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VLSI Architecture for DSP Application

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ABSTRACT

Most present day arithmetic processors are worked with models that have been settled in the writing, with a considerable lot of the most recent developments dedicated to extraordinary technologies circuits and the utilization of cutting-edge innovations. In particular, the plan of multipliers is basic in digital signal processing applications, where a high number of increases are required. We have limited the number of adders by presenting diverse compressors. The twofold counter property has been converged with the compressor property to grow high request compressors, for example, 5-3 and 7-3 compressors partitioning, simulated annealing, and analytical placement).

Keywords: Compressors, Counters, Xilinx, FPGA

I. INTRODUCTION

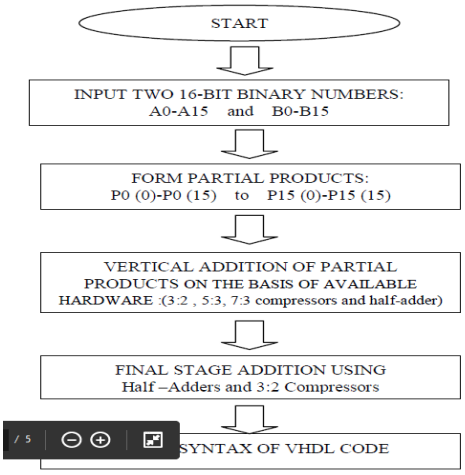
Noise Lately, speed, and in addition zone and power, are the most noteworthy issues in VLSI plan. Pass transistor rationale has been created new progressions in the field of rapid and low-control advanced circuits. Most present day math processors are assembled with models that have been settled in the riting, with a considerable lot of the most recent developments dedicated to unique rationale circuits what's more, the utilization of cutting-edge innovations [1]. In particular, the plan of multipliers are basic in advanced flag handling applications, where a high number of augmentations are required [2].

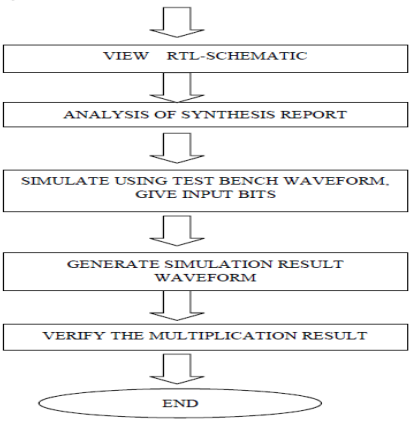
Multipliers are an inescapable piece of frameworks like ALUs, DSPs and different processors. They are regularly the slowest segment of the circuit which restrains the general execution of the framework. Subsequently, decrease of preparing delay has been a noteworthy worry in examine [1]. Wallace tree multipliers are very quick among the accessible multipliers, as they utilize the convey spare expansion calculation, however with the consistently expanding interest for quicker activities, endeavors are being made to make it considerably speedier [2]. The essential procedure of duplication includes three fundamental advances:

1. Generation of partial products
2. Reduction of the partial products
3. Summation of the reduced partial products in order to produce the final product.

The overall delay of the multiplication process may be reduced by applying delay-reduction techniques in any or all of the three stages.

II. PROPOSED ALGORITHM





III. LITERATURE SURVEY

This paper proposes the outline of various VLSI (Very Large Scale of Integration) designs focusing on various exchange offs among the above execution measurements. MIMO innovation has been generally perceived as a promising plan for present day remote interchanges owing to its high information rate and enhanced flag quality [1]. The center of the product is a gathering of mVLSI segments which are fit for executing the required tasks of organic examinations. These segments can be put away in a library of element records, depicted utilizing a basic netlist particular language. VLSI usage of such an arrangement of tenets is effectively workable. The design displayed in this segment receives a course of radix-4 butterfly stages (the last phase of the course is blended radix-4/radix-2 to help additionally FFT transform lengths which are energy of-two); such an approach is reasonable for stream-arranged information handling frameworks found in correspondence and mixed media applications. An outcome of this consistency is that VLSI models of calculation are very reasonable as a methods for measuring the outcomes in silicon zone, a measure of-cost, and figuring time, of engineering decisions inside a chip. Whenever a assortment of computerized advances must be viewed as, each with its-own cost, execution, and useful specialization, such demonstrating was considerably less tractable, or could be completed just at a coarse level.

