimental results show that the segregation of waste into wet and dry waste has been successfully implemented using the AWS And it also alerts concerned person about the capacity(i.e when the dustbin is full) by using GSM and provides its location using GPS..

I. INTRODUCTION

In recent times, garbage disposal has become a huge cause for concern in the world. A voluminous amount of waste that is generated is disposed by means which have an adverse effect on the environment. The common method of disposal of the waste is by unplanned and uncontrolled open dumping at the landfill sites. This method is injurious to human health, plant and animal life .This harmful method of waste disposal can generate liquid leachate which contaminate surface and ground waters can harbour disease vectors which spread harmful diseases and can degrade aesthetic value of the natural environment and it is an unavailing use of land resources.The project is the realization of a compact, low cost and user friendly segregation system for urban households to streamline the waste management process. We are implementing a smart dustbin which is a cheap, easy to use solution for a segregation system at households.

II. PROCEDURE

Once the waste is placed on dustbin the moisture detects the waste and segregates it as dry and wet. Two IR sensor placed inside the dustbin detects the waste when it is full it sends information two Adriano chip which in turn sends the message to concerned person using GSM along with the location of Dustbin using GPS.

Detection of type of waste

The system uses moisture sensor to identify the wet material and separate the wet waste to the respective wet bin and does the same with dry waste and dumps it to respective dry bin. The sensor sends the respective signals to the Adriano processor which intern sends the response signals to the DC motor which is connected to the system. The motor rotates creating passage for the waste material to dry bin or wet bin according to the instructions received by the Adriano processor.

Checking for the optimal capacity of the bin

The waste is collected in the two bins depending on their type. The IR sensors placed in each bin keeps a constant check of the level of the bin, once the optimal level which is programmed is reached the respective IR sensor intimates the Adriano processor through a signal, the Adriano processor reads the signal and sends a message to the necessary person through GSM in order to empty the contents of the bin. The person can obtain the position of the system through the GPS.

III IMPLEMENTAION

All objects which have a temperature greater than absolute zero (0 Kelvin) posses thermal energy and are sources of infrared radiation as a result. Sources of infrared radiation include blackbody radiators, tungsten lamps and silicon carbide. Infrared sensors typically use infrared lasers and LEDs with specific infrared wavelengths as sources.

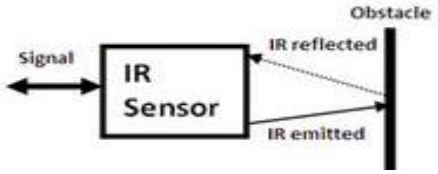

Figure 1: IR Sensor working principle

A transmission medium is required for infrared transmission, which can be comprised of either a vacuum, the atmosphere or an optical fibre. Optical components, such as optical lenses made from quartz, CaF_2, Ge and Si, polyethylene Fresnel lenses and Al or Au mirrors, are used to converge or focus the infrared radiation. In order to limit spectral response, band-pass filters can be used. Next, infrared detectors are used in order to detect the radiation which has been focused. The output from the detector is usually very small and hence pre-amplifiers coupled with circuitry are required to further process the received signals

Soil Moisture Sensor

Figure 2:Soil Moisture Sensor

Ideal for performing experiments in courses such as soil science, agricultural science, environmental science, horticulture, botany, and biology. Use the Soil Moisture Sensor to measure the loss of moisture over time due to evaporation and plant uptake, Evaluate optimum soil moisture contents for various species of plants, Monitor soil moisture content to control irrigation in green houses. and to Enhance your Bottle Biology experiments.

IR Obstacle sensor: An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion. An Infrared (IR) sensor is used to detect obstacles.

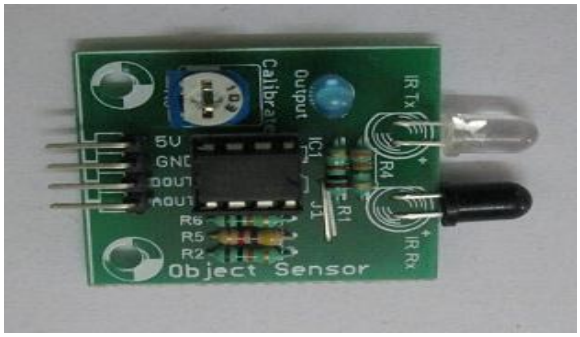

Figure 3: IR Obstacle sensor

An IR sensor consists of an emitter, detector and associated circuitry. The circuit required to make an IR sensor consists of two parts; the emitter circuit and the receiver circuit. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, its resistance and correspondingly, its output voltage, change in proportion to the magnitude of the IR light received. This is the underlying principle of working of the IR sensor.

Arduino

Arduino is open-source hardware. The hardware reference designs are distributed under a Creative Commons Attribution Share-Alike 2.5 license and are available on the Arduino website. Layout and production files for some versions of the hardware are also available. The source code for the IDE is released under the GNU General Public License, version 2.[8] Nevertheless an official Bill of Materials of Arduino boards has never been

released by the staff of Arduino. Although the hardware and software designs are freely available under copy left licenses, the developers have requested that the name "Arduino" be exclusive to the official product and not be used for derived works without permission. The official policy document on use of the Arduino name emphasizes that the project is open to incorporating work by others into the official product.[9] Several Arduino-compatible products commercially released have avoided the *Arduino* name by using -*duino* name variants.

Figure 4. An official Arduino Uno R2

The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits. The *Diecimila*, *Duemilanove*, and current *Uno*provide 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs, which can also be used as six digital I/O pins. These pins are on the top of the board, via female 0.1-inch (2.54 mm) headers. Several plug-in application shields are also commercially available. The Arduino Nano, and Arduino-compatible Bare Bones Board[13] and Boarduino[14] boards may provide male header pins on the underside of the board that can plug into solderless breadboards.

Many Arduino-compatible and Arduino-derived boards exist. Some are functionally equivalent to an Arduino and can be used interchangeably. Many enhance the basic Arduino by adding output drivers, often for use in school-level education, to simplify making buggies and small robots. Others are electrically equivalent but change the form factor, sometimes retaining compatibility with shields, sometimes not. Some variants use different processors, of varying compatibility.

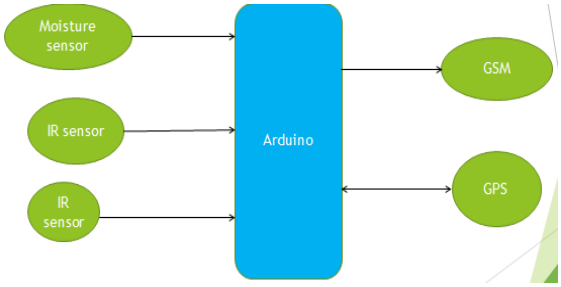

Figure 4 Design methodology of the smart dustbin.

IV APPLICATIONS

Shopping Malls: Smart Dustbin will be useful to those shopping centre employees who might be involved with planning and implementing recycling and waste prevention programs at malls and shopping centres. Because waste management services at most shopping centres are controlled by property management rather than by retail tenants. As shopping malls produces large amount of waste every day , it is better to use smart dustbin and understand the social responsibility .

Public Places: Usually at public place different dustbins are placed for different kind of waste. Unfortunately this step is not successful completely due to the simple reason that people love to break rules but, that is not the only reason. We all know that India tops in adult illiteracy and hence many of us don't understand particular dustbin for a specific waste. Also, kids will have a problem in identifying correct/suitable dustbin for a particular waste. The above said complex problem can be avoided by using a simple Smart Dustbin which automatically separates the waste.

In and around schools: According to THE HINDU , the indiscriminate dumping of garbage in front of the Government higher secondary school in Chithode near Erode poses serious health hazardto the students. A number of commercial establishments, particularly eateries, tea shops and bakeries, in Chithode town were found dumping the garbage in front of the school. As the local administration does not carry out regular cleaning, the garbage remains uncollected for weeks together. But no efforts have been made to prevent the commercial establishments from dumping garbage near the school so far. Officials have also failed to take any steps to remove the garbage. So, if

Govt. provides Smart Dustbins for schools this problem can be avoided.

V. RESULTS

The experiment has been conducted for large volume of the dry waste objects, and a minimum quantity of one object each for wet waste objects. This is done to consider the worst case scenario.

Smart Dustbin module basically segregates two types of wastes which is wet and dry waste using moisture sensor. The necessary message along with the location of the bin is sent using the GPS to the concerned person through GSM to inform that the bins have reached their maximum extent.

Type of Waste	Object	Dimensions (cm)
Dry Waste	Paper	8
	Polythene bag	7.5
	Plastic bottle	5*14
	Plastic box	12*6.5*2.5
	Plastic lid	11*2.5
	Dry cloth	20*20
	Ceramic plate	20
	Wood	8*8*2
Wet waste	Onion	Piece of onion
	Onion peel	From an onion
	Banana peel	From a banana
	Carrot peel	From a carrot
	Potato peel	From a potato
	Dry lemon	Half a lemon piece

Fig 5.Types of waste and their size

The segregation of waste will help to separate dry and wet waste. The above figure shows the types of wastes classified in wet and dry waste. This is how the separation will be done by the moisture sensor.

CONCLUSIONS

Waste Segregation using smart dustbin has been successfully implemented for the segregation of waste into dry and wet waste at root source. The method presented provides a fruitful way to come out of this problem by making entire system automated. The components used in smart dustbin are economical, environmental friendly and gives accurate results for separating three different types of wastes which are generally produced at places like shopping malls, offices, houses, schools and colleges etc. the biggest advantage of smart dustbin is the safety it provides. This device carefully separates two types of waste and not only increases the economic value of waste but also gives a healthy and beautiful environment at lesser cost.

Segregating waste manually is not accurate and many of us don't like to do that. Due to open dumping of solid waste, it emits bad smell due to presence of dead animal waste and biodegradable components. Rodents and dogs are feeding on such dumping place and they may bite peoples present in those areas. Such dumping sites are spoiling environment of nearby villages surrounding the dumping site.

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"A SURVEY ON APPLICATIONS OF VOICE AUTOMATION SYSTEMS"

BHAVIN KUMAR S
CSE Department, MSEC, Bangalore, INDIA
Email: bhavin.091989@gmail.com

ABSTRACT

In this modern era, there have been a tremendous change in the field of Room Automation due to the introduction of improved voice recognition & wireless technologies. These systems are supposed to be implemented in the existing infrastructure of any home without any kind of changes in the existing connections. This system is most suitable for elderly and physically challenged person those who have difficulty in moving around from place to place. The voice recognizing feature of this system also provides a security aspect to this system. The physically challenged persons would be able to control various home appliances by their mere voice commands according to their need and comfort. The Room Automation system is intended to control lights and other electrical appliances in a room using voice commands.

The intuitive interaction system such as Cooperative Fire Security System using HARMS (CFS^2H) is implemented to deal with fire in a high-rise building. The interaction system is a bridge connecting human, as an operator, to the whole system. Utilizing a natural language processing (NLP) technology using Microsoft Kinect makes the interaction system intuitive and has human-oriented operations. Human-Agent-Robot-Machine-Sensor (HARMS) provides a distributed network so that the systems are able to communicate with a high-level communication protocol. Here adding a scenario to verify the interaction system along with the system as a whole. The result of the verification left several technical issues and challenges.

A prototype of android Smartphone application is added to control the doors and the windows by using voice commands is created. Some users which have different dialects are going to use the application for tests. Further, the tests are done by giving an obstacle to determine whether the voice command signals propagation can still be received by the actuators within the range of a work area around the house. So in this proposal our aim is to design and implement a voice automation system to control lights, electrical appliances in a room, control doors, windows and utilize voice commands as an interactive tool between human and a robot to deal with fire in a building.

Keywords— HARMS; embedded systems; FSK modulation home automation system, voice recognition; relay drivers

Introduction

The voice recognition based room automation system uses HM2007L IC [5] to identify the voice speech or commands of a specific user. The command recognized by the device is being checked and verified with that of the stored voice speech database from an individual in order to confirm the user identity. Once the identity is found, the corresponding data is being sent from the microcontroller [7] to the encoder for specific encoding techniques to be applied. The encoded data is transferred to the modulator for generation of FSK [6] signal in order to transmit it via an antenna to a remote or far away receiver. The FSK(Frequency Shift Keying) modulated signal is received by the receiving unit for demodulation and successive decoding purpose so as to obtain the desired voice command of the user. The decoded data obtained from the output of the decoder is again compared with the predefined set of data for further checking of valid transmission. If matching is

established, the corresponding relay is either energized or de-energized through a relay driver for turning ON or OFF the desired electrical appliance in accordance with the voice command.

HRI(Human Robot Interaction) plays a significant role in Fire Safety. Robots with full mobility have already begun to perform various operations on fire, such as fire detection, situation report to the operator, and rescuing survivors guided by the operator. Fire-fighters may have difficulties in controlling the robots using joysticks or other input devices if they are not well-trained to control the robots. Moreover, non-natural communication methods require intensive training to minimize mistakes in operation. In fire fighting situations, a small mistake may have serious consequences. Many lives may be lost in a disaster due to a slight mistake. Therefore, it is essential for robot operators to have extensive training to accurately and safely control fire-fighter robots. HRI allows users to have a direct, intuitive communication with the robots, which may drastically reduce the training time that is needed to control the robots.

The housework which is like opening or closing doors and windows, and also locking and unlocking them, for some people, these activities are heavy duties. Especially, for elderlies, disability people, as well as busy persons or busy families [4]. However, these activities can be facilitated by creating a system like home automation.

IMPLEMENTATION

A. Wireless Home automation System by using voice commands

This system mainly comprises of three independent stand alone modules. The voice recognition module, the transmitting module and the receiving module. The embedded system is having the microcontroller as central processing unit along with other peripheral devices for encoding, modulation, decoding, demodulation, transmission and reception of the data over a communication link. The microphone connected to the voice recognition module serves the purpose of the sensing unit which senses the voice command of the individual. The reception module is connected to a driver based relay system which is connected to several different electrical appliances which are to be controlled by voice commands

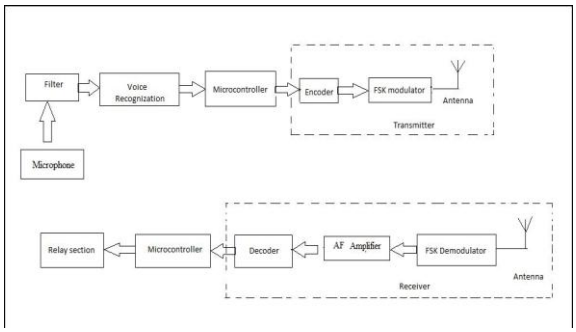

Fig. 1. Block Diagram of Voice Controlled Room Automation System

Voice Recognition

HM2007 is a CMOS voice recognition integrated circuit that supports voice analysis, recognition process and system control functions. It is a 40 isolated-word voice recognition system that has external microphone, keyboard, 8K X 8 Static RAM. The speech recognition system is trained with the words, the user want the circuit to recognise. The system can accept voice samples from multiple users, in any language and can identify the user as well as the command by matching it with the trained voice samples. The system will generate an error code (77H) if a user gives any command which he did not train, or that has been trained by some other user.

Fig. 2. HM2007 based Voice Recognition Unit

A microphone is used to take the voice signals as an input. The signal is filtered from the extraneous noise by a noise eliminating filter [3]. The system is trained by storing the voice signal at the user specified location of the 8K X 8 SRAM by the HM2007, and this data will be used by the HM2007 to recognize the voice commands given by the user, during its operation. An 8 bit data corresponding to the location of the voice signal will be generated as the output if the given command matches with the trained command, else an error

signal 55H(word too short), 66H(word too long), 77H(no match found) will be generated by the system

Transmitting End

The 8bit data from the voice recognition system is fed to the microcontroller. The microcontroller generates the signal to be transmitted (4bit at a time). This signal is encoded with the receiver address for secure communication (the address of the encoder should match with the address of the receiver), it is then modulated using FSK modulation technique and transmitted through an antenna.

Fig. 3 Transmitting Unit

Receiving End

The modulated signal is received at the FSK demodulator. The demodulated output is fed to the decoder. The decoder matches the address bits, from the demodulated signal, with its own address bits and gives this signal in parallel form to the microcontroller, which on receiving the data from the decoder energizes or de-energizes the designated relay, to switch the appliances ON or OFF.

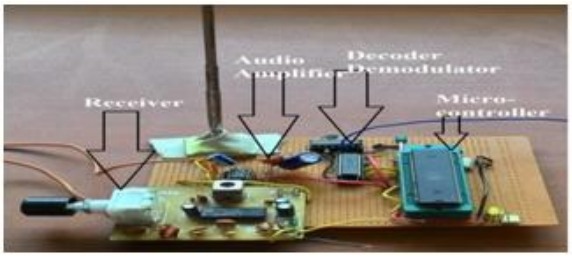

Fig. 4. Receiver Unit

B. **Fire Safety Using a Speech Recognition Technology**

➢ **Objectives of the interaction system in CFS^{2}H**

The interaction system, as shown in Fig. 6, is a computer system that acts as a bridge to connect the operator with the whole system (CFS^{2}H). The user uses human voice to communicate with the interaction system. Three main objectives are defined in order to achieve the goal of the interaction system.

- Surveillance for fire safety: The whole system collects information about the conditions of rooms in a building, gathered from wireless sensor network, to report fire security level to the user through the interaction system.
- Remote control of human rescue robot: NLP recognizes speech from operator to match predefined commands to control fire-fighter robots. The operator does not need to be an expert to control the robot. by using NLP allows the operator to control the robot using predefined verbal commands.
- Survivor detection: due to the fact that fire-fighter robots have limited hardware performance and resources to control themselves, the interaction system helps them by running a face detection algorithm to detect any survivor near human rescue robot. The human rescue robot transmits its live video feed in the form of rapidly changing, individual frames, while exploring the area in order to find any humans that may be in danger. If one or more survivors are detected by the face detection algorithm, the interaction system will notify the operator and send a command to the human rescue robot to initiate a rescue procedure.

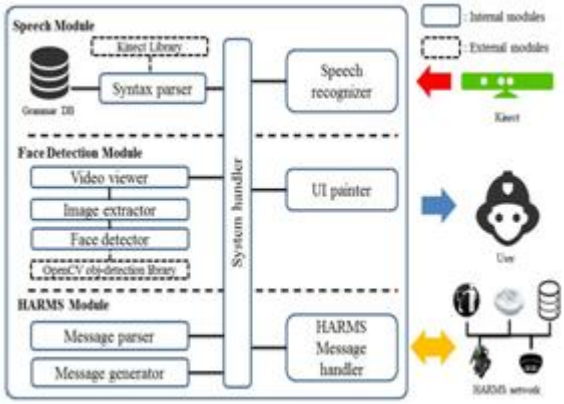

Fig 6.The intuitive interaction system diagram: Speech Module, Face Detection Module, and HARMS Module

➢ **Communication using HARMS**

- HARMS are a communication provider that allows systems to communicate with each

other with a high-level message protocol. HARMS aims at a distributed system so that every system is treated as a peer. Moreover, HARMS supports multicast of a message to enable 1:*n* communication, where *n* is the number of agents/systems in a system. Here all the systems are connected through TCP/IP protocol using either Ethernet or Wi-Fi. Furthermore, all the peer information is kept in this system (i.e. IP address and peer name) to every peer so that a pair of IP address and peer name from a peer is available to the rest of the peers in the network. Therefore, all the systems of the whole system are fully connected.