IV. COMPARISON TABLE OF VLSI ARCHITECTURE

There are four architecture for VLSI. Table shows comparison between them on the various functionality.

- ✓ The VLSI Architecture of a Highly Efficient Configurable Pre-processor for MIMO Detections.
- ✓ VLSI Implementation of High Speed and High Resolution FFT Algorithm Based on Radix 2 for DSP Application.
- ✓ Area Efficient VLSI Architecture for DCT using Modified CORDIC Algorithm.
- ✓ High-speed, area efficient VLSI architecture of Wallace-Tree multiplier for DSP-applications

Table 1

Highly Efficient Configurable Pre-processor for MIMO Detections	**FFT Algorithm Based on Radix 2 for DSP Application**	**DCT using Modified CORDIC Algorithm**	**High-speed, area efficient VLSI architecture of Wallace-Tree multiplier for DSP-applications**
The proposed architecture is completely parallel and outlined in light of the stack task	Fast FFT acrhitecture was gotten by two techniques. The pipeline structure and parallel outline lead us to have fast FFT calculation.	CORDIC utilizes just Shift-and Add arithmetic with table look-as much as execute unique abilities.	They are regularly the slowest part of the circuit which constrains the general execution of the framework.

The calculation plays out a settled number of tasks to identify the flag autonomous of the clamor level and channel conditions	The guideline engineering depends on utilizing a memory to keep info and yield information.	DCT set of guidelines has various projects and is broadly utilized for photo pressure.	Higher request compressors, for example, a 7:3 compressor diminishes the inertness of the circuit and the speed is expanded as way delay is decreased.
This framework is acknowledged in a pipelined systolic exhibit engineering for accomplishing high-throughput	The determination was expanded by coasting point computation amid The FFT procedure.	all the assessment obligations in CORDIC are defined as a pivot of vectors in different Organize frameworks.	we have utilized our compressors in multiplier circuits effectively by actualizing them as parallel counters.

V. CONCLUSION

Distinctive compressors are utilized to accelerate the augmentation process. 4-2 compressors and even 5-2 compressors are accounted for prior yet those are not utilized as a part of multiplier effectively. Here we have utilized our compressors in multiplier circuits effectively by executing them as twofold counters. Higher request compressors, for example, a 7:3 compressor lessens the inertness of the circuit and the speed is expanded as way delay is diminished. We have utilized 3:2, 5:3 and 7:3 compressors supplemented with their counter property to produce total and convey bits appropriately. Exhibitions of multipliers are contrasted and the regular approach where just adders are utilized to include the incomplete items.

VI. FUTURE SCOPE OF WORK

Advance changes in the outline of lessened Wallace-tree multiplier can be accomplished by utilizing adjusted Corner calculation in the age of incomplete item in the main stage. Likewise higher piece duplication can be examined by different techniques for Wallace tree multiplier, for example, The Kogge Stone snake (KSA) which is utilized for fast and Brent Kung snake (BKA) which is utilized to lessen the territory.

VII. ACKNOWLEDGEMENT

Our thanks to the head of department, Computer Science and Engineering Poornima Institute Of Engineering And Technology and Mr. Abhishek Dadhich for his encouragement in the course of this work. We say thank you all.