- The interaction system communicates with some of the systems; Wireless Sensor Network, Big data system, human rescue robot for rescuing survivor(s), and UGV robot. Communication definitions for each connected system with the

C**. Automation system for opening doors and windows by through voice command**.

The intuitive interaction system contains Speech Module, Face Detection Module, HARMS Handler, and System Handler, including Graphical User Interface (GUI), as shown in Fig.6. The following subsections present a detailed explanation of the system.

➢ **Speech Module**

The Speech Module converts operator's speech into a command. A speech device called Microsoft Kinect to be able to recognize human speech. Microsoft Kinect provides recognition libraries and speech engines to recognize words based on a designated grammar database.

Table-1

Word	**Corresponding Command**
NAVIS	Wait for the following instruction
Go straight	Make rescuing robot move forward for 3 steps
Turn left	Make rescuing robot turn 90 degree to the left
Turn right	Make rescuing robot turn 90 degree to the right
Search survivor	Make rescuing robot look around to search survivor
Situation	Collect information from sensory and Big data system to show user current Condition of the building

The speech recognizer uses a confidence value to estimate individual words from speech. Setting proper threshold for the confidence value is important to accurately extract any words from human voice; in other words, to reduce estimation error. If the confidence threshold is too high, very clear words in a speech are recognizable. On the other hand, too low confidence threshold collects most of all words in speech, and uses even environmental noise to estimate words, which affects the performance of the Speech Module. We found a proper threshold (0.2) by trial and error approach, a well-known method to find a solution by reducing a previous trial error.

Table I represents matches between predefined words and commands. When operator says a sentence with any of the defined words, the corresponding command or function is executed. For instance, if operator says "human rescue robot! find survivors" then the human rescue robot starts searching for survivors by looking from the left to the right. In order to prevent putting a wrong command to the interaction system by a noise, operator should say "*NAVIS*" first, which is the name of the interaction system, to give a command to the system

➢ **Face Detection Module**

The Face Detection Module in the interaction system uses a face detection technique, based on object-detection libraries provided by OpenCV [2]. A series of frames transmitted from the human rescue robot, which roams over near the fire location, is used to detect any human faces. While the interaction system is looking for any survivors, the operator transmits control commands to the human rescue robot directing it to move in order to search the surrounding area in which some people might be waiting to be rescued. Once any survivor is detected by the Face Detection Module, the interaction system immediately sends a notification message to let the human rescue robot know that a survivor is now in front of the robot. At the same time the interaction system also transmits the number of survivors to Big data system to sum up total number of found survivors.

➢ **HARMS Module**

All the communications or interactions between the interaction system and other systems are performed through HARMS Module. HARMS Module generates a message according to HARMS messaging protocol.

HARMS Module provides three ways to send message: unicast, multicast, and broadcast. The three message types distinguish ways of how to react to a message. For instance, if a system receives a query message from other system, the system is forced to send a notification message as a response of the query message.

➢ **RESULT AND DISCUSSION**

The experiment was performed as a whole system, due to the fact that all the systems act as a part of CFS^{2}H for fire safety. Here established a scenario to verify all the systems. Here setting a hand-held sized candle as a fire and a man next to the candle, acting as a survivor. The scenario is unfolded with number of steps as follows. The bolded descriptions indicate that the intuitive interaction system is involved.

1. Wireless Sensor Network gathers condition information in a room and sends the information to the Big data system.
2. Big data system analyses the sensor data to determine the optimal perception model to detect any potential fire. Big data system often sends adjusted threshold values for each sensor to the Wireless Sensor Network to improve accuracy of the measurements.
3. After fire has been detected by Wireless Sensor Network, the network transmits a fire alert to all systems.
4. The UGV robot begins a greedy algorithm to search the area for the exact fire location and determines whether or not the fire alert is real. After the process of the exploration in the area, The UGV robot reports the result of existence of the fire to interaction system. Moreover, the UGV robot transmits the fire location to both fire fighting robot and human rescue robot, if the fire alert is real.
5. If the fire alert is real, interaction system notifies operator by showing an alert message, and begins sending a message to rescuing robot to establish video stream between the system and the robot
6. When fire fighting robot reaches the fire location, the robot starts using its vision system to find the fire. Once the fire is detected, the robot extinguishes using fire extinguisher.
7. When human rescue robot gets close enough to the fire location, operator begins controlling the robot by saying predefined commands to the interaction system. At the same time, the robot starts transmitting picture captured by its vision system to the interaction system. The interaction system runs the face detection algorithm with the transmitted pictures to look for any survivors. If any survivor is found, the interaction system notifies the rescuing robot to initiate rescue procedure to guide the survivor(s) to the exit, in which the rescue robot came though.

C. **Opening Doors and Windows by using voice commands**

In this system, voice commands are used to open doors and windows automatically and translating voice commands an android Smartphone application are used. Finally voice commands are translated into digital texts first.

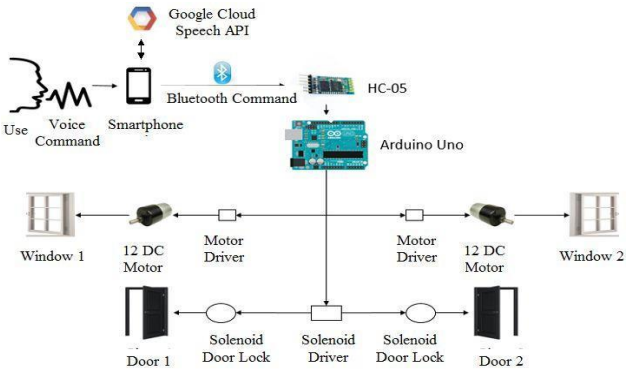

Fig. 7. The detail of the proposed automation system

The application then finds matched data by using the API. If the digital texts are found then they are going to be used as a Bluetooth command to move actuators to control the doors and the windows.

The Components of Hardware and Software

To implement this system, there are several hardware components are used:

➢ The android Smartphone with Bluetooth v2.0. −2 GB internal memory. 512 MB RAM.

- HC-05 Bluetooth module as a connector to send data from Smartphone to Arduino Uno.
- Arduino Uno as a main hardware component. It is a microcontroller board based on the ATmega328P.
- Actuator (Solenoid Door Lock and Motor DC 12V). Further, the software component is the android Smartphone which uses Jelly Bean Operating System Version and has API-16.

Conclusions

The Voice Recognition System is an efficient one for users who are unable to move freely in their houses and for disabled persons. This system can also incorporate the aspect of switching ON and OFF the entire process of a house by interfacing it with the MCB board. The voice automation also used for opening doors and windows automatically and this system can be build by using less internal storage space and it can be done by using Google Cloud Speech API on an android Smartphone application .The system uses an 8bit addressing system to select the desired transmitter and receiver pair. This enables the transmitter side to communicate up to 256 different receiving hubs; each assigned a different address, installed in different rooms by using one single transmitter, by changing the transmitter side address.

An Intuitive Interaction System is developed with the combination of Hidden Markov Model (HMM), and Harms networks. In this system there is an improvement in voice recognition and it also act as a more efficient interface system so it can be implemented efficiently in fire safety technology.

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CATEGORY: CSE

PROXY RE-ENCRYPTION WITH ANONYMITY AND CONDITIONALLY SHARED CIPHERTEXT FOR BIG DATA

ARUNA M G
Associative Professor, Dept of Computer Science and Engineering, M S Engineering College, Bangalore, India
APOORVA GM, HAJIRUNNISA R, R RISHI CHENDRAYAN, SURAJ S
B.E students of M.S.E.C, Bangalore, India

ABSTRACT
Nowadays individuals and companies choose to upload their data to Hadoop since the hadoop supports considerable data storage service but also efficient data processing capability. A basic security requirement of big data storage is to guarantee the confidentiality of the data. Fortunately, some existing cryptographic encryption mechanism can be employed to fulfil the requirement. For instance, Public Key Encryption (PKE) allows a data sender to encrypt the data under the public key of receiver such that no one except the valid recipient can gain access to the data. Nevertheless, this does not satisfy all the requirements of users in the scenario of big data storage. In this paper we implement the multi-hop identity based proxy re-encryption scheme. In this scheme each and every person in the multi-hop they create the keys by using their identities and encrypt the identities using identity based encryption. For this, we enhance the work by implementing the Password Based Encryption with MD5 and DES.
Keywords: Privacy, multihop, conditional sharing, big data.

I. INTRODUCTION

Big data is a term for data sets that are so large or complex that traditional data processing applications are inadequate. Challenges include analysis , capture, data curation, search, sharing, storage, transfer, visualization, quering, updating and information privacy. The importance of Big Data doesn't revolve around how much data we have, but what we do with it. We can take data from any source and analyse it to find answers that enable: cost reductions, tie reductions, new product development and optimized offerings, smart decision making. Applications of big data include:

Banking, Education, Government, Health Care, Manufacturing, Retail.

Hadoop is an open source framework that allows storing and processing of big data in a distributed environment across clusters of computers using simple programming models. It is designed to scale up from single servers to thousands of machines. The applications run using MapReduce algorithm where the data is processed in parallel. Hadoop is an Apache open source framework written in Java that allows distributed processing of large dataset across clusters of computers using simple programming models.

Hadoop can work directly with any mountable distributed file system such as local FS, HFTP FS, S3FS and others but the most common file system used by hadoop is the Hadoop Distributed File System (HDFS). Hadoop Distributed File System (HDFS, based on the Google File System (GFS), provides a distributed file system that is designed to run on large clusters (thousands of computers) of small computer machines. HDFS uses a master/ slave architecture.

Hadoop framework includes four modules:

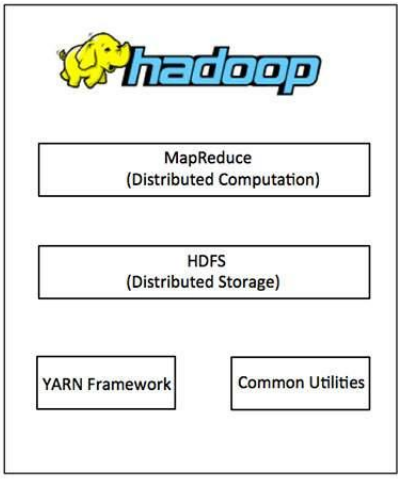

Figure 1.1 Hadoop Framework Components

II. LITERATURE SURVEY

Literature Survey plays an important role in software development process. In the field of networking the specialist area of network security consists of infrastructure policies to avoid unauthorized access. The Data Loss Prevention (DLP) technique is to compartmentalize large networks with internal boundaries. An Intrusion Prevention System (IPS) helps detect and inhibit the action of malware. Symmetric Key Cryptography is a method in which both the sender and receiver share the same key. It was the only encryption method in June 1976.

The Data Encryption Standard (DES) and the Advanced Encryption Standard (AES) are block cipher designs which have been designated cryptography standards by the US government. Cryptographic hash functions are a third type of cryptographic algorithm. They take a message of any length as input, and output a short, fixed length hash which can be used in a digital signature.

In 1976, Whitfield Diffie and Martin Hellman proposed a public key cryptography in which two different but mathematically related keys (public key and private key) are used.

In 1978, Ronald Revert, Adi Shamir, and Len Adleman invented RSA another public-key system. In 1997, asymmetric key cryptography had been invented by James H. Ellis at GCHQ.

Proxy re-encryption (PRE) allows a proxy to convert a cipher text encrypted under one key into an encryption of the same message under another key.

III. SYSTEM ARCHITECTURE

System architecture is the conceptual model that defines the structure, behaviour, and more views of the system. The Architecture provides a formal description and representation of the system, organized in such a way that, it supports reasoning about the structures and behaviours of the system. System architecture can comprise system components, the externally visible properties of those components and relationships between them. It can provide a plan from which products can be produced, and systems developed, that will work together to implement the overall system. The following figure shows system architecture of our system.

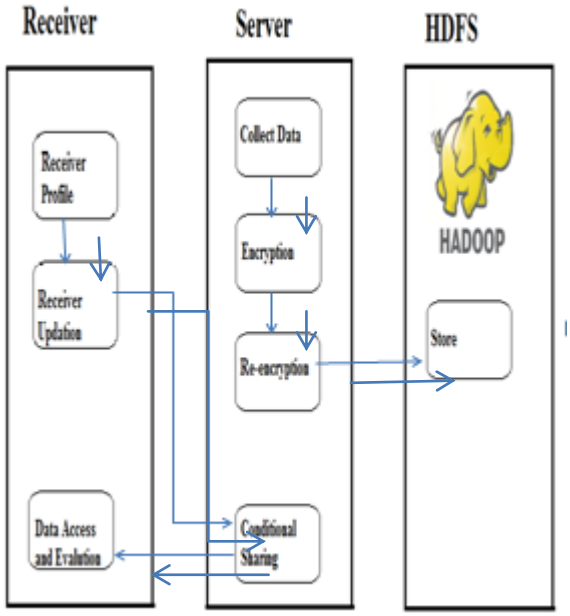

Figure 1.2 System Architecture

In the above figure 1.2 System Architecture we divide it into six modules where each module performs its own functions.

In the first module, we need to collect dataset, then encrypt it using DES algorithm and Re-encrypt it using AES algorithm which generate cipher text then store it into HDFS.

Receiver needs to update his profile by providing personal information like name, mail id,

password and he has to get unique id from the server. Server would authenticate the receiver and provide requested necessary information to the receiver. Then the receiver would decrypt and re-decrypt the cipher text and get the required plain text.

IV. ALGORITHMS

Algorithm Encryption (field _ name, age, gender, month, place, disease)

{
//Input: field, Secret Key, DES
//Output: Cipher text of the field
Step 1: Start
Step 2: Get connection with database using jdbc:mysql://localhost:3306/multisharing "root" ,"root"
Step 3: if (username -> root and password ->root)
Establish connection
Else
Step 3: Assign string v -> "The Best Secret Key"
Step 4: Get instance of DES using
Cipher.getInstance ("DES")
Step 5: Invoke DES (SecretKey, data)
Cipher.init (Cipher.ENCRYPT_MODE, key)
Step 6: Convert plain data into byte Array using
byte[] ->plainData.getBytes ()
Step 7: Encrypt the data using doFinal()
Cipher.doFinal(byteDataToEncrypt)
Step 8: Encode the generated Ciphertext using
BASE64Encoder().emcode(Ciphertext)
Step 9: Update into database
Step 10: Stop
}

Algorithm DES Encryption (dataset, cipher key)

{
//Input: Dataset D
//Output: Ciphertext
Step 1: Start
Step 2: Process the 64 bit key
Step 3: Calculate the key schedule
Step 4: Perform the permutation on the 64 bit key
Step 5: The parity bits are discarded, reducing the key to 56 bits
Step 6: Split the permuted key into 2 halves.
first 28 bits are C[0] and last 28 bits are D[0]
Step 7: Calculate the 16 sub keys.
Initialize i -> 1
Step 8: Perform one or two circular left shifts on both,
C[i-1] and D[i-1] to get C[i] and D[i]
Step 9: Permute the concatenation, K[i] C[i]D[i] (48 bits long)
loop back to Step 8 until K[16] is calculated
Step 10: Perform final permutation
Step 11: Stop
}

Algorithm AES Re-encryption(cipher text, cipher key)

{
//Input: Ciphertext, Cipher_Key
//Output: Ciphertext
Step 1: q[128][128] (Ciphertext[128][128] || Cipher_Key[128][128])
Step 2: Reverse padding to convert a[128][128] to p[16][16]
Step 3: if (p[16][16] !=0)
Then a[4][4] -> p[16][16] / 1[1][16]
else goto Step 1
Step 4: if (a[4][4]==0)
Then state ->a[4][4]
Fourth row is not shifted
Third row is shifted one position to the left
Second row is shifted two positions to the left
First row is shifted three positions to the left
else goto Step3
Step 5: if (a[4][4] >=0)
then substitute State with S-box
else incorrect format
Step 6: Stop
}

V. RESULT

We compare our result with existing system. Time efficiency of existing system is more compared to our system. Our system is more secured compared to existing system.

Fig.5.1 shows Load Dataset frame. Collect Data option is used to select the Dataset. View Data would display the selected Dataset on the text area provided.

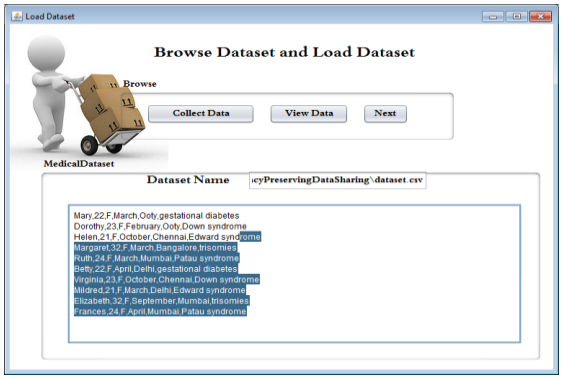

Figure 5.1 Load Dataset Form

Fig.5.2 shows the Load into HDFS form. The Dataset (file) uploaded would be displayed in this form.

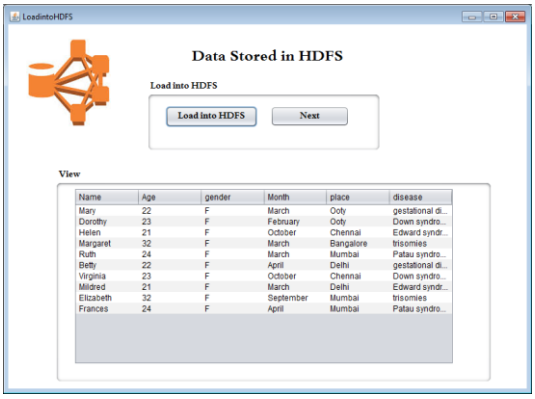

Fig.5.2 Dataset stored in HDFS

Fig5.3 Data Encryption frame. The patient details like name, age, gender, month, place and disease are encrypted and secret key and cipher text will be generated.

Fig5.3 Patient Data Encryption

Fig.5.4 shows Proxy Re-Encryption frame. Here the patient dataset (details) are re-encrypted, the secret key and cipher text are generated for each patient details.

Fig.5.4 Data Re-encryption

Fig5.5 shows the Data Sharing frame. The receivers' details are obtained and based on authentication the data sharing is done with the receivers. Conditional sharing is based on the category that the receivers selected.

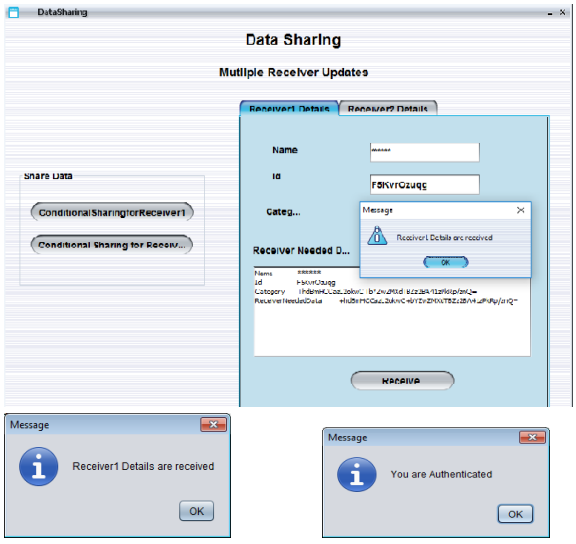

Fig. 5.5 Data sharing

VI. CONCLUSION

We conclude that the proposed Proxy Re-encryption with Anonymity and Conditionally Shared Ciphertext for Big Data achieve properties of anonymity, multisharing and conditional sharing. This paper includes merits of proxy re-encryption with anonymous technique in which a ciphertext can be securely and conditionally shared multiple times with anonymity between senders and receivers.

VII. FUTURE ENHANCEMENT

A cloud storage system is a large scale system which consists of independent and distributed storage servers. One way to provide robustness to the data is to replicate data. All storage servers contain same data copy with them. Because if any one server fails to send the data, then

any one of the remaining servers send data, or else from those we retrieve data.

To overcome above problems we can propose a method called threshold re-encryption scheme. In this method there exist distributed storage servers and key servers. In this system key servers are maintained separately for storing cryptographic keys.

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Smart Mobile App for e-Tourism: Intelligent Mobile Tourist Guide

PRADEEP. M[1], LOKESH.A[2], ROSHANGURAGAIN[3], R.DEVA NANDA[4], RITESH KUMAR[5]
[1]Assistant Professor,MSEC,pradeep.pradeemb@gmail.com
[2]Assistant Professor,MSEC,lokeshyadav.ka@gmail.com
[3]C.S.E 6TH SEM M.S.E.C,roshanguragain10@gmail.com
[4] 6TH SEM M.S.E.C,devananda96@gmail.com
[5] 6TH SEM M.S.E.C,vickydonor760@gmail.com

ABSTRACT
Tourism in India is economically important and is growing rapidly. The World Travel & Tourism Council calculated that tourism generated ₹14.02 lakh crore (US$220 billion) or 9.6% of the nation's GDP in 2016 and supported 40.343 million jobs, 9.3% of its total employment. About 88.90 lakh (8.89 million) foreign tourists arrived in India in 2016 compared to 80.27 lakh (8.027 million) in 2015, recording a growth of 10.7%. Domestic tourist visits to all states and Union Territories numbered 1,036.35 million in 2012, an increase of 16.5% from 2011.[7] In 2014, Tamil Nadu, Maharashtra and Uttar Pradesh were the most popular states for tourists.[8] Delhi, Mumbai, Chennai, Agra andjaipur have been the five most visited cities of India by foreign tourists during the year 2015. Worldwide, Delhi is ranked at 28 by the number of foreign tourist arrivals, while Mumbai is ranked at 30, Chennai at 43, Agra at 45, Jaipur at 52 and Kolkata at 90.
In the existing approaches, the people who want to go to visit certain place, Needs to research on the place on a web by using say Google search engine. Find out about the place, list down list of spots to visit at the place, Find out the hotels to stay. In some instances people tend to go to a city and then pay heavy amount or waste time by finding out the places in manual way by reaching the places. Tourism is considered as a most profitable industry in today's era, because it provides the opportunity to the people to earn chunk of money. Whenever a person opens a particular site, in order to attain information about a particular tourism spot, then the website always shows the same data to different number of people i.e. the content remains the same. Searching for a particular place provides the people huge amount of information which is generally waste of time.
In this paper a Recommendation System is a personalization tool that offers users with a list of items that best fit their individual taste. The project involves the user to register and set his/her preferences known as context information. The user after registration will provide the a trip data like budget, city to visit from a preferred list. Based on this input data mining is performed on the websites namely and then the data is transformed into relevant information storage by the administrator. On the collected data the recommendations are provided to the user based on the budget and weather information along with POI's (Point of Interest) best places to visit. Also various set of routes are given between from and to destination points and the route which has the shortest path is also recommended.

I. INTRODUCTION

In the existing approaches, the people who want to go to visit certain place, Needs to research on the place on a web by using say Google search engine. Find out about the place, list down list of spots to visit at the place, Find out the hotels to stay. In some instances people tend to go to a city and then pay heavy amount or waste time by finding out the places in manual way by reaching the places.
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II. PROCEDURE

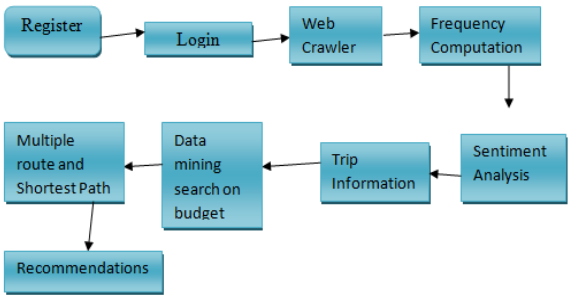

Fig:Mythodology

Register

This function allows the new users to register into the application by providing the details like first name, last name, user id and email and password operations.

Fig: Flowchart for User Creation Module

Input- Username, Password

Output- Validation of data is done and page is appropriately routed

The figure shows the User Creation module for customer.

Login

The function is used to authenticate the user. If username and password are valid user is allowed to login. The user can login as an admin or login as the user.

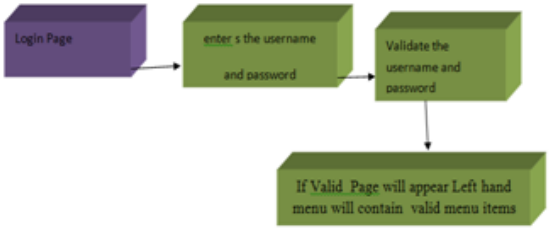

Fig: Fig Flowchart for Login Module

Input- Username, Password and Login Type

Output- Validation of Username and Password is done and page is appropriately routed

The figure shows the login module for the student. If the student enters the valid username and password then the student would be able to login otherwise not. In a similar way the lecturer and Admin also is applicable

Data Cleaning and Sentiment Analysis Algorithm and N recommendations for Admin

The admin is allowed to select a city. Click on search and then obtain a set of 20 different places and then filter out the best places to visit by applying the Data mining algorithm

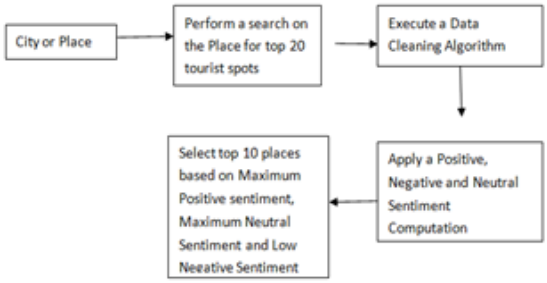

Fig: Web Data Collection and Selection of Top Places

Data Collection using Web Crawler Algorithm

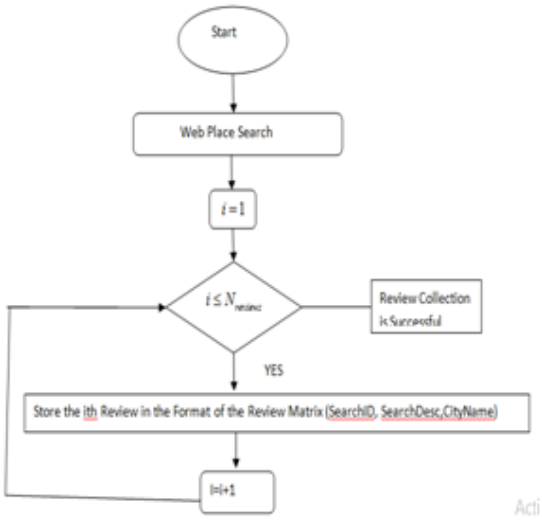

Fig: Data Collection using Web Crawler

Fig shows the Data collection using Search ID, Search Description and City Name acts as an output for a given city name.

Data Cleaning Algorithm

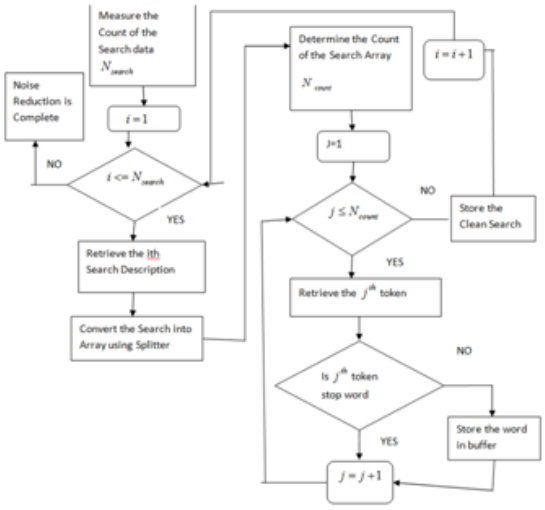

Fig: Data Cleaning Algorithm

Conclusion

Using tour recommendation system, we can boost up the tourism industry in India. Tourists will find their journeys easy in compared to the current situation. So their time as well as money will be saved which can lead the tourists to discover more places to visit in their holidays or leisure time.

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Actualizing DNA Cryptography in Distributed Computing and Attachment Programming

Nisha Choudhary[1], Archana G R[2], Asha Umesh Shetty[3], Deepika A[4], Soujanya K[5]
[1]B.Tech, M.Tech[2-5]
B.E, Computer Science and Engineering, M.S Engineering College
[1] er.nishachoudhary@gmail.com; [2] archanagr1995@gmail.com; [3] amruthaumeshshetty@gmail.com
[4] deepikaa2105@gmail.com; [5] soujanyareddy255@gmail.com

ABSTRACT
Cloud Computing is a technology of computing which relies on sharing the computing resources rather than having the local servers or personal devices to handle the applications. It is a type of Internet based computing where different services such as servers, storage and applications are delivered to an organization computer and device to the Internet. It is taking the services (i.e., cloud services) and moving them outside and organizing the firewalls on shared systems.
Most of the organizations are apathetic to work on cloud services due to data security issues as the data remain on the cloud service provider's servers. To overcome these issues, many organizations have approached several ways by various researches worldwide to strengthen the security of data storage and cloud computing.
To resolve these kinds of security problems, we carry out Bi-Serial DNA Encryption algorithm that have been furnished two types of security levels wherein hacking problems can't be occurred.
Algorithms such as RSA, Diffie-Hellman[1], DNA Encryption is one such techniques which is used in cloud computing. The two layer security is accomplished for the ASCII character set, ignoring non English user of cloud computing.
The proposed system emphasis to carry out the Bi-directional DNA Encryption algorithm (BDEA) to employee the Unicode character set. The destiny work will be focusing on the possible attack and the study of analysing the information of cipher text and measuring its strength.
Keywords: Cloud computing, Data security issues, Bi-directional DNA Encryption algorithm, DNA digital code, Socket Programming.

I. INTRODUCTION

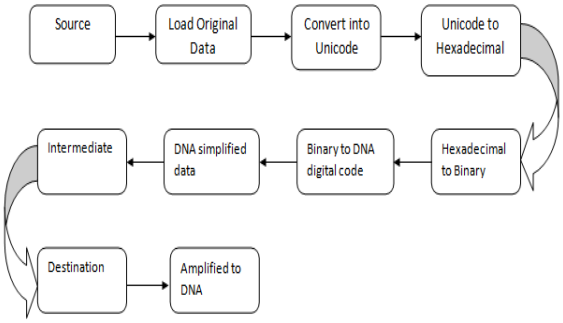
Cloud computing has recently reached popularity and developed into a major trend in IT. We perform such a systematic review of cloud computing and explain the technical challenges facing in this paper. In Public cloud the "Pay per use" model is used. In private cloud, the computing service is distributed for a single society. In Hybrid cloud, the computing services is consumed both the private cloud service and public cloud service. Cloud computing has three types of services. Software as a Service (SaaS), in which customer prepared one service and run on a single cloud, then multiple consumer can access this service as per on demand. Platform as a Service (PaaS), in which, it provides the platform to create application and maintains the application. Infrastructure as a Service (IaaS), as per term suggest to provides the data storage, Network capacity, rent storage, Data centers etc. It is also known as Hardware as a Service (HaaS).

II. PROCEDURE

An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it.

A. Design: System design is the process of defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements. One could see it as the application of systems theory to product development. There is some overlap with the disciplines of systems analysis, systems architecture and systems engineering. If the broader topic of product development "blends the perspective of marketing, design, and manufacturing into a single approach to product development," then design is the act of taking the marketing information and creating the design of the product to be manufactured. Systems design is therefore the process of defining and developing systems to satisfy specified requirements of the user.

B. System Architecture



III. RESULTS

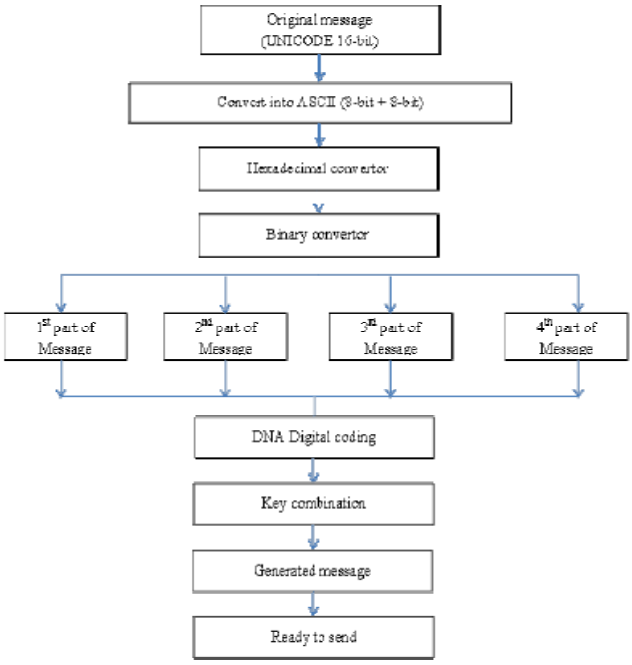
A. Modules

1) Source: In this source module first user send original data . That data is read by plain text after that it passed to unicode. Unicode convert that plain text to hexadecimal for encryption.

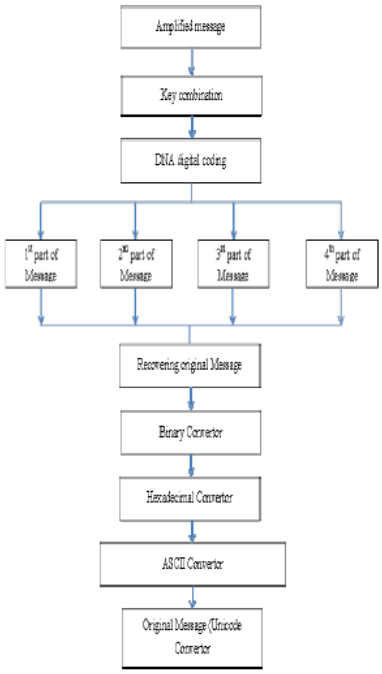
2) Intermediate: Intermediate process is that sending encrypted data to destination and receiving decrypted data to source. Converted hexadecimal data to binary format and send that to DNA base pair.

3) Destination: Destination receive that DNA base pair value and amplified data to DNA. Digital code is only decrypt that data and finally receive DNA cipher in destination side. It send that value to user.

B. Encryption process



C. Decryption process



D. DNA Digital coding

In information science, the binary digital coding encoded by two state 0 or 1 and a combination of 0 and 1. But DNA digital coding can be encoded by four kind of base as shown In the below table. That is ADENINE (A) and THYMINE (T) or CYTOSINE (C) and GUANINE (G). There are possibly 4! =24 pattern by encoding format like (0123/ATGC) [4].

Discussion of Results

Binary value	DNA digital coding
00	A
01	T
10	G
11	C

IV. CONCLUSIONS

Data security is the main challenge for cloud usability. Various algorithms like RSA[2], Diffie-Hellman[1], DNA encryption [4] etc. are available to provide data security for the data stored on cloud. Digital signatures [3], Extensible Authentication Protocols are used for authentications. Using BDEA algorithm, we achieve 2-layer security for ASCII character sets. The proposed system focuses on extending the BDEA algorithm to be used with Unicode character set. This can help reach to the wider community of the cloud users. The future work will focus on the possible attacks and cryptanalysis of the cipher text and measure its strength.

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Analysis of Digital Video Watermarking Techniques

AKASHDEEP SAHU[#1], SANTOSH KUMAR SHA[*2], SHREYA AGARWAL[3], NISHA CHOUDHARY[#4]

[1,2,3]Students, CSE BE,[4]B.tech M.tech, Assistant Professor
MS Engineering College, Bangalore
[1]akashsahujkd@gmail.com; [2]santoshkumarsha96@gmail.com; [3]agarwalshreya30@gmail.com;
[4]er.nishachoudhary@gmail.com

ABSTRACT

In today's modern world of technology and popularity and accessibility of the internet, protection and illegal redistribution of digital media has become an important issue. Without security information it is impossible to automatically verify the authenticity of the uploaded multimedia. Thus, digital watermarking technique can be used to protect digital information and IPR(intellectual property rights) protection from illegal manipulation and distribution such as recording, editing and replication of multimedia contents. In general, watermark can be embedded in spatial domain or transform domain technique of an image. A digital watermark is the process of embedding a watermark in a noise tolerant signal such as an audio, video or image data used to identify the ownership of the copyright of such signal. The steganography[3] is a form of watermarking and in this; the messages are hidden in the content without making the people to note its presence. This technique increases robustness, fidelity, capacity, speed and imperceptibility and computation complexity to handle several types of image artefacts. This paper gives a comparison of different watermarking technique for protecting digital content.

I. INTRODUCTION

Various digital watermarking schemes have been proposed in the literature for still images and videos. Most of them operate on uncompressed videos, while others embed watermarks directly into compressed videos. Video watermarking techniques can be grouped as security related like Copy control, fingerprinting, ownership identification, authentication, tamper resistance etc. or value added applications like legacy system enhancement, database linking, video tagging, digital video broadcast monitoring , Media Bridge etc.

Digital data are distributed across high-speed networks like the Internet and World Wide Web is easily accessible for sharing. Due to this access possibility of tempering data and republishing it as own is increased. Consequently leads the motivation of techniques providing security to this multimedia content. Digital watermarking is the technique used for this purpose. Number of techniques of watermarking is used to insert ownership data of contents, which help to keep the integrity of data. Existing video watermarking techniques are divided into different categories as shown in Figure 1. They can be divided into 3 main groups based on the domain that the watermark is embedded. They are spatial domain method, frequency domain method, MPEG coding structure based.