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Intelligent Monitoring System – A network based IDS

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ABSTRACT

With the introduction of new technologies; new attacks and new infiltration are also emerging in the network. For this, network security became an important part of every network in government and private organizations. Unfortunately, in this digital world it is difficult to hide yourself from attacks and infiltration. In this paper, we developed an intrusion Detection System (DS) which implements the predetermined algorithm of the artificial neural network (ANN) to identify the attack. The system has been developed using java programming Language, which provides the ability to capture packets from Jenpapp.ID identifies basic attacks on the network IDS is easy to install and use on the host machine. Currently it has been developed as host based IDS (HIDS), but it is detected by the network-based IDS (NIDSI Programming Router Multi-Layer Perspectorone (ILP) for infiltration. Most of the previous HIDs are in Off-line mode and mainly on identifying records of normal or unusually the Drit. But here we are classifying records in various categories by identifying the type of attack.

Keywords: Intrusion Detection System, Artificial Neural Network, Multi-layer perceptron, SYN_FLOOD, PING_FLOOD, JPCap

I. INTRODUCTION

Noise Today's network security infrastructure promisingly depends upon Network Intrusion Detection System (NIDS). NIDS provides safety from proverbial intrusion attacks. It's unacceptable to prevent intrusion attacks, thus organization got to be able to handle them. IDS could be a defensive mechanism whose primary purpose is to stay work occurring considering all do able attacks on a system.

Intrusion observation could be a method would not to detect suspicious activity each at network and host level. 2 main ID techniques obtainable anomaly detection and misuse detection. In anomaly based mostly detection system, audit knowledge is employed to differentiate abnormal knowledge from traditional one. On the opposite hand, misuse detection system, additionally known as signature based mostly IDS, uses pattern of documented attacks to match with audit knowledge and determine them as intrusions. Functioning of misuse detection models is during a sense much kind of like that of antivirus applications. Misuse IDS will analyse network or system and compare its activities against signatures of noted intrusions and network behaviours. For recognizing traffic as attack, IDS should be tutored to acknowledge traditional activity. Numerous ways in which obtainable to accomplish this like use of computer science techniques. Audit knowledge used for testing and making rules or outline patterns will be collected from numerous sources like network traffic knowledge, system logs from hosts and system calls from numerous processes. IDS need device. Device is that the system on that Associate in Nursing IDS is put in and running. Network device monitors network

packets like TCP/IP headers, length of association, and range of bytes transferred etc. whereas host device monitors system logs, memory usage on host etc.

Figure 1 demonstrates the traditional IDS model. Here detector element machine generates security events, management console monitors those events and controls detector element. The intrusion detector engine records events logged bye the sensing element into information and generates alerts supported rules from security events.[1]

Figure 1. Traditional IDS Model [1]

Section1 offer the essential introduction regarding the IDS and need/purpose of IDS. In Section II, basic ANN ideas are given. Section III concentrates on dataset use for implementation of the system and classification technique used for characteristic intrusions. Section IV provides general implementation details of the project. Section V concludes the paper with future scope and good thing about system.

A. Purpose of the system

The purpose of the system is to observe bound documented intrusion attacks on the host system and show warnings to the user and conjointly store data relating to the informatics addresses and permit the traffic supported that data [2].

B. Scope of the System

The designed system works on off-line knowledge and on-line knowledge captured via the host machine. Because it uses supervised learning, once the network is trained via back propagation rule, it identifies attacks 100% and no false negatives area unit generated for on-line knowledge whereas off-line is additionally showing smart results

II. C ONCEPTS OF ARTIFICIAL NEURAL NETWORK (ANN) FOR IDS

An artificial vegetative cell could be a machine model impressed from the natural neurons. Artificial neurons primarily consists of inputs (like synapses), that area unit increased by weights (strength of the receptive signals) & then computed by a mathematical relation that determines the activation of the vegetative cell. Another operate (which is also the identity) computes the output of the bogus vegetative cell (sometimes in dependence of a particular threshold). ANNs mix artificial neurons so as to method info [3]. Soft computing techniques deals with partly true and unsure information that makes them engaging to applied for coming up with of IDS. As an example, genetic algorithms are used beside call trees to mechanically generate rules for classifying network connections [4].

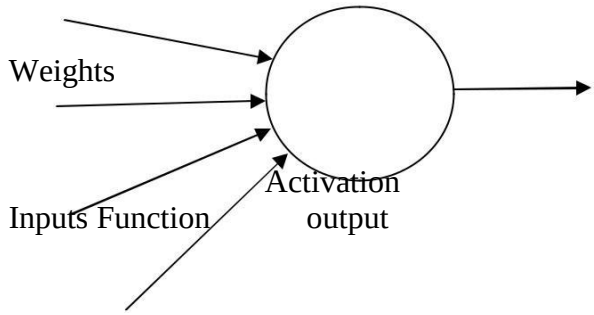

Figure 2. An Artificial Neuron [3]

However ANNs are unit foremost normally used soft computing techniques in IDSs [5][6][7][8][9][10]. Learning method in neural network is actually associate optimisation method within which the parameters of the most effective set of association (weights) for determination a retardant area unit found and includes the subsequent basic steps[6][11]:

1. Present the neural network with variety of inputs vectors (each representing a pattern).
2. Check however closely the particular output generated for a selected input matches the specified output.
3. Amendment the neural network parameters (weights) to raise approximate the outputs.

The most basic use of neural network in IDS is for coaching the network. Once the network is
Trained mistreatment needed learning methodology with Associate in Nursing ANN
Algorithmic program, it's obtainable for capturing information

III. D ATASET USED IN THE SYSTEM

The coaching and learning of the system uses offline and online captured knowledge each. Whereas when implementation, the system uses online packets to notice intrusion. As the system works each in online and offline mode, it considers common attacks like TCP/IP flood, ICMP (ping) Flood, UDP Flood, SYN Flood attack. For offline mode, agency dataset is taken into account. From the downloaded dataset, solely needed 11 options and few records derived in an exceedingly sample file to coach the network and so the testing is finished with remaining knowledge within the file. Equally for online mode, same 11 options are thought about and packets are captured online. These options are loosely categorised into 2 sets.

Set 1 contain options associated with association details of the captured packets like protocol kind, basic flags, length of packet, hop limit etc. whereas set II concentrates on directions used for the association institution. Since solely 11 most vital options are needed for distinctive attack in four categories, the eleven dimension vector is taken into account. For designated options, a numerical worth is attributed. Numerical conversion of feature vector is critical because the input vector for neural network should be numerical. Since the ranges of the option were completely different and this created them in comparable, the option were normalized by mapping all completely different values for every feature to [0,1] range [6].

IV. IMPLEMENTATION OF THE SYSTEM

The system is enforced mistreatment Java programing language. JPCap is employed to capture packets on-line whereas java.io package is employed for reading information from the government agency set. The government agency dataset is split into alittle file for testing purpose, with eleven options extracted from the initial file and concerning one hundred records from every variety of category. Similarly, same eleven options area unit extracted from the web packets and used for coaching the network. In each on-line and off-line mode, same network is trained with totally different input vector. The neural network developed is a pair of MLP with one hidden layer. Whereas developing system, 1st 2 hidden layers were chosen. With 3MLP network, rate of correct classification in off-line mode was ninety two try to in on-line mode, it had been 100 percent whereas with 2MLP, it's eighty eight hopeful for off-line mode and 100 percent for on-line mode and no false negatives were generated.

A. Learning Method and Algorithm Used

Supervised learning method with Feed forward back propagation formula is employed implementing system. In Feed forward neural network, neurons area unit solely connected in forward direction. Every nerve cell in each layer is connected with the neurons within the next layer however no association is back direction. A new neural network may be thought-about wherever neurons area unit totally connected in forward and backward direction that is termed as Hopfield neural network. The term back propagation determines the coaching technique of neural network. Back propagation could be a form of supervised learning technique. During this coaching technique, the network should be fed with sample

Input and its expected output. This output is compared with actual output for given input vector. With this expected output, back propagation coaching

formula calculates the error and adjusts weights of varied layers backwards from the output layer to the input layer. The back propagation and Feed forward algorithm area unit usually used along.