II. Principle

A digital watermarking system should include three basic parts watermark generation, watermark embedding and watermark extraction or detection. Watermark extraction algorithm using the corresponding key vector from the hidden watermark is detected or recovered without the key. The attacker finds very difficult to find and modify the hidden watermark vector.

III. CHARACTERISTICS:

- Random detection- The watermark is detected in any position of the video rather than the position according to the video playback order to detect the watermark.
- The combination of video codec standard- Video is in compressed formats in the storage or transmission procession, so information hiding technology research cannot do anything without specific video codec standard. Only combined with the encoding and decoding standard, video information hiding technology can make the real-time requirements fulfilment.
- Better robustness- Video watermarking scheme must ensure it can resist almost all kinds of processing or attacks.
- Blind detection scheme- Non-blind detection needs the original host signal, but it is very inconvenient to use the original data, because of the huge video data. Blind detection does not need the original host signal.

IV. TYPES OF TECHNIQUES

A. Digital Video Watermarking using Discrete Wavelet Transform and Principal Component Analysis:

Due to the extensive use of digital media applications, multimedia security and copyright protection has gained tremendous importance [1]. Digital Watermarking is a technology used for the copyright protection of digital applications .Here; we propose an imperceptible and robust video watermarking algorithm based on Discrete Wavelet Transform (DWT) and Principal Component Analysis (PCA) .DWT is more computationally efficient than other transform methods like DFT and DCT[4]. Due to its excellent spatio-frequency localization properties, the DWT is very suitable to identify areas in the host video frame where a watermark can be embedded imperceptibly. It is known that even after the decomposition of the video frame using the wavelet transformation there exist some amount of correlation between the wavelet coefficients[2].PCA is used to hybridize the algorithm since one of its inherent properties is of removing the correlation amongst the data i.e. the wavelet coefficients and it helps in distributing the watermark bits over the sub-band used for embedding thus resulting in a more robust watermarking scheme that is resistant to almost all possible attacks. Watermark is embedded into the luminance component of the extracted frames as it is less sensitive to the human visual system. The following block diagram (Fig.1&2) shows the embedding and extraction procedure of the watermark [12]. PCA helps in reducing correlation among the wavelet coefficients obtained from wavelet decomposition of each video frame thereby dispersing the watermark bits into the uncorrelated coefficients. The video frames are first decomposed using DWT and the binary watermark is embedded in the principal components of the low frequency wavelet coefficients[5]. The imperceptible high bit rate watermark embedded is robust against various attacks that can be carried out on the watermarked video, such as filtering, contrast adjustment, noise addition and geometric attacks

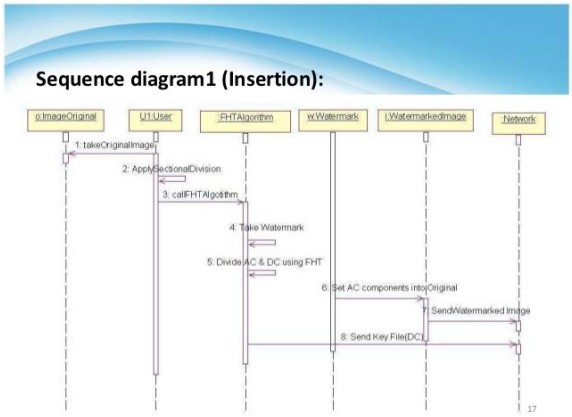


Fig.1

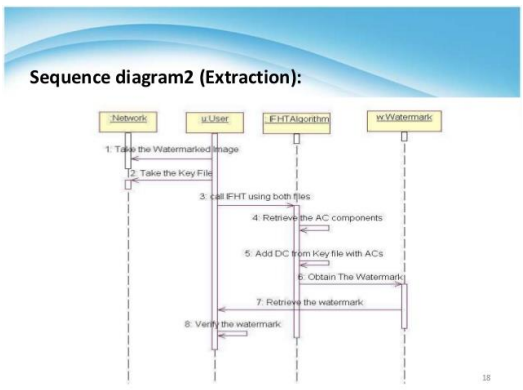


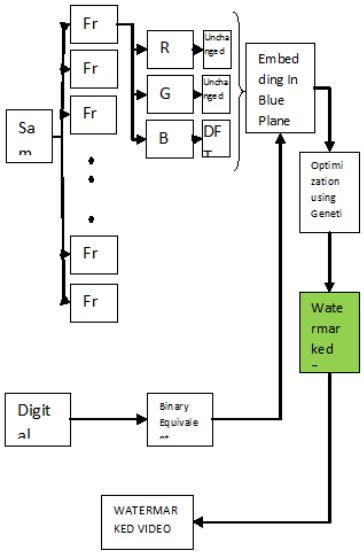
Fig.2

B. DIGITAL VIDEO WATERMARKING SCHEME USING LSB SUBSTITUTION AND GENETIC ALGORITHM

The advancement of Internet services and various storage technologies is making video piracy as an increasing problem particularly with the proliferation of media sharing through the internet. There is an explosion of data exchange on the Internet and the extensive use of digital media. Therefore, digital data owners can quickly and massively transfer multimedia documents through the Internet. It has aroused intense interest in multimedia security and multimedia copyright protection, and this has become a critical issue in the modern digital era. Research in copyright protection mechanisms and content authentication, where one of which includes digital watermarking consequently has been receiving an increasing interest from scientists especially in designing a seamless algorithm for effective implementation [6]. Basically digital watermarking involves embedding secret symbols known as watermarks within video data which can be used later for copyright detection and authentication verification purposes. This paper presents Least Significant Bit approach in video watermarking techniques. However, using LSB, the Mean Square Error increases to a considerable extent. To compensate for this, a genetic algorithm approach is used to minimize the mean square error, thereby increasing the Peak Signal to noise ration which is a quality metric for the watermarking process. It also addresses the main key performance indicators which include robustness, speed, capacity, fidelity, imperceptibility and computational complexity. Mathematical techniques are presented and simulation is carried out using MATLAB[7].

Embedding Algorithm:

1. Separate the given video into frames. The frame rate typically depends on the format of the video as well as video quality.
2. Let the frame size be m *X* n. Each frame is then divided into red, green and blue planes for the purpose of watermark embedding.
3. A binary watermark is used for embedding in Blue plane of the color image as the human eye has least sensitivity for blue color plane.

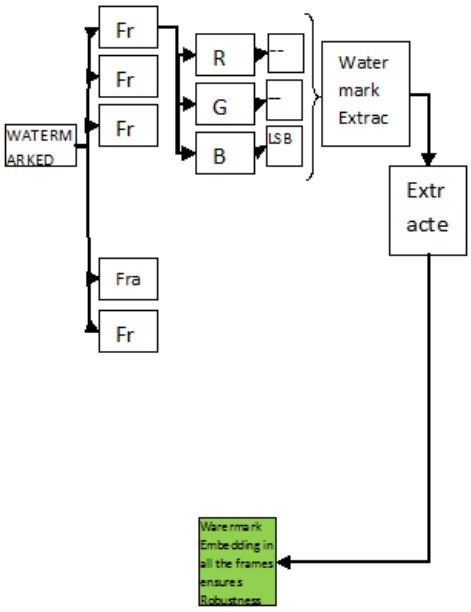


Proposed Architecture of Embedding Process

Extraction Algorithm:

1. Separate the given video into frames. Obtain the Red, Green and Blue planes of frame.
2. Extract the LSB of the Blue color plane[8].

3. Repeat the process for all the frames to ensure the presence of watermark even in the case of frame dropping. As watermark is embedded in all the frames, this scheme provides a robust watermarking technique



Proposed Architecture of Extraction Process

C. COHEN-DAUBECHIES-FEAUVEAU WAVELET AND GOLLMAN CASCADE FILTERED CARRY SHIFT REGISTER:

Due to advanced technologies available, the legal data can be distributed illegally and modified easily. It may create which a problem for the owners of the content which may lead to financial degradation of that organization. The unauthorized users can also exchange the copyrighted content illegally over peer-to-peer networks. Authentication of digital data and identifying authorized user is very essential. So, in this paper a secure watermarking technique for video has been presented for user identification and data authentication. In this paper Cohen-Daubechies-Feauveau (CDF) 9/7 lifting wavelet has been used and it is showing positive results[10]. The watermarking has been performed on LH5 and HL5 sweatbands that consist of the most significant features of the video. The most significant information is important in order to authenticate the video watermarking. The reason is that, any modification done to the watermarked video will modify the most significant information. For generating secure random numbers that will be used for watermarking Gollman cascade filtered-feedback carry shift register (F-FCSR) is used.

D. ROBUST NON-BLIND COLORVIDEO WATERMARKING USING QR DECOMPOSITIO AND ENTROPY ANALYSIS:

Digital watermarking can be used to settle the issues such as content identification, document and image security, audience measurement, ownership and copyright among others. The present work addresses the aforementioned issue by introducing a robust and imperceptible non-blind color video frame watermarking algorithm[9]. The method divides frames into moving and non-moving parts. The non-moving part of each color channel are processed separately using a block-based watermarking scheme. Finally a watermarked frame is generated by adding moving parts to it. Several signal processing attacks are applied to each watermarked frame in order to perform experiments and are compared with some recent algorithms.

E. AN ADAPTIVE HVS BASED VIDEO WATERMARKING SCHEME FOR MULTIPLE WATERMARKING USING BAM NEURAL AND FUZZY INFERENCE SYSTEM:

Here we have discussed an efficient reversible adaptive video watermarking scheme for multiple watermarks based on Bi-directional Associative Memory (BAM) Neural Networks and Fuzzy Inference System namely, Multi-BAM-FUZ scheme[11]. The main goal here is to design a robust video watermarking system which facilitates secure video transmission over a communication channel. The BAM neural network supports creation of weight matrix and this matrix is embedded into the DWT uncorrelated mid frequency coefficients of all the components of every frames of the video with varying embedding strength 'α'. The simulations performed on various test videos explain that the proposed Multi-BAM-FUZ performs other existing methods with respect to various video degradation processes, along with maintaining a satisfactory image quality. The novel adaptive process enhances the visual quality of about 60.97 dB in terms of PSNR and 0.9998 in terms of SSIM. Moreover, the proposed scheme facilitates high level of payload without affecting the imperceptibility and robustness level.

V. COMPARISON

Comparing with the general robust watermarking approaches which uses a meaningful binary image as the watermark image, the advantages of our proposes approach is that our watermark information can relatively contain longer text information and we can guarantee the content of the QR Code is the embedded text watermark information, as long as the extracted QR Code image can be decoded normally. Digital Image Watermarking can protect image, video, audio from hackers, domain user, noise, copyright etc. DCT and DWT domain watermarking is comparatively much better than the spatial domain encoding since DCT domain watermarking can survive against the attacks such as noising, compression, sharpening, and filtering and use JPEG compression method and DWT is used implanted zero-tree wavelet (EZW) picture compression project and high frequency sub bands as LH etc.

VI. CONCLUSIONS

Digital Image Watermarking can protect image, video, audio from cyber exploitation, noise, copyright etc. DCT and DWT domain watermarking is comparatively much better than the spatial domain encoding since DCT domain watermarking can survive against the attacks such as noising, compression, sharpening, and filtering and use JPEG compression method and DWT is used embedded zero-tree wavelet (EZW) picture compression plan and extremely high frequency sub bands as LH etc.

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AN ADAPTIVE APPROACH OF CAMPUS AUTOMATION SYSTEM

NISHA CHOUDARY[1], SWATI PRIYA[2], SUSHMA SHERLY CEPHAS[3], SIMREN J.[4]
[1] B.Tech,M.Tech,[2,3,4] B.E. Students
Department of CSE, MS Engineering College, Bangalore
[1] er.nishachoudhary@gmail.com; [2] priyaswati1218@gmail.com;
[3]cephassushma@gmail.com,[4]simrenjaiguru@gmail.com

ABSTRACT

An Education society in India has become sophisticated in last decade due to the development of the technology. Smart class, video conferencing are some of the examples of modern trends in educational system. The application assist the institute to move forward quickly, complete their vision and accomplish their goals, E-way. Android College Management system is an automaton application which is ready to lend a hand for the students as well as the colleges. In the existing system all the activities are hand operated. It is expensive and time consuming. Here almost all work is computerized. So the accuracy is maintained. Maintaining backup is very easy. In our proposed system, It tracks all the details of a student from the day one to the end of their course which can be used for reporting, recording of attendance, progress in the course, and so on. It also deals with all kind of student information, academic allied information, college details, and other resource related details too. The cause behind developing the campus automation system is to ensure that the users can use the application at any location provided the user has an android phone, with Internet. The data will be stored in the college server. Campus is considered as a network to distribute the information among students and faculties. The android application is concentrating on helping the staff's for a number of things in a series and the academic development of the organization. It maintains a database of all the facts provided. It helps the faculties to support those students who need attention for their academic role and also in case of any personal grievance.

I. INTRODUCTION

College management application is an incorporated android application that handles various educational and non-educational activities of a Academic organization. The application can access by every students or faculties of the institution through cellular phone devices with the help of his/her user name and password[2]. Every user will have a personalized home page with his/her profile management amenities. Through links that displays in the home page the user can access different options of the application assigned to him. The concept of developing campus automation using android technology is to make sure that student can access data at any point, within campus. The new systems put forward improved services for staff, and students, administrative data are standardized. It helps the students and faculties on campus to discover and access information about their time table which are relevant to students or lecturers, Our proposed system ensures to overcome these limitations such as all the paper and manual work. This article focuses on presenting information in a straightforward and understandable manner which provides amenities like online listing and profile design of students, attendance monitoring, circular, results viewing, reducing paper work and automating the record in an educational society[1]. It makes surveyed planning of students about attendance issues, and informs the staff about the step taken towards the poor attendance. There is one more part which is feedback, the student can

give the feedback at anytime from anywhere to faculty. It also facilitates parents to gain all the information about the actions held in the university. Each parent will be provided with the details of his/her ward only. Today, we do not have to maintain paper based Notice boards. Following this thought ,This paper focuses on how the students are able to get notifications on to their mobile. The application is well-matched with all Android versions from Gingerbread2.3 to Lollipop 5.0.1 so that students who cannot afford to buy high end mobiles and institutes located in distant, rural region can also take the benefit of this application.

II. EXISTING SYSTEM

Taking existing scheme eager on consideration, it can be establish that the apprentice has to often interact with the office individually, brief on the requirements they expect. All these need more man power and time. If administration needs particular information he checks the data about a student, staff, worker etc. It is hard to organize the physical work to store the data about all the students, staffs etc.

The limitation of existing system:

- Existing system contains material work.
- Requires many departments to handle various tasks and involves lot of document work.
- Notices are dispersed all over college class by class by hand or they are displayed on notice board.
- There is no computerization of records.
- Loss of account is likely to take place, as it is paperwork
- Employees communicate with Head of Department by meeting face to face.
- No stipulation for lost and found.
- Too much use of paper and other assets.
- Maintenance is difficult and Time consuming.
- Managing record is mind-numbing job.

III. PROPOSED SYSTEM

There is a necessitate to gap the bridge between faculties and parents by designing an android app to give well-timed and critical student information to the parents.

Faculties leave management; Faculties can apply leave, so that classes of that particular day or days so that the class can be engaged by another faculty. Message or notification should be sent from FACULTY to parents. Regarding student absence and regarding student internal marks if they have scored less marks

In our proposed system the following actions can also be fulfilled:

1. **Widening involvement**: The main advantage for majority of the regions was activating wider access to digital learning
2. **Flexible teaching**: The use of digital resources and methods allowed easy adjustment and updating of matter for an progressively student base, incorporating an ever wider range of education tools.
3. **Inspiring teaching environments**: All areas reflected on the “transforming and inspiring” eLearning for the faculty and teaching method.
4. **Quality and competence:** A final reflection was the potential of eLearning to improve the effectiveness of the learning course.

IV. ADVANTAGES OF PROPOSED SYSTEM

It is used reduce the physical work load. designed to provide well-organized services like student attendance, marks etc.

1. The application will significantly shorten and speed up the result preparation of an organization.
2. It contains commercial of the college thus satisfying the marketing section to showcase[3].
3. It overcomes the boundaries of the web based system as our proposed system is developed on Android OS.
4. As the present system is manual it does not require any complicated training for the User of the system.
5. This paper will provide facilities to all the existing versions of android devices.
6. Students need not to visit the college notice board every time.
7. No chance of the error as calculations for attendance will be automated

V. PROCEDURE

We have three Main Modules →

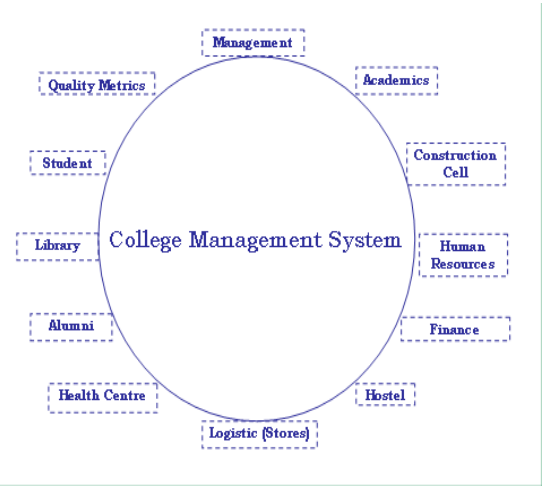
- **Admin Module**: management can view the information of staff's and students, send some proclamation to the alternate staff to handle the class and can generate the time table for the exacting semesters.

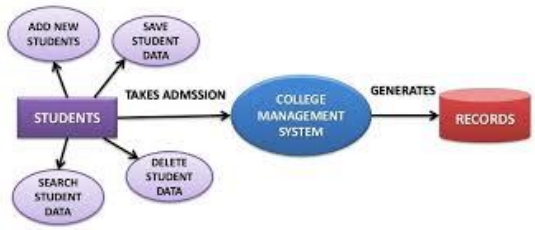
Staff Module: employees can view the generated time table, can send the announcement to the parent if student is not present, also if student have less marks.

Student Module: Student can view the generated time table and also can view their semester performance

Library Module: Students can issue books and refer different subjects, magazines etc.

Placement Module: Students can apply for their campus recruitment.