B. System Details

The System is split into essentially 3 parts: Implementation of algorithmic rule, coaching of network and Artificial traffic generator to check network

C. Implementation of Algorithm

In this section the neural network coaching rule i.e. Feed forward Back propagation rule is developed. For this, 3completely different user outlined categories area unit used.

1. Single Neuron category: This category is employed to calculate weight of one somatic cell by assignment some random weight at the start to all or any the dendrites connected to the somatic cell. A random operate is employed to assign random weight to each nerve fibre and everyone these weights area unit accustomed calculate initial weight for each incoming somatic cell.
2. Single Layer category: This category is that the class accustomed calculate weight for every somatic cell during a layer. Associate in nursing array containing weights for every somatic cell during a single layer is made during this layer.
3. Neural Network Class: Neural Network category is that the category that is employed to coach the neutral network exploitation Feed forward methodology.

In this, learning Rate, total variety of layers within the neural network and neurons in every layer is provided. On top of declared category, Single Layer along with Single Neuron category is employed to seek out variety of neurons in every layer in conjunction with initial weight of input layer. Here, variety of neurons in next layer is an added than previous layer and solely output layer area unit having predefined variety of neurons that is up to the amount of output classes supported network demand. Following area unit the varied functions declared within the Neural Network class:

- Set Inputs (): this operate is employed to assign initial weight to the input layer. The weights for the input layer area unit accepted as Associate in nursing argument of kind array with information kind double.
- Limiter (): one.0 / (1 + maths.exp (-x)) formula is employed to input argument provided to the operate.
- Run Network (): This operate is employed to update all the recent values to new set of values. A brief output array is made which is able to store the outputs. At the start every somatic cell in each layer aside from input layer, price zero is assigned as default price. currently the new prices {for each |for each} somatic cell in every layer aside from output layer are going to be calculated by multiplying weights and price of every somatic cell in previous layer so adding them with value of previous layer. Once scheming new price {for each, for each} somatic cell in every layer, bias is else and electrical circuit operate is applied to each somatic cell. These new prices area unit set as output value of each layer.
- Sigma weight Delta() : Back propagation rule wants add of weights increased by delta{for each |for each} somatic celling every layer. This operate is employed to calculate it.
- Train (): this can be one amongst the foremost vital operate within the network. This operate is employed to truly implement back propagation rule. It calls set Inputs () operate to initialize values of input layer and run Network () operate to calculate and update all the initial/default or recent values.

For Back propagation, we'd like to begin from last layer as initial to back propagate once obtaining output price for every layer.

D. Training Network

For coaching network, supervised learning is employed. As we tend to victimisation feed forward technique with back propagation formula, supervised learning is that the best technique to coach the network. Whereas coaching network, the captured packets are monitored by the administrator and so admin can mark the packets either as ok or intrusion. All the packets marked as intrusion by the admin are hold on in AN Object Output Stream category file and an object file are created.

- Update DB (): technique update DB () is employed to make an information file to store all the packets that a marked as intrusions. The tactic write Object from Object Output Stream category of Java in-built category is employed to put in writing those intrusions within the information.
- browse DB() : this can be the tactic accustomed read intrusions from the information file, convert them in packets and so show within the style of packets in table type on the java frame.

E. Artificial traffic generator to test network

To test the network, a man-made traffic generator program is made. This program is employed to come up with all the four style of intrusions i.e. FLOOD_SYN, PING_SYN, UDP_SYN and TCP_SYN attacks. The intrusions generated are captured by the network and can be displayed as intrusions.

V. CONCLUSION

Different types of techniques for intrusion detection area unit studied before the particular implementation of the projected model. The motivation behind the adopted approach for Intrusion Detection conferred within the style is that the strength and capability of Back propagation methodology used primarily for classification. The planning is of IDS is thus versatile that it may be tailored simply for brand new sorts of intrusion. On identification of the signature of the new attack the used algorithmic