VI. IMPLEMENTATION

Algorithm For Admin Module :

Step 1:Login to portal by credentials.
if(p.equals(store.p)
{
//Run the toast script for testing//
}

Step2:Fetch the details of staff
List(Nam valuepair)x=newArraylist(Namevaluepair)
x.add(new BasicNamevaluepair("str',sub);
Step3:Fetch the student details
Arraylist(Hashmap x string,stry)contactlist
Contact.put(Name,nm);
Contact.put(Email,em);
Contact.put(Mobile,mob);
Contact.put(Mobile par,mp);
Contactlist.add(contact);
Step4:Allocate the classes to faculty.
SMSmanager.sendmessage(mob,sms);
Step5:Genetrate the timetable
list(Namevaluepair) x=new
ArraylistLnamevaluepair;
x.add(new Basic Namevaluepair("sub","day");

Algorithm for staff module :-

Step 1:Login to the portal by credentials.
if(p.equals(store.p)
{
//Run the toast script for testing//
}
Step 2:Update the attedence status of student
if(state=absent)
SMSmanager.sendtextmsg(phno,sms);
Step 3:View the TimeTable
data.getstr("scode")
data.getstr("sname");
Step 4:Staffs apply for leave to the HOD
SMSmanager.sendmsg(phno,sms);
Step 5:Sendsms to the student's parent number who got internal marks less than or equal to 15.
if(marks<=15)
SMSmanager.sendtextmsg(phno,sms);
Step 6:Fetch semester result of the student
mwebview.loadURL("http://www.vtu.ac.in:/);

Algorithm for student module

Step 1:Login to the portal by credentials.
if(p.equals(store.p)
{
//Run the toast script for testing/
}
Step 2: View the TimeTable

data.getstr("scode");
data.getstr("sname");

Step 3: Fetch semester result of the student
mwebview.loadURL("http://www.vtu.ac.in:/);

VII. RESULTS

- Faculties leave management.
- SMS alert or notification should be sent from FACULTY to parents. If there is a shortage of attendance
- SMS alert or notification should be sent from FACULTY to parents. If the student has secured less than 15 marks
- Teachers can apply leave, so that classes of that particular slot can be arranged respectively.

VIII. CONCLUSION

We have implemented faculty leave administration along with generating time table for one department. In general, semester time table is generated manually which has been avoided in this paper, which makes manual work easy and decreases the burden. There will be improved communication between staffs and parents. Accessing App is user friendly, hence it is more effective.

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Energy Efficient Routing by Taking Willing Status of Node in Wireless Sensor Network

VEENA R C[1], ASHWINI P R[2], S. ANUSHA[3]
Department of computer science and engineering, M S Engineering College, Bengaluru, India
Veenavn288@gmail.com; ashpirangi@outlook.com;allizzzwellanu@gmail.com

ABSTRACT
Wireless sensor network is a network used to communicate various wireless sensors through radio link. In WSN the efficient routing willing status (WSN) is used as a proactive routing protocol. The Hello Messages are used in ERWS. The ERWS is extended to the Energy Efficient-ERWS (EE-ERWS). The ERWS is prone to various attacks. The severe attack is the Sleep Deprivation Torture attack. In this paper we are mainly concentrating on the Sleep Deprivation Torture attack. The low energy node is targeted by the Sleep Deprivation Torture attack. The low energy node is taken as the victim by the attacker and moves permanently to the sleep mode. All energy of the node is exhausted by the sleep deprivation attack. This type of attack is also possible at the routing level. The willing property of each node is known by the broadcasting Hello messages to all the nodes. So here we are proposing Intrusion Detection System (IDS). The IDS is used to detect the Sleep Deprivation Torture attack. The Network Simulator (NS 2) is used for the simulation for the performance and the existing is compared for the performance.

I. INTRODUCTION

A number of cellular sensors called as the wireless sensors are communicated with a central base station through a connection of radio link which is generally called as the wireless sensor networks. Sensor field consists of a large number of tiny sensor detector nodes in WSN [1, 2]. The data can directly transmit to the gateway through detecting using sensor nodes in wireless sensor networks. The tiny sensor nodes are connected through base station. There are two types of routing [3] protocols in WSN. Namely the reactive routing protocol and the proactive routing protocol. The reactive routing protocol is worked by finding the path to transmit the data only if there is transmission of the data. The proactive routing protocol is worked by in advance finding the paths to each and every source and destination. The proactive routing protocol is more advantageous compared to the reactive routing protocol, in advance having all the paths to every node. So in the ERWS we are using a proactive routing protocol. The most prominently used in the ERWS is the proactive routing protocol

The ERWS is enhanced to the Energy Efficient ERWS (EE-ERWS) [5]. In the EE-ERWS the MPR (Multi Point Relay) nodes are used. Each nodes show their willingness property. Based on the willing property of each node the MPR nodes are selected. The willingness property shows the efficiency of the node that is the battery life time of the node. Based on this property the willingness of the node is recognized. Then the node is considered as the MPR node. The MPR node which helps to reduce the flooding of packets and the network congestion is reduced.

But the unauthorized access is not known by the EE-ERWS. The traditional ERWS is not used other than that the EE-ERWS method is used for the attacks. The EE-ERWS is used to overcome the attacks compared to the traditional ERWS. At the time of routing the Sleep Deprivation Torture attack [4] is also possible. The adversary selects the victim node, and all the energy is exhausted. The node which has

the low battery power is selected by the adversary node. After removing all the energy the node goes to permanent sleep mode. In which the node has no energy due to the attack of the adversary node. The attacker node when interacted by the node the lifetime of the node will be linearly reduced. The energy of the node can be drained by the victim in various ways. The attacker gives more tasks to the victim node to drain all its energy. Many researches researched based on the sleep deprivation torture attack, which resulted in many solutions. Among all the solutions one of it is the MAC protocol. MAC protocol [5] shows the single point of failure. The MAC protocol analysis that various types of denial of sleep is possible. The solution which is described by the MAC protocol is not efficient due to the increase of network overhead. One of the solutions was also introduced by the Chen C. et al. The fake schedule switch solution was introduced, but it also has a drawback that is the complex installation.

The MAC layer shows that at the level of routing there may be an occurrence of Sleep Deprivation Torture attack. Here in order to avoid the Sleep Deprivation Torture attack we use the Intrusion Detection attack (IDS). There are three types of the IDS [6] namely specification based, anomaly based and signature based. The anomaly based and signature based IDS are the most popular IDS, but there are not used frequently because they generate more false alarms. The specification based is one of the most popularly used IDS because it detects the malicious attacks, and also the problems are avoided

II. EFFICIENT ROUTING WILLIN STATUS

A. Summary of ERWS

ERWS is one of the datagram protocols. The ERWS is specially designed for the mobile ad-hoc network which uses the table driven link state routing protocol. ERWS is proactive protocol. While broadcasting the messages the overhead occurs by flooding of control packets. The routes are available when needed immediately, using the link state algorithm. In order to avoid flooding we use multipoint relay (MPR) nodes. The MPR nodes overcome flooding. The high energy nodes are made as the MPR nodes. These multi point relay nodes are made to broadcast messages. The 1-hop neighbor nodes are used for the MPR selection. These MPR nodes forward the messages to the 2-hop neighbors of the particular node. By selecting the MPR nodes, the transmission will be easily made to the 2-hop neighbor nodes

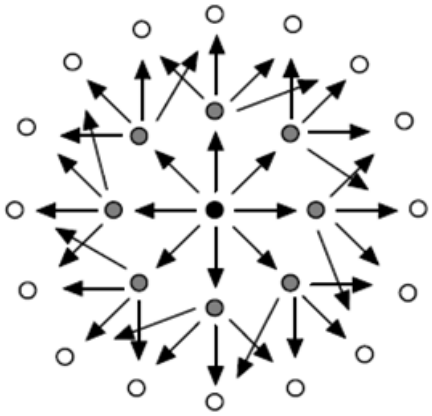

Fig. 1. General Transmission Consequence

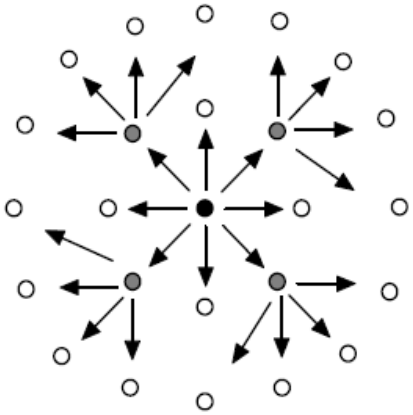

Fig. 2. Transmission by MPR Selection

The MPR selection is done in the node set of 1-hop neighbor nodes. The overhead and flooding of control packets is increased due to forwarding messages to all the nodes. So the MPR nodes are selected due to the avoidance of the flooding of control packets. Due to the MPR selection mechanism the network transmission has an advantage of more efficiency. It is more scalable in the usage of the MPR mechanism. Fig 1 shows the general transmission consequence. All the 1-hop neighbor nodes receive the control packets and forward it. By the participation of all the nodes in 1-hop neighbor, the duplicate data packets are generated. In order to avoid the duplicate data packets we are using MPR selection of nodes. The

general transmission consequence shows the drawback of the traffic overhead. In order to overcome the drawback the MPR forwarding is done. The Fig 2 shows the Transmission by MPR selection. Due to this the traffic overhead is reduced.

B. Message Broadcasting in ERWS

The ERWS is one which uses the 2 types of control messages. The control messages used by the ERWS are the hello messages and the Topology Control (TC) messages. First the node sends the hello messages to all the nodes. By sending the hello messages to all the nodes in ERWS, the willing status of each node is reveled. Then by knowing the willing status, the MPR selection is done. Due to the MPR selection, it will be easy to route the packets to the nodes. There are different attributes set for each node. The attributes are like WILL_DEFAULT, WILL_NEVER, and WILL-ALLWAYS. The WILL_DEFAULT attribute indicates the default value of the node.

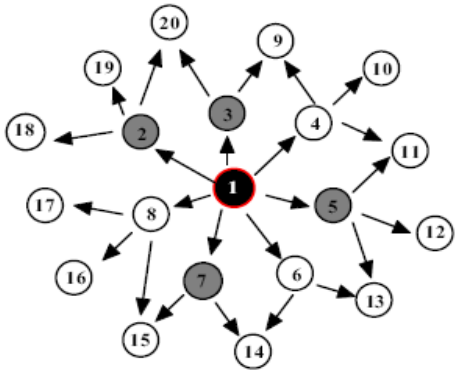

Fig. 3. Attack Framework

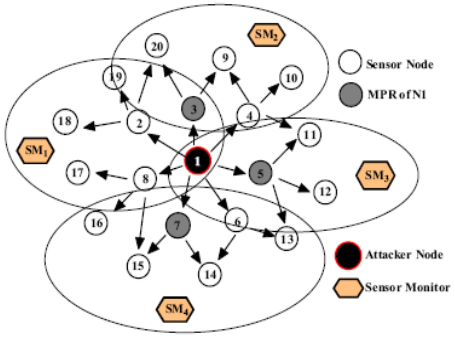

Fig. 4. Description of Sensor Monitors

The neighbor nodes never select the node as MPR node, when the node has the attribute of WILL_NEVER. The WILL-ALWAYS attribute shows that it is ready for transmission, with willing status always. Now let us consider the Fig 3 as the example. The 1-hop neighbor nodes are the N2, N3, N4, N5, N6, N7, and N8. Now all the 1-hop neighbor nodes receive the hello messages. The 2-hop neighbor nodes are the N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19, and N20. After receiving the hello messages, the 1-hop neighbor shows the willing status of each node. Instead of sending packets from the entire 1-hop neighbor to the 2-hop neighbor, we use the MPR selection. Because in order to avoid flooding we use the MPR selection. The WILL-ALWAYS nodes are selected as the MPR nodes, the packets are sent to the 2-hop neighbor. Each MPR nodes contains an MPR selector set. The MPR selector set should be known to the nodes. The MPR nodes should sends the TC messages to all the nodes in the network. The MPR selector set is also sent to all the nodes. By sending TC messages from the MPR node, it comes to know the originator MPR node. When the MPR selector set is empty, then no TC messages will be sent to the node. For example consider Fig. 3 in which the node 1 sends its MPR set through N2. Because N2 is the subset of N1.

III EE-ERWS

Here the energy is the most essential part in the WSN. The sensor nodes cannot store more power. They do not provide backup, especially in the critical situation, due to its size. The sensor nodes are tiny in size. As the energy is needed as the most prominent one in the WSN. Due to this the route failures are also possible in the networks. So in order to avoid this we are using energy efficiency. This energy efficiency does not only provide us the power. The energy efficiency also measures the performance of the network. It checks the performance through the life-time of the network. Here the energy of each node is displayed.

The willing status is seen by the remaining energy left out in the node. That is the energy used and the energy remaining are calculated. By using these measures the current energy of the node is calculated. A node cannot have some battery power all the time. It may be changing. If the power supply is done to a node simultaneously then, the node can have a good backup, then it can transmit more

packets. In this condition the node attribute will be WILL_ALWAYS. If the other node has not connected to the simultaneous power supply and if it does not have a backup. Also no power in the node to transfer packets, then the willingness property will be WILL_NEVER. If the power in the node frequently changes to low, then the willingness property will be WILL_LOW.

There are many researches going on to provide good power to the nodes, in order to provide best communication in WSN. The status of the willingness of the nodes can also be represented by numbers. If the states of a node would be WILL_NEVER, then it is set to integer 0. Likewise the WILL_LOW to 1, WILL_DEFAULT to 3, and WILL_HIGH to 6 and finally WILL_ALWAYS to 7

A. Attack Scenario

The ERWS is expanded to the EE_ERWS. The node should select the high energy node to transfer the packets. After sending the hello messages, each node shows its attributes that is the willing status. Some may be willing status high and some may be low. To send a packet the node should select a willing status high node. So that through the high energy, the more packets arte sent simultaneously. This is the procedure of the selection of node in the energy efficient ERWS. But in the case of the attacker he does totally a different process. To elaborate the attack scenario, let us consider fig. 3. Consider that node N1 contains 1-hop and 2-hop neighbor nodes. The 1-hop neighbor nodes of N1 are {N2, N3, N4, N5, N6, N7, N8} and the 2-hop neighbor nodes are the {N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19, N20}. Now first the hello messages are transferred to all the nodes from node N1. Then the attribute of each node is known, that is the willingness property of each node is reveled and exchanged with the node. Now in the process of ERWS the node has to select the high energy node. As shown in the fig. 3 consider N3, N5, N7 set of nodes are WILL_LOW. Then N4, N6, N8 are showing the willing status WILL_HIGH. Then the WILL_ALWAYS is shown by N2. But the attacker selects only the willing status low nodes. Then these willing status low nodes are converted to MPR. The attacker uses only the WILL_LOW nodes. The attacker's main aim is to concentrate on the low energy nodes. Then moving the low energy nodes into the permanent sleep mode. All the energy of the node is removed and wasted by giving unwanted work to the node.

IV PROPOSED SOLUTION IDS

Here we use sensor monitors, to detect the attacks. The sensor monitor is one which is clustered with many number of sensor nodes. Small sensor nodes are grouped from a sensor monitor. In a group of nodes, some set of SMs are used. These SMs are used to detect the attacks. They try to detect the attacks by having communication with the other sensor monitors. Here we use sensor monitors, to detect the attacks. The sensor monitor is one which is clustered with many number of sensor nodes. Small sensor nodes are grouped from a sensor monitor. In a group of nodes, some set of SMs are used. These SMs are used to detect the attacks. They try to detect the attacks by having communication with the other sensor monitors.

B. Working of IDS

Here working of the IDS algorithm is described. In order to detect the intruder attacks. The hello messages are sent to all the nodes. The hello messages are never exchanged by the neighbor nodes. After transferring the hello messages the hello table and TC tables are updated.

Algorithm IDS

1. Energy Initialization.
2. HELLO Packet Transmission.
3. Updating HELLO Table and TC Table.
4. 1-hop nodes Energy level displayed.
5. MPR Selection.
6. If Low MPR Selection
   a. Low Energy Node Selected
   b. Message sent to SM
   c. SM Identifying Malicious Node
   d. Malicious Node moved to Block List
   e. Data Transmission from WILL_YES Node.
7. If High MPR selection
   a. High Energy node Selected
   b. Data Transmission

END

After updating the tables, the willing status of the 1-hop neighbor is displayed. These all high energy nodes are said as the MPR nodes. For a good packet transmission the high energy nodes should be taken. But a node tries to transfer the packets to the low energy nodes. Then these low energy nodes sends message to the SM. The SM receives a message of selection of low energy node for packet transmission. Then the SM doubts for choosing the low energy node. One SM communicates with the other SM. The SM comes to know that it is the attacker. The attacker's main intention is to choose a low energy node. By choosing the low energy node, the attacker moves the node to permanent sleep mode. So the SM after knowing the attacker stops the node for data transmission. Then the node is moved to the block list. Now the data transmission takes place through willing status yes nodes.

C. Working of IDS

Here we use 4 sensor monitors. The sensor monitors used namely are the SM1, SM2, SM3, and SM4. Each sensor monitor monitors the number of nodes within its range. The description of sensor monitors is as shown in the fig. 4. The nodes within the range of sensor monitors are monitored by a particular sensor monitor. The 1-hop neighbor nodes of N1 are the N1, N2, N3, N4, N5, N5, N6, N7, and N8. The 2-hop neighbor nodes are the N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19 and N20. Now the hello packets are sent to the nodes and willing status of the node is known. The willing status are updated in the hello table. The sensor monitor can access the hello table to see which node has been selected for data transmission and also can know the willing status of each node.

TABLE I : HELLO TABLE

Sl. No.	HELLO_ID	Origin_ HELLO	Neighbor_Add	Int_ WILL	Rcv_Time (s)
1	H1	N2	N1, N18, N19, N20	7	1.009
2	H2	N3	N20, N9, N1	1	1.012
3	H3	N8	N15, N16, N17, N1	6	1.013
...	...	...	...	...	...

TABLE II: TOPOLOGY CONTROL TABLE

Sl. No.	TC_ID	Origin_TC	MPR_ADD	Rcv_Time
1	TC1	N1	N3, N5, N7	1.020
...	...	...	...	...

It also communicates SM3 through the node N4. In which the node N4 has the willing status WILL_HIGH. By communicating with the entire sensor monitor the node N1 is moved to the blocked list. Then the packet transmission made from node N1 is discarded and stopped. So by this the node N1 is stopped for doing any transmissions. Table I shows the hello table. Table II shows the topology control table. Each time the values of the nodes are changed. The tables are updated frequently. The SM checks the tables for the willing status of each node.

V PROPOSED SOLUTION IDS

The sleep deprivation torture attack has overcome and detected. The IDS algorithm helps to detect the attacks of the sleep deprivation torture attack. The performance of EE-ERWS is increased. It is increased and measured through specific parameters. The parameters in order to measure the performance used are the throughput, packet delivery ratio [15], End to End delay [15], average life time. Here for the simulation we use NS-2 simulator. We are using NS-2.34 version for the simulation. Linux is used as the operating system, which is flexible in the network simulation. The number of nodes used here is 10-100. The total time taken for the simulation process is the 500sec. The wireless channel communication is used. The hello packets are transferred within 2sec and the time taken for TC interval is the 5sec.

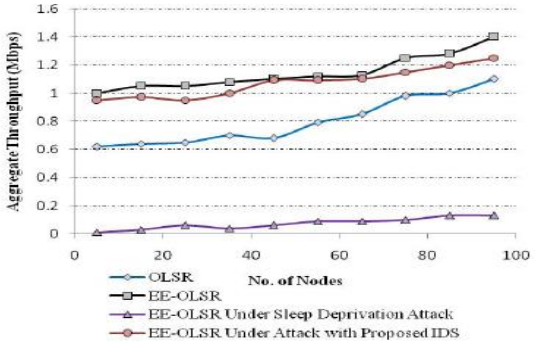

Fig. 5. Throughput

The throughput graph is as shown in the Fig. 5. It shows the comparison between the four parameters. The first parameter is EE-ERWS under

the sleep deprivation torture attack. The second parameter is better than the first parameter which is ERWS. The third parameter which gives better throughput than using IDS. The good throughput is given by the EE-ERWS.

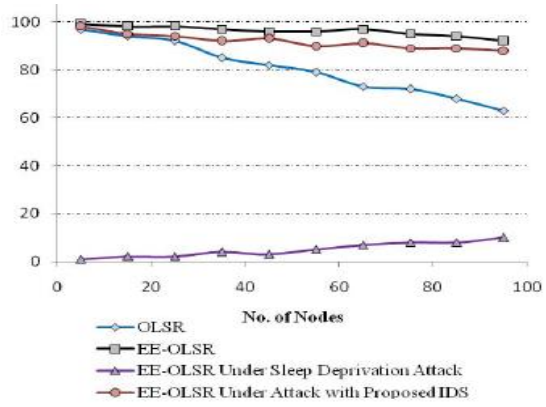

Fig. 6. Packet Delivery Ratio

Packet delivery ratio is represented in Fig. 6. The same four parameters is used to measure the packet delivery ratio. The EE-ERWS helps to get good packet delivery ratio.

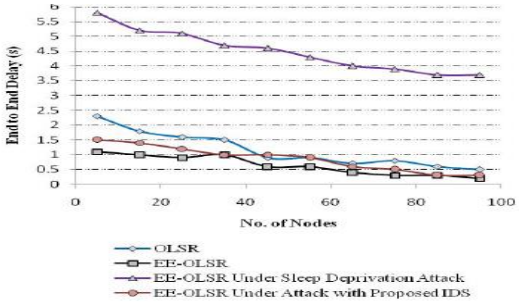

Fig. 7. End to End Delay

The graph of End to End delay is as shown in Fig.7. When attacked by the sleep deprivation torture attack there is a long delay. The delay of packets is reduced when used with EE-ERWS.

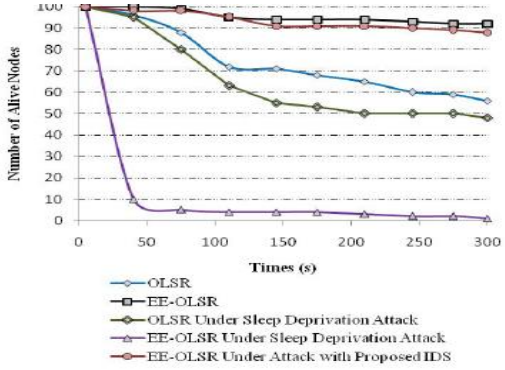

Fig. 8. End to End Delay

The average lifetime of the packets is as shown in the Fig. 8. Average life time shows us the lifetime of each and every node.

VI CONCLUSION

In WSN the first beneficence is the energy efficient ERWS. The MPR election rule is a different energy plan. The throughput, packet transmission, point-to-point delay, general nodes life span in EE-ERWS outperforms historic ERWS. In EE-ERWS the sleep deprivation attack is possible when trustworthiness of packets is not checked in EE-ERWS. The sleep deprivation attack is blocked by the EE-ERWS in which the network is divided and life span of the node is miniaturized.

The ERWS protocol is scheduled for disclosure workings especially considering sleep deprivation attack. With rate regarding quantity, PDR, end-to-end delay and general node life span, the issue about the intrusion can be nullified through huge extension which is illustrated in the experimental results of the IDS.

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An IOT test bed for Building Smart City

SYEDA SHAFIA RUBBANI[1],CHETHAN SAGAR[2], MILANA S[3]
[1]M.Tech, [2,3] B.Tech
Information Science and Engineering,
M.S Engineering College
[1] syeda.sr.msec@gmail.com;[2] chethansagar8@gmail.com;[3] milanashivashankar@gmail.com

ABSTRACT
The process of morphing Messina into a "smart" city, an explicit mission for the crowd funded Smart City project, it is essential to set up an infrastructure of smart devices embedding sensors and actuators, to be scattered all over the urban area.
An horizontal framework coupled with the Fog computing approach, by moving logic toward the "extreme" edge of the Internet where data needs to be quickly elaborated, decisions made, and actions performed, is a suitable solution for data-intensive services with time bound constraints as those usually required by citizens. This is especially true in the context of IoT and Smart City where thousands of smart objects, vehicles, mobiles, people interact to provide innovative services. We thus designed Stack Things as an Open Stack-based framework spanning the Infrastructure as-a-Service and Platform as-a-Service layers. We present some of the core Stack Things functionalities implementing a Fog computing approach towards a run-time "rewireable" Smart City paradigm ,by outlining node management and contextualization mechanisms, also describing its usage in terms of already supported and developed verticals, as well as a specific example related to environmental data collection through SmartME.
Keywords-IoT; Smart City; Cloud; IaaS; OpenStack; Stack Things; Arduino; SmartME

INTRODUCTION

The concept of a Smart City highlights the need to enhance quality, interconnection and performance of various urban services with the use of information and communication technologies (ICT). Smart City technologies promote cloud-based and Internet of Things (IoT) based services in which real-world user interfaces use smart phones, sensors and RFIDs. Cloud computing and IoT are presently two most important ICT models that are shaping the next generation of computing. Both concepts have major impact on how we build and deploy smart applications/solutions for smart cities. Cloud computing represents the delivery of hardware and software resources on demand over the Internet-as-a-service. On the other hand, IoT concept envisions a new generation of devices (sensors, both virtual and physical) that are connected to the Internet and provide different services for value-added applications .This paper addresses the convergent domain of cloud computing and IoT for any smart city application deployment. Dubai as a smart city is discussed with some application-based scenarios. An IoT based healthcare framework is also proposed in the paper.

II. PROCEDURE:

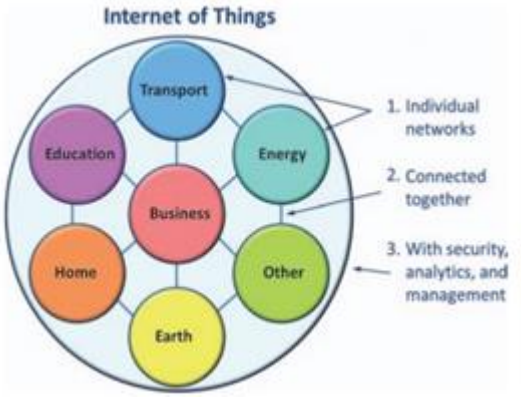
The tendency of making cities smart also makes it susceptible for new methods of computerization which would be integrated into services with already laid infrastructure. The definition of smart cities ranges from sociological, technological and urban perspectives.

III.TECHNOLOGY USED:

IoT: The internet of things (IoT) is the internet working of physicaldevices,embedded with electronics, software, sensors, actuators, and

network connectivity that enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society." The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure

IP convergence

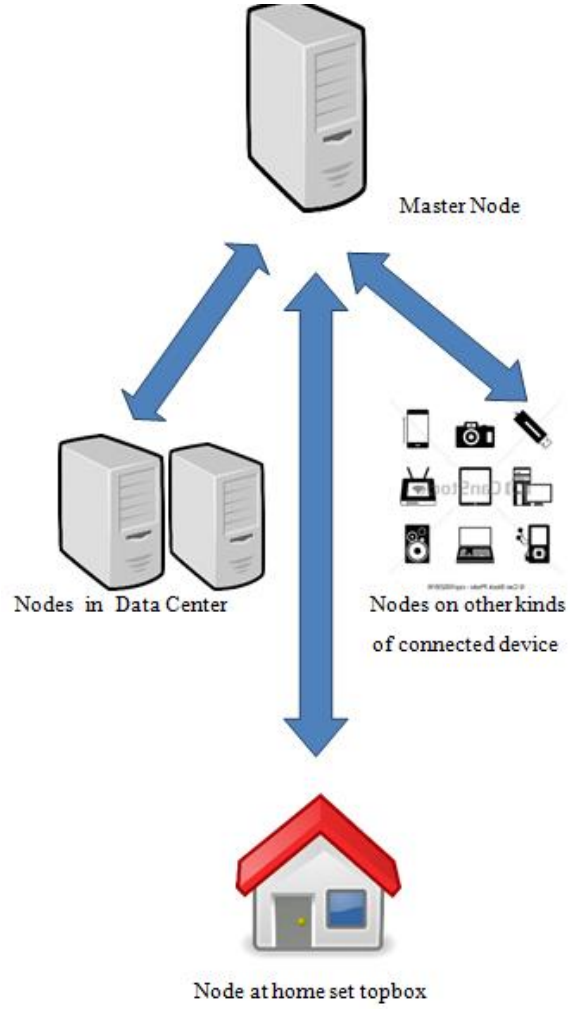


IOT VIEWED AS NETWORK OF NETWORKS

The use of IP to communicate with and control small devices and sensors opens the way for the convergence of large, IT-oriented networks with real time and specialized networked applications. Currently, the IoT is made up of a loose collection of disparate, purpose built networks, which are mostly not inter-connected. Today's vehicles, for example, have multiple networks to control engine function, safety features, communications systems, and so on. Commercial and residential buildings also have various control systems for heating, venting, and air conditioning (HVAC); telephone service; security; and lighting. As the IoT evolves, these networks, and many others, will be connected with added security, analytics, and management capabilities and some of them will converge. This will allow the IoT to become even more powerful in what it can help people achieve. A presentation of IoT as a network of networks is given. The Internet of Things is not a single technology, it's a concept in which most new things are connected and enabled such as street lights being 14 Internet of Things Strategic Research and Innovation Agenda networked and things like embedded sensors, image recognition functionality, augmented reality, and near field communication are integrated into situational decision support, asset management and new services. These bring many business opportunities and add to the complexity of IT. Distribution, transportation, logistics, reverse logistics, field service, etc. are areas where the coupling of information and "things" may create new business processes or may make the existing ones highly efficient and more profitable.

IV.SYSTEM ARCHITECTURE

Cloud computing is used for provisioning and management of the resources with minimal effort and high user based applications. The cloud computing paradigm is an umbrella term for computing services that are accessible over the Internet and developed on a common pool of remotely hosted resources. There are different kinds of cloud computing services depending on the type of resources delivered via them. Current state-of-the-art cloud services can be such as Infrastructure-asa-Service (Iaas), Platform-as-a-Service (PaaS), Software-as-aService (SaaS), Network-as-a-Service (NaaS), Storage-as-aService (STaaS), Sensor-as-a-Service (SSaaS), etc.

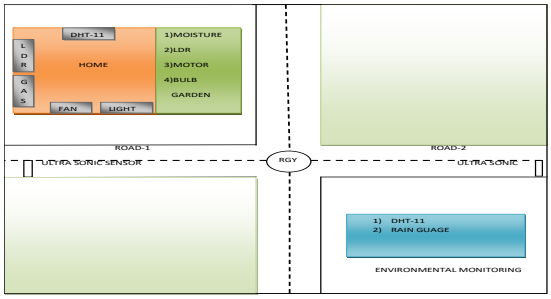


Smart system application in cloud environment

A.Design:

Different sensors or actuators are interfaced to the Controller and it checks for the conditions and if satisfied then certain data are uploaded to the internet or cloud. Updated data can be Monitored with the help of smart phone or any PC. Status in some cases can be altered from the user end.

B. System Architecture



IOT BASED URBAN AREA APPLICATION(Smart City)

V. Results

A .Raspberry pi: Raspberry pi is a series of small single board computers developed in the united kingdom by the raspberry pi foundation to promote the teaching of basic computer science in schools and in developing countries

The raspberry pi2 uses a 32bit 900MHz quad core ARM Corte-A7 processor

The Raspberry pi3,with a quad –coreCortex-A53 processor,is described as10times the performance of a Raspberry pi1.

B.Sensor for Moisture: It measures the quantity of water in the soil. Since there is direct type measurement of gravity or free soil type moisture, it requires segregating, drying out and weighting of the respective representatives, moisture in soil type sensors which measures the water in volumetric content of water which by indirectly considering in acknowledging the various properties of the respective soil and these can be stated as resistance to electricity, constant being diaelectic, neutrons interaction and as also the information on proxy of the content constituted in moisture. Basic relation we can know is the property measured and moisture in soil is actually calibrated and this even varies relying on the factors of environment which constitutes type of soil, temperature or conductivity nature. Those reflected microwave type radiation is actually effected by the moisture content and is utilised basically for sensing in remote manner in hydrology and even agriculture. Portable type probing instruments can be actually utilised by farmers or gardeners respectively.

C.DHT11 Sensor: DF Robot DHT11 Temperature and those features of humidity type sensors herein features temperature and humidity type sensor which are complexes with calibrated with digital signal type output. By utilising exclusive type digital kind signal acquisition technique and temperature and humidity type sensing technology primarily requires higher kind reliability and long term stable function can be expected. This particular sensor comprises of resistive type measurement of humidity with the component and an NTC type temperatures, it connects to a greater performing 8 bit micro type controller which is offering an excellent quality type with speedy reactions, interface ability of anti type and cost being maintained effective.

D.GAS SENSOR: Gas type sensor can be called the device which actually detects the gas presence in the respective area often as the safety type system. This equipment type is chosen and applied to make detection in gas in leakage or any other emissions happening can be arranged interfaced with those of control system hence the process can be shut down in automatic way. There is an alarm function for an operators in the respective area wherein the leakage is happening, giving an opportunity for making an exit by humans. This device type is significant enough since there are many gases which can be harmful to the life of humans or animals.

Sensor of infrared nature can be an electric nature which makes emit by considering the aspects of the surroundings. An IR type sensor herein measures the level of heat with an object as well it motion is even detected. There is passive type IR sensor, which measures only radiation of infrared type which considers in omitting.

VI. CONCLUSIONS

The importance of this project derives from the fact that we studied the ways through which the Cloud and Internet of Things concepts can be used in the context of smart cities. A smart city deployment requires the integration of a distributed sensor network and a centralized platform based on cloud computing.

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CATEGORY: CSE

Predicting Ultimate Analysis using ANN and WNN

RAMESH N [1], SAILAJA THOTA [2]
REVA University , Rukmini Knowledge Park, Kattigenahalli, Yelahanka,
Bangalore, Karnataka, India
[1]ramesh1661@gmail.com; [2]sailajathota@revainstitution.org

ABSTRACT
In the real world, generating the electricity depended both on renewable and non-renewable sources. Renewables sources are eco-friendly. We are not able to generate electricity all the time using renewables sources due to non-availability of the source. Non-renewables sources can generate electricity irrespective of time. In this paper, we are examining the improvement of one of the non-renewable source, i.e., coal. Still now-a-days in many countries coal is used for generation of electricity. Coal property varies from one country to another. Based on the efficiently burning the coal, maximum utilization is obtained. For each coal type it is necessary to find some of the existing elemental composition. We can achieve this by the process called proximity analysis and ultimate analysis. Ultimate analysis can be obtained by using the gross level composition obtained from proximity analysis. Still obtaining the ultimate analysis is long process and cost involved. Based on the available data from past years we are using the neural network for predicting this values. We are using both Artificial Neural Network and Wavelet Neural Network processing for finding the best methods that can be applied in efficiently utilizing the coal in power plant. Artificial Neural Network using Back Propagation of errors as activation function and Wavelet Neural Network using Morlet wavelet non-linear transfer as activation function.

I. INTRODUCTION

In many Thermal power plant, coal is used as main sources. Coal are complex material and exhibits both physical and chemical property. Physical property defines the type of material available such as in terms of solid rock or like a powder. Chemical property defines the chemical combination such as ash, moisture and other form of gases. Based on this physical and chemical properties coal must undergo some pre-process before sent to burning process. Physical property can be found by seeing the existing condition of the coal. But chemical property can be identified by testing process which is carried in laboratories.

Proximate Analysis and Ultimate Analysis values can be obtained only by chemical testing of the coal, which is carried in laboratories. Proximate Analysis includes various parameters such as %Volatile Material, %Ash, %Fixed Carton and %Moisture known as gross level composition. Ultimate Analysis parameters are %Oxygen, %Carbon, %Nitrogen and %Hydrogen known as elemental composition.

Finding the elemental composition is very important from the design, operational and environment point of view. This process repeat for each sample of coal. Considering the cost involved in finding the ultimate analysis, most of the coal power plant cannot invest in this process. So, the alternative process is finding the proximity analysis which is cost effective and easily available in any of the plants. After finding the proximity analysis values we need to find the ultimate analysis. The relationship between the proximate analysis (i.e., gross level composition) and ultimate analysis (i.e., elemental level composition) is nonlinear, whereas the available empirical formula is based on linear assumptions.

In this paper, we are suggesting the alternative way of finding the ultimate analysis by computing the output of two different neural network process. The ultimate analysis values are obtained by using the past data setups collected for many years. For both the neural network we are giving this data setup as input and based on the output from both the network we are defining which is the best method that can predict the ultimate analysis values.

II. PROCEDURE

There is different process of obtaining the ultimate analysis by using the empirical formula. For this empirical formula, the values obtained from proximity analysis is given as input. Again, finding the values for proximity analysis for each sample of coal is time consuming. Each time we are calculating proximity analysis for different batch of the same coal obtained from same mining place.

Neural Networks are inspired by neurons of the biological brain. This Neural Network simulates the brain neurons. In this process, we are considering the Artificial and Wavelet Neural Network for finding the best process for adopting in the power plant. This Neural Networks remains same in the functioning of neural, but differ by their Activation functions defined within the network.

Based on the available data from past year's we are sending this data as input to Neural Network. At the end, the output of the Neural Network predicts the future values of ultimate analysis. New values are being assumed that it will be the same value obtained by examining the coal properties in laboratories.

A. ANN and WNN

Neural network is its ability to learn. A neural network is not just a complex system, but a complex adaptive system, its internal structure based on the information flowing through it. This is achieved through the adjusting of weights. Each line represents a connection between two neurons and indicates the pathway for the flow of information (fig 1). Each connection has a weight, a number that controls the signal between the two neurons. If the network generates a good output, there is no need to adjust the weights. If the network generates a poor output—an error, so the system must adapt, altering the weights to improve the results.

By using layers, nodes and weight we are predicting the next value of ultimate analysis proper. All the base functionality of both ANN and WNN remains the same but their Activation function used for both the neural function differs. This Activation function defined to find the best output and the weight of each node changes in each training process of network making it more accurate.

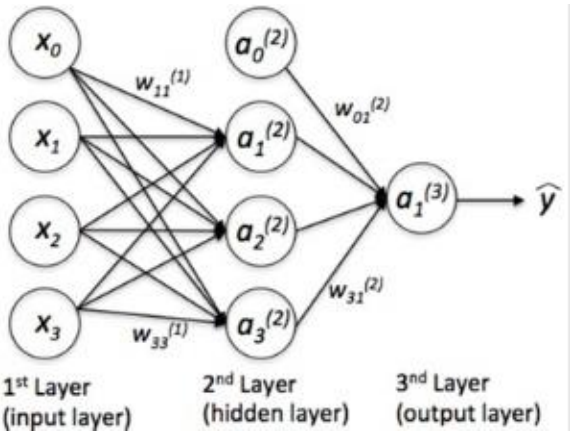

Fig. 1 General Neural Network Architecture

B. Perceptron

Perceptron is the simplest neural network: defines as a computational model of a single neuron of the network. A perceptron consists of one or more inputs, a processor, and a single output (fig 2).

A perceptron follows simple "feed-forward" model, means inputs are sent into the neuron, are processed, and result in an output. Inputs from left and output from right side of neural.

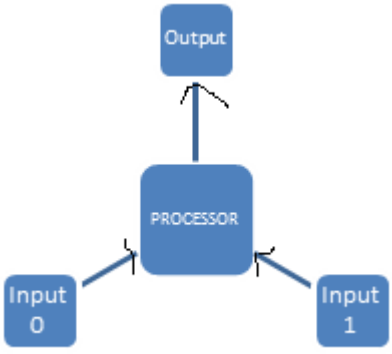

Fig. 2 Perceptron

C. Perceptron Algorithm

1. For every input, multiply that input by its weight (initially the weight value of each node is 1).
2. Sum all the weighted inputs.
3. Compute the output of the perceptron based on that sum passed through an activation function (the sign of the sum).

D. Activation Functions

The operation of a neural network is to sum up the product of the associated weight and the input signal and produce an output or activation function (fig 3). For the input unit, this activation function is the identity function. The neuron of a layer gets the same type of activation function. In almost all cases non- linear activation functions are used.

The various types of activation functions used in a neural network are identity function, binary step function, binary sigmoid functions and bipolar sigmoid functions.

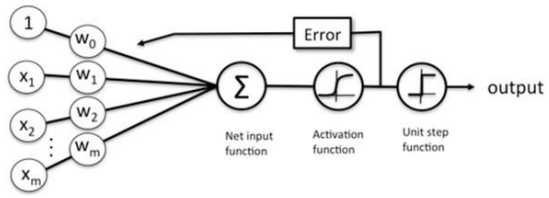

Fig. 3 Activation Function

For ANN, back propagation of errors is used as Activation Function. For WNN, Morlet wavelet non-linear transfer is used as Activation Function.

Data is collected from power plant and calculated ultimate analysis (elemental composition) by using below equations:

%Carbon (C) = 0.97*(%FC) +0.7*%VM-0.1*(%ash)) -(%M) * (0.6-0.01*(%M))

%Hydrogen (H) = 0.036*(%FC) +0.086*((%VM)-0.1*(%Ash)) -0.0035*(1-0.02*(%M)) *(%M)2

%Nitrogen(N) = 2.10 – 0.020 *(%VM)

%Moisture (M) = %M

%MM = 1.1*%Ash

%Oxygen(O) = 100-%C-%H-%M-%S-%N-%MM

M = Moisture, FC = Fixed Carbon, VM = Volatile Material, MM = Mineral Matter

For each elemental composition, ANN and WNN ruined. Based on the predicted values we can define which is the most efficient neural network that can be used.

III. RESULTS

Neural Network executed for one of the gross level composition %Carton. The output from ANN and WNN varies in minor values (Table 1). Since we are predicting the future value of the %Carton contain in coal to check whether it is valid or not, we can compare the output value with next input value. Most of the predicted output values are expected.

Table. 1 WNN and ANN output

%Carton	WNN	ANN
27390	0.264	0.250494
28094	0.267	0.248017
29260	0.265	0.338133
28138	0.263	0.259234
26928	0.298	0.273931
28094	0.24	0.271618
26972	0.265	0.280296
23650	0.263	0.273864
25982	0.288	0.293337
23650	0.239	0.308604

IV CONCLUSIONS

Using the existence system finding the ultimate analysis is time constant and cost is very high. By using neural network, we can predict the future value of the ultimate analysis. This will save time for running the power plant. By using two different neural network, ANN and WNN we can predict accurate values. If the output of both the neural network majorly differs, then we can once again train the neural network with huge set of corrected data and get the accurate value for ultimate analysis.

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AUTHOR BIOGRAPHY

1. Ramesh N: Working in Manhattan Associates and pursing M.tech in Computer Network and Engineering in REVA Institute of Technology and Management.

2 Sailaja Thota: Working in REVA University as Assistant Professor, Department of Computer Science and Engineering.

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REPLICATION TECHNIQUES IN CLOUD

Prof. Mary M D'Souza[1], Prof. Sreelatha P K[2] Prof. Mamatha E[3]

[1,3]Department of ISE, VTU, Sai Vidya Institute of Technology, Rajanukunte, Bengaluru, Karnataka, India

[1]mary.mdsouza@saividya.ac.in

[2]Department of CSE, VTU, Sai Vidya Institute of Technology, Rajanukunte, Bengaluru, Karnataka, India.

2sreelatha.pk@saividya.ac.in; 3mamatha.e@saividya.ac.in

ABSTRACT

Replication is the process of creating an exact copy of the data for ensuring availability of services. Replica copies are used to restore and restart services, if data loss occurs. Based on the SLA for the service being offered to consumers, data can be replicated to one or more locations. Replication can be classified as – local replication and remote replication. This paper discusses in detail these two replication details.

It is absolutely necessary for cloud service providers to protect mission – critical data and minimize the risk of service disruption. If a local outage or disaster occurs, faster data and VM restore and restart is essential to ensure business continuity. One of the ways to ensure business continuity is replication. These replica copies are used for restore and restart services, if data loss occurs. Based on the availability requirements for the service being offered, to the consumer the data can be replicated to one or more locations. Local replication refers to replicating data with-in the same location. Widely diploid local replication techniques are snap-shots and mirroring. Remote replication refers to replicating data across multiple locations. In a remote replication data can be synchronously or asynchronously replicated.

Facing an increased reliance on IT and the ever present threat of natural or man-made disaster, most businesses rely on business continuity processes. Down time and data loss have become unacceptable to more and more organization. Hence the above said replication techniques helps the service providers to prevent data loss.

Keywords : remote mirroring, local mirroring, snapshot.

I. INTRODUCTION

Cloud data replication is absolutely necessary for cloud service[1] providers to protect mission-critical data and minimize the risk of service disruption. If a local outage or disaster occurs, faster data recovery, VM restore and restart is essential to ensure business continuity. One of the ways to ensure BC is replication. As shown in Figure 1, it is the process of creating an exact copy (replica) of the data. These replica copies are used to restore and restart services, if data loss occurs. Based on the availability requirements for the service being offered to the consumer, the data can be replicated to one or more locations.

Fig 1: Local Replication

II. REPLICATION TECHNIQUES

Replication can be of two major categories: local and remote. Local replication is the process of replicating data within the same location. Local replicas help to restore the data in the event of data loss or center.Snapshot and mirroring are the widely deployed local replication techniques. Remote replication refers to replicating data across multiple locations. Remote replication helps organizations to

mitigate the risks associated with regional outage resulting from natural or human-made disasters. During disasters, the services can be moved to a remote location to ensure continuous business operation. In a remote replication, data can be synchronously or asynchronously replicated.

III. LOCAL REPLICATION

Process of replicating the data within the same array or same data centre is called local replication. Local replication can be done using two ways. one is compute based replication, where replication is performed by using CPU resources of compute system. Types: LVM based mirroring[4] and File System Snapshot. Another is storage array based replication, where replication is performed using CPU resources of the storage array. Types: Full volume mirroring, pointer based full volume replication, pointer based virtual replication.

A. LVM Based Mirroring

In an LVM-based local replication, the logical volume manager is responsible for creating and controlling the compute-level logical volume. An LVM has three components: physical volumes (physical disk), volume groups, and logical volumes. A volume group is created by grouping together one or more physical volumes. Logical volumes are created within a given volume group. In an LVM based local replication, each logical partition in a logical volume is mapped to two physical partitions on two different physical volumes. An application write to a logical partition is written to the two physical partitions by the LVM device driver. This is also known as LVM mirroring. Mirrors can be split and the data contained therein can be independently accessed.

B. File System Snapshot

File system (FS) snapshot is a pointer-based local replication that requires a fraction of the space used by the production FS. This snapshot can be implemented by either FS itself or by LVM. It uses the Copy on First Write (CoFW) principle. In a CoFW mechanism, if a write I/O is issued to the production FS for the first time after the creation of snapshot, the I/O is held, and the original data of production FS corresponding to that location is moved to the snap FS (replica). Then, the new data is allowed to write on to the production FS. The bitmap and block map are updated accordingly. Any subsequent write to the same location will not initiate the CoFW activity. When the snapshot is created, a bitmap and a block map are created in the metadata of the Snap FS. The bitmap is used to keep track of blocks that are changed on the production FS after creation of the snap. The block map is used to indicate the exact address from which the data is to be read when the data is accessed from the Snap FS. Immediately after creation of the snapshot, all reads from the snapshot will actually be served by reading the production FS. To read from the Snap FS, the bitmap is consulted. If the bit is 0, then the read is directed to the production FS. If the bit is 1, then the block address is obtained from the block map, and data is read from that address. Reads from the production FS are performed as usual.

C. Full Volume Mirroring

In full-volume mirroring, the target is attached to the source and established as a mirror of the source.

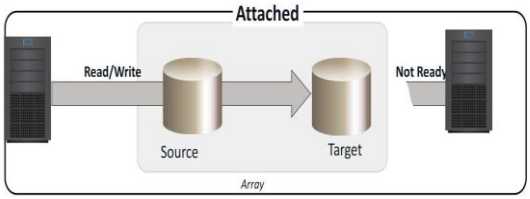

Fig 2: Full Volume Mirroring

As shown in figure 2[3], the existing data on the source is copied to the target. New updates to the source are also updated on the target. After all the data is copied and both the source and the target contain identical data, the target can be considered a mirror of the source. While the target is attached to the source and the synchronization is taking place, the target remains unavailable to any other server. However, the production server can access the source.

IV. REMOTE REPLICATION

Remote replication is the process of creating replicas of production (local) data to remote sites (locations).Remote replicas help organizations mitigate the risks associated with regionally driven outages resulting from natural or human-made disasters. Similar to local replicas, they

can also be used for other business operations. The infrastructure on which the data is stored at the primary site is called Source. The infrastructure on which the replica is stored at the remote site is referred to as Target. Data has to be transferred from the source site[2] to a target site over some network. Two basic modes of remote replications are: Synchronous and Asynchronous replication.

In synchronous remote replication, writes must be committed to the source and the target, prior to acknowledging "write complete" to the computer system. Additional writes on the source cannot occur until each preceding write has been completed and acknowledged. This ensures that data is identical on the source and the replica at all times. Further, writes are transmitted to the remote site exactly in the order in which they are received at the source. Hence, write ordering is maintained. In the event of a failure of the source site, synchronous remote replication provides zero or near-zero RPO, as well as the lowest RTO. However, the application response time is increased with any synchronous remote replication. The degree of the impact on the response time depends on the distance between sites, available bandwidth, and the network connectivity infrastructure.

In asynchronous remote replication, a write is committed to the source and immediately acknowledged to the computer system. Data is buffered at the source and transmitted to the remote site later. Data at the remote site will be behind the source by at least the size of the buffer. Hence, asynchronous remote replication provides a finite (nonzero) RPO. RPO depends on the size of the buffer, available network bandwidth, and the write workload to the source. There is no impact on the application response time because the writes are acknowledged immediately by the source. This enables deployment of asynchronous replication over extended distances. Asynchronous remote replication can be deployed over distances ranging from several hundred to several thousand kilometers between two sites.

A. Compute Based Remote Replication

Compute-based remote replication implies that all the replication is done by using the CPU resources of the compute system using software that is running on the compute system. The following are the compute-based remote replication methods: LVM-based replication is performed and managed at the volume group level. Writes to the source volumes are transmitted to the remote compute system by the LVM. The LVM on the remote compute system receives the writes and commits them to the remote volume group.Prior to the start of replication, identical volume groups, logical volumes, and file systems are created at the source and target sites. LVM-based remote replication supports both synchronous and asynchronous modes of data transfer. In the asynchronous mode, writes are queued in a log file at the source and sent to the remote compute system in the order in which they were received.

Database replication via log shipping is a compute-based replication technology supported by most databases. Transactions to the source database are captured in logs, which are periodically transmitted by the source compute system to the remote compute system. The remote compute system receives the logs and applies them to the remote database. Prior to starting the production work and replicating the log files, all the relevant components of the source database are replicated to the remote site. This is done while the source database is shut down. After this step, production work is started on the source database. The remote database is started in a standby mode. Typically, in the standby mode, the database is not available for transactions. All DBMSs switch the log files at preconfigured time intervals, or when a log file is full.

B. Storage Array Based Remote Replication

In storage array based remote replication, replication is performed by the array operating environment. Storage array based remote replication technologies support three modes of operations: Synchronous, asynchronous, and disk buffered.

Disk-buffered replication is a combination of local and remote replication technologies. A consistent PIT local replica of the source device is first created. Then, the data on the local Replica in

the source array is transmitted to its remote replica in the target array. Optionally, a local PIT replica of the remote device on the target array can be created. The frequency of this cycle of operations depends on the available link bandwidth and the data change rate on the source device, this process is shown in figure 3.

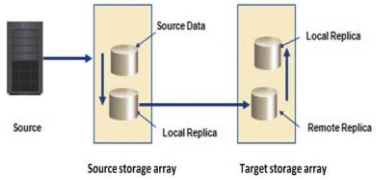

Fig 3: Storage Array Based Remote Replication

V. ADVANCED REPLICATION TECHNIQUES

Three-site replication is used for the mitigation of risks identified in two-site replication. In a three-site replication, data from the source site is replicated to two remote sites. Replication may be synchronous to one of the two sites, and provides a zero-RPO solution. It may be asynchronous or disk buffered to the other remote site, and provides a finite RPO.

SAN-based remote replication allows the replication of data between heterogeneous vendor storage arrays. Data is moved from one array to the other over SAN/WAN. The technology is application and server operating system independent, because the replication operations are performed by one of the storage arrays. There is no impact on the production servers or the LAN because replication is done by the array and the data is moved over the SAN.

Traditional data protection technologies do not meet the needs of all applications in a CDC. Mission-critical applications require instant and unlimited data recovery point options. Continuous data protection captures all writes and maintains consistent point in time images.

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FEATURE EXTRACTION AND COMPARATIVE ANALYSIS OF LUNG CANCER NODULE USING IMAGE PROCESSING TECHNIQUES

RADHIKA U[#1], POOJA J[#2], SHANTHI MAHESH[#3]

[#]Department of Information Science and Engineering, Atria Institute Of Technology
Visvesvaraya Technological University, Machche, Belgaum, Karnataka, India
[1]radhikanaik93@gmail.com; [3]poojajraju@gmail.com; [3]shanthi.mahesh@atria.edu

ABSTRACT

The common cause of death among people throughout the human race is lung cancer. In this research work, median filter is used for image pre-processing. For segmentation, Otsu's thresholding method is used. In feature extraction, physical dimensional measures and grey-level co-occurrence matrix (GLCM) method are used. CT (computed tomography) scan image is suitable for lung cancer diagnosis. This paper consist of 4 modules: Pre-processing, Image Enhancement, Segmentation, Feature extraction and comparative analysis. To implement the

Algorithm, MATLAB software is used. This technique can help radiologists and doctors to know the condition of diseases at early stages and to avoid serious disease stages for lung cancer patients. Lung cancer is the uncontrolled growth of abnormal cells in one or both of the lungs, usually the cells that line the air passages. The abnormal cells do not develop into healthy lung Tissue; they divide rapidly and form tumours.

I. INTRODUCTION

Lung cancer is a leading cause of tumour-related deaths in the world. At the same time it appears that the rate has been steadily increasing. Lung cancer is caused by uncontrolled growth of tissues in the lung [1]. The body is made up of several types of cells. Each type of cell has a specific function. Cells in the body grow and then divide in an orderly way to form new cells as they are needed to keep the body healthy and working properly. When cells lose their ability to control their growth, they divide too often and without any order. The extra cells which form a mass of tissue are called a tumour. Tumours can be Malignant or Benign. The majority of all cases are caused by tobacco smoking. Exposure to asbestos, radon, uranium and arsenic are other factors for lung cancer. Lung cancer is a deadly disease and has chances to spread to other parts of the body, e.g. the brain liver, bone and bone marrow. Early detection of lung nodules is extremely important for diagnosis of lung cancer[3]. Lung cancer had been commonly detected and diagnosed on chest radiography. If the lung cancer is detected in early stages, the survival is more than 80%. Since the early 1990s CT has been reported to improve detection and characterization of pulmonary nodules. Cancer that starts in the lungs is called as pulmonary cancer. Pulmonary nodules are those nodules whose diameter is less than 3cm. pulmonary nodules more than this measurement is known as pulmonary mass. Pulmonary nodule detection is attractive application of computer-aided- detection (CAD) because lung cancer is the leading cause of cancer deaths. Many number of CAD methods are developed for lung nodule to aid radiologist in identifying nodule from CT images. The first stage starts with taking a collection of CT images (normal and abnormal) from the available Database. The second stage applies several techniques of image enhancement to get best level of quality and clearness. The third stage uses the image segmentation algorithm which plays an effective role in image processing stages, and the fourth stage obtains general features from

enhanced segmented image which gives indicators of normality or abnormality of images[4]. The early detection and diagnosis of nodules in CT image are among the most challenging clinical task performed by radiologists. Computed tomography (CT) is mainly used in lung scans due to its clear display of the obtained scan with its capability to detect very minute structures with complete detailing. CT scanning involves a series of x-rays that create a 3dimensional view of the lungs. In a CT image, overlapping structures are eliminated, masking the internal anatomy more apparent. CT images allow radiologists and physicians to identify internal structures and see their shape, size, density and texture. This detailed information can be used to determine if there is a medical problem as well as extend and exact location of the problem, and other important details. The image can also show if no abnormality is present.

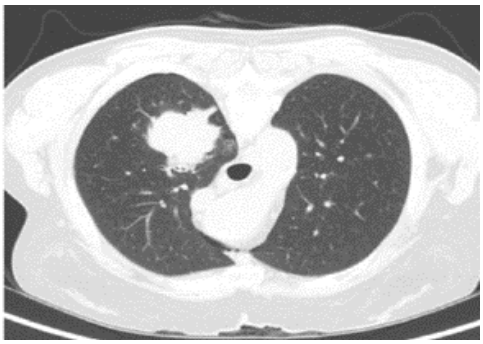

Fig. 1 Lung Nodule

II. PROCEDURE

The procedure uses the following steps:

(1)Image collection (2) Pre-processing (3) Enhancement (4) Segmentation (5) Otsu's Thresholding (6) Feature Extraction.

A. Image Collection

The foremost step in medical image processing is collection of images. The lung CT images are collected from radiologists and the medical data is usually in DICOM format which is the standard for storage and transfer of medical images[7]. Computed Tomography images have better clarity and low noise and distortion for lung diagnosis. CT scan of lung images are given as the input for this system. Dimensions of the images are 512x512 pixels in size and the input of the CT image contains noises such as white noise, salt and pepper noises etc[8]. Therefore image pre-processing step is needed to eliminate noises.

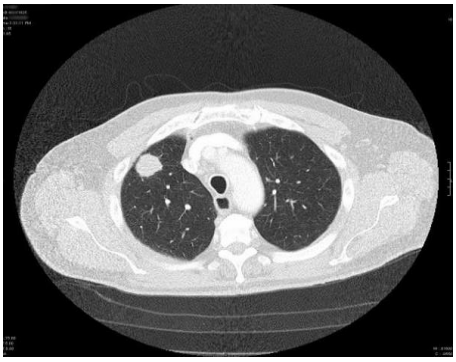

Fig. 2 A sample of original image

B. Pre-processing

Pre-processing can significantly increase the reliability of an optical inspection. Several filter operations which intensify or reduce certain image details enable an easier or faster evaluation[9].

C. Enhancement

Image enhancement is the process of adjusting digital images so that the results are more suitable to display further image analysis. Enhancement in simple words is a way of increasing the required regions of the image area according to the user wish in order to get smoother image and an accurate result. Median filter is one of the filter methods of image processing. The median filter is a non-linear tool and the filtering is a simple, intuitive and easy to implement of smoothening images that is reducing the amount of intensity variations between one pixel and the next, than other filters. The median filter is normally used to reduce the salt and pepper noise in an image. It often does a better job than the other filters of preserving useful detail in the image. The median is calculated first by sorting all the pixel values from the surrounding neighbourhood into numerical order and replacing the pixel being considered with the middle pixel value. Median filter is used to remove the noise of images. This filtered image is used as the input for image segmentation.

Some commonly used image enhancement features are:

- Filtering with morphological operators.
- Histogram equalization
- Noise removal

- Linear contrast adjustment
- Median filtering

D. Segmentation

Segmentation is a process of partitioning a digital image into multiple segments. The major goal of segmentation is to simplify or change the representation of the image into something that is more meaningful and easy to analyse. Image segmentation is typically used to locate objects and boundaries in an image[2]. More precisely, image segmentation is a process of assigning a label to every pixel in an image such that the pixel with the same label share certain common characteristics.

E. Otsu's thresholding

Thresholding is one of the most powerful tools for image segmentation. Thresholding methods have the advantages of smaller storage space, fast processing speed and ease in manipulation, compared with gray level image. Otsu's thresholding is one of the global thresholding method which is a non-linear operation and converts a gray scale image into binary image.

$$g(x,y) = \begin{cases} 1 & f(x,y)>T \\ 0 & f(x,y) \le T \end{cases}$$

Where g (x,y)=output image ,f (x,y) =input image

T = threshold value

F. Feature extraction

The Image features extraction stage is very important in our working image processing techniques which using algorithms and techniques to detect and isolate various desired portions or shapes of an image. Feature extraction is an essential stage that represents a final results to determine the normality or abnormality of an image. These features act as the basis for classification process. Only three features are considered to be extracted; area, perimeter, and eccentricity. The features are defined as follows:

1) *Area:* it is a scalar value that gives the casual number of overall nodule pixel. It is obtained by the summation of areas of pixel in the image that is registered as 1 in the binary image obtained.

2) Perimeter: it is the scalar value that gives the casual number of the outline of the nodule pixel. It is obtained by the summation of the interconnected outline of the registered pixel in the binary image.

3) *Eccentricity:* this value is the roundness or circularity or irregularity index is to 1 only for circular and it is <1 for any other shape. Here it is assumed for circularity of the object.

4) Contrast: Measures the local variations in the GLCM. It calculates intensity contrast between a pixel and its neighbor pixel for the whole image. Contrast is 0 for a constant image.

5*) Correlation*: Measures the joint probability occurrence of the specified pixel pairs

6) *Energy*: Provides the sum of squared elements in the GLCM. It is also known as uniformity or the angular second moment

7) *Homogeneity:* Measures the closeness of the distribution of elements in the GLCM to the GLCM diagonal.

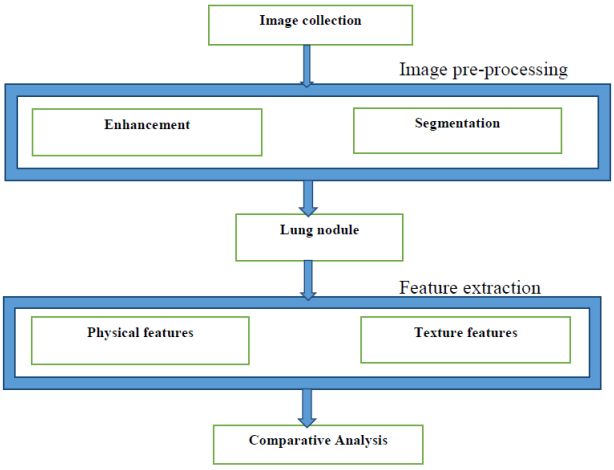

Fig. 3 Image Processing Steps

III. RESULTS

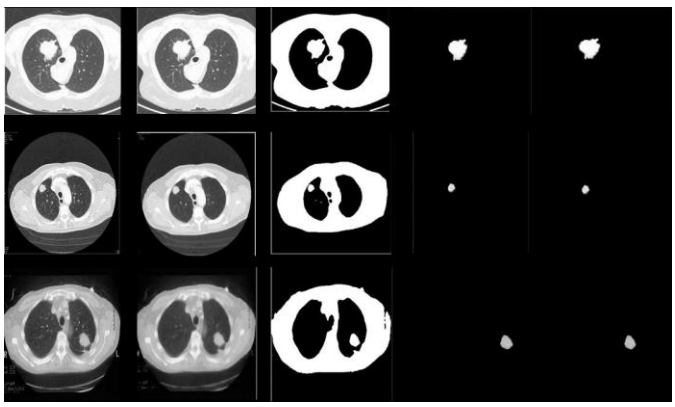

Fig. 4 Segmented Images

TABLE I : PHYSICAL DIMENSIONS

SL. No	Area	Perimeter	Eccentricity
Sample 1	13240	[3.0277]	[5.22361]
Sample 2	2274	[5.3926]	[1.9998]
Sample 3	1086	[4.6763]	[1.2225]

TABLE IIIII : TEXTUAL FEATURES

SL .No	Contrast	Correlation	Energy	Homogeneity
Sample 1	[0.0329 0.0319]	[0.9820.9828]	[0.958 0.957]	[0.9982 0.9981]
Sample 2	[0.0101 0.0089]	[0.9367 0.9443]	[0.99590.959]	[0.9992 0.9994]
Sample 3	[0.020 0.01696]	[0.9116 0.92672]	[0.990.99093]	[0.998 0.9990]

TABLE IVVVI : PERFORMANCE EVALUATION

SL .No	Contrast	Correlation	Energy	Homogeneity
Sample 1	[0.0329 0.0319]	[0.9820.9828]	[0.958 0.957]	[0.9982 0.9981]
Sample 2	[0.0101 0.0089]	[0.9367 0.9443]	[0.99590.959]	[0.9992 0.9994]
Sample 3	[0.020 0.01696]	[0.9116 0.92672]	[0.990.99093]	[0.998 0.9990]

IV. CONCLUSIONS

In this paper lung nodule detection, extraction, isolation, statistical analysis is performed and evaluated. All the scope and objectives of the project have been taken into consideration in generating the system. This system has a user interface which helps the user to use the system conveniently. MATLAB and image segmentation tool have been used for the entire project. By using the proposed method it is possible to clearly identify the nodule present in the lungs. The segmentation of the cancer cells in turn helps in medical research to clearly outline the shape and location of the cancer nodule. The proposed modules were tested with different sample images. Otsu's Thresholding is used to segment the lung nodule. This system has given efficient results with accuracy of 99%, precision 97%, specificity of 0.27 and sensitivity of 0.99 by comparing the manual and automated segmented images. The proposed system does nodule detection, feature extraction and comparative statistical analysis of lung cancer nodule which will be useful for the radiologist for their further diagnosis and for analysing the stage of cancer. The prediction could also help the doctors to plan for better medication and provide the patient with early diagnosis.

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AUTHOR PHOTOS AND BIOGRAPHY

NAME: RADHIKA U
VIII semester, Dept. of Information Science and Engineering, Atria Institute of Technology.
PHONE NO: 9483950429
EMAIL: radhikanaik93@gmail.com

NAME: POOJA J RAJU
VIII semester, Dept. of Information Science and Engineering, Atria Institute of Technology.
PHONE NO: 9483401234
EMAIL:poojajraju@gmail.com

NAME: SHANTHI MAHESH
Associate Professor, Dept. of Information Science and Engineering, Atria Institute of Technology.
PHONE NO: 9900021131
EMAIL:shanthi.mahesh@atria.edu

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MULTICOPY Proactive Management

H.V. Shashidhara
Associate professor, Department of Computer Science & engineering
Malnad college of Engineering
Hassan
shashihv@yahoo.com

ABSTRACT

Cloud framework offers a huge amount of storage room for clients to store their content record in a cloud. To build the benefit now and again cloud service providers access the data and also hide data loss information to maintain the community. Cloud system is more controlling and consistent than pc. If the owner needs to store a text files then owner need to enroll on the cloud. The data to for away cloud service provider permits association to store a bigger number of information on the cloud service provider than on private pc frameworks. Many valid users can access the stored data in different locations it more advantage to users.

I. INTRODUCTION

This document is a template. An electronic copy can be downloaded from the conference website. For questions on paper guidelines, please contact the conference publications committee as indicated on the conference website. Information about final paper submission is available from the conference website. Multicopy proactive management mainly concentrate on multiple data files in the cloud storage. Distributed computing is web based advancement. Cloud storage avoids the complexities of direct hardware organization.

Cloud framework offers a huge amount of storage room for clients to store their content record in a cloud. To build the benefit now and again cloud service providers access the data and also hide data loss information to maintain the community. Cloud system is more controlling and consistent than pc. If the owner needs to store a text files then owner need to enrol on the cloud. The data to for away cloud service provider permits association to store a bigger number of information on the cloud service provider than on private pc frameworks. Many valid users can access the stored data in different locations it more advantage to users.

Multicopy proactive management is a technique for approving information respectability over cloud servers. In this scheme, propose a viable and adaptable distributed storage confirmation along dynamic information operation. When data owner needs to upload a text file owner need to register at cloud after registration owner login to home page. Here, owner uploaded the text file, it will divide into three blocks with one private key. Hash value generated for text files. Hash value processed using private key and generated data tags. Then users registration, users can access the file they sent request to the owner, owner response to users through mail. Owner sends the decryption key to user, using decryption key users can easily access the file or downloaded the file. Cloud service providers include the all files. All text files are encrypted forms. Update the encrypted files, data owner sent request to the third party auditor. Verifier validates the multiple copies of dynamic data compare with cloud service provider stores data. In data integrity updates the choose able file and restore the original data. Again login as cloud service provider view the all files. Cloud service provider need to changes the text file like append, insert, delete without the knowledge of user.

II. EXISTING SYSTEM

A Data owner can store the original data in cloud by taking help from cloud service providers. A

cloud service provider manages the cloud servers to provide space for the stored owner files. Valid users can easily access the far away data by using valid password and username. Here, data security is the one of the main problem. All information of the users data stored in database. Data owners store the multi copies of the users data in cloud. But, there is no confirmation about original data is stored in cloud servers.

Ayad F. Barsoum et.al [2] projected a verify multicopy active data possession scheme which provided a reasonable agreement to the CSP saves all copy approved ahead the provision contract. It is mainly concentrate on single data copies.

Tao Jiang et.al [12] provides a capable public reliability audit scheme with user revocation located on vector assurance and verifier limited revocation assembly mark. There is no quality of data. There is no guarantee about space allocated for users.

III. PROPOSED SYSTEM

Here, we introduce multi copy proactive management system. It is more focus on the data security and also allows the data owners to update, insert and delete operations on original data. In proposed system data are going to divided into some levels or formatting Individual files. It generates numeric value. It is computed by Sha-one algorithm. Keys are generated by using SUNEC algorithm. It gives the security for the data in cloud. These data are verified by the verifier. Third party auditor data copy compared with cloud copy data. Data integrity can restore the original data. If any data can modified by the data owner it displays 0 otherwise 1.

Advantages of proposed system

- Data is very effective.
- Confirmation about space location for the users data.
- It mainly focuses on the multi copies data.

Feasibility Study

The importance aim of the feasibility study is to analysis the proposed project and compares the proposed system to existing system. In Feasibility study, if the cost is less to develop the proposed system is very sufficient and value is high.

- Technical Feasibility

In this technology evaluating the performance and cost. To develop this application we use the tomcat application server with mysql. It must require an internet connection and a database server. The proposed system is technically feasible to be implemented with the existing software and hardware.

- Operational Feasibility

This technology is used to check whether developed application installation is works in proper way or not. It is used for hardware experience. It is user friendly and application works in according to the design and instruction to the application.

IV. SYSTEM DESIGN

System design describes the explanation to creating an original system. It includes architecture, components modules. System designs have two phase a progress logical design, physical design.

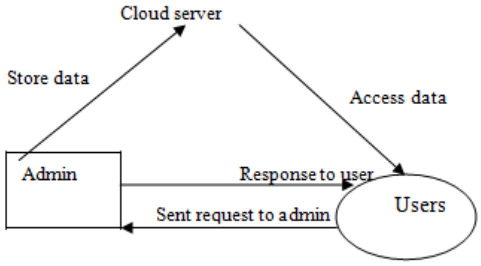


Fig. 1 System Perspective

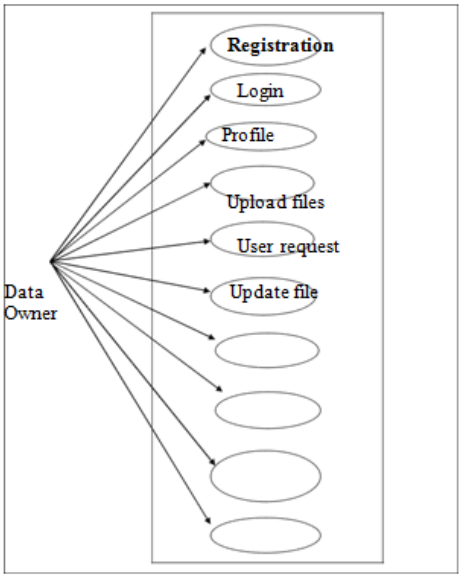
Fig. 1 explains the how users can interact with the admin and cloud servers. Admin stores the users data in cloud. Using dynamic operations like insertion, append, deletion admin can change the blocks. Users send the request to the admin. Admin response to the users via internet. Admin send the decryption key to users. Using decryption key users can easily access the data from cloud.

The below figure Represents use case diagram of data owner. Here, Data owner can process the registration, login, upload files, user request, auditing, recover data and logout. Data auditing can upload the file, delete the file, add the file. Data integration compare the original files with tpa files.and recover the files using multi copies of data.

usecase diagram for Cloud service providers first sign in login page, view the all files of users, csp has rights to changes the users file. Csp update the files then logout the csp page. Use case diagram for Verifier first sign in to login page. Then verifier

maintains the consistency of data. The changes made by the csp or data owner that is stored in mvt table, it is view by users, then verifier sign out the page.

Sequence Diagram



A sequence diagram shows a how processes operate with one another. A sequence diagram shows as parallel vertical lines, different processes that live simultaneously. It represents simple runtime in a graphical manner.

Collaboration diagram is same as sequence diagram. Sequence diagram depend on messages. But collaboration diagram depends on object. It shows how one object can interact with other object easily.

Collaboration diagram of user shows the how data in the system being exchange between owner and users using file access object. Using private key uses can access file and encrypt file into decrypt file.

Collaboration diagram of csp shows interaction between the csp and users. Csp update and store the all file in cloud storage. Csp has rights to view all files and encrypt the all files.

Activity diagram shows the workflows of control. It is a step by step process to explain the activities of the system. It supports the repetition of mathematical calculation, allow multiple users interact with system.

Activity diagram for owner shows the starting point of the workflow. Here, owner login to the application and upload the files, response to the user request, update the files these are the represent action.

Data flow diagram

The above figure shows a level-0 data flow diagram. This shows how to connect database with owner module and user module.

Table 1 Connection to owner/user modules to the database

Process no.	System names	Data flow to Description
1.0	MPM	Owner/user modules connect to the data using user id and password, then it connects to the database.

Process no. System names Data flow to Description

The table 1 shows the process between user/owner module and database.

Table 2 Validation and Verification of owner

Process no.	System name	Data flow to description
1.2.1	Register	Owner enters the valid input then login to the system
1.2.2	Login	Authorized users can only login to the system
1.2.3	Upload file	Owner upload the text files they store in the database
1.2.4	Update file	If user need to change the file they retreive file from database then update the file

The owner module contains sub modules. Table 3 shows owner registration. owner register to the cloud, then login to the system. Verify the

authorized users by the system. Owner uploads the users file. Upload files are stored in database. Owner needs to update the file, retreive the data from database later owner update the file, and stores the update file in database.

V. CONCLUSIONS

In this paper, we describes about the cloud storage used and services. Cloud storage become a developing trend in nowadays. Because here we study how to make easier to heavy load of local data storage and maintenance. Also learn the problem of built multiple copies of changing data file and verify the data files on untrusted cloud storage. To increase the capacity of a system, which u can get strong security. Customer wants their data an exact copy on multiple servers. We propose an effective and flexible multicopy proactive management scheme. It supports the multicopies of changing data, data owner can easily access the old records and new records stores by the csp. Users access the data from csp without broken data using secret key. It supports verifying data based on random documents and allows own data quality verification. Recover the any type of calculation within minimum time. It supports to find out the corrupted data copies and recover the complete corrupts data files on other services. We also provide the third party auditing to maintain the scheme. Users can safely checking and maintain the consistency of data by third party auditors. And also I learned the basics of java programming. We show that our project is highly efficient and security.

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AUTHOR PHOTOS AND BIOGRAPHY

Shashidhara H.V was born in Hassan, India, in 1969. He received the B.E. degree in computer science & engineering from the University of Mysore, Mysore, India, in 1991, and the M.Tech. degree in information technology from the University Banglore Bangalore, India, in 2006.

In 1997, he joined the Department of Computer science and Engineering, Malnad college of engineering, as a Lecturer, and in 2006 became an Assistant professor. Since December 1997, he has been with the Department of Computer science and Engineering, MCE Hassan, where he was an Assistant Professor, became an Associate Professor in 2011. His current research interests include Computer networking, web technology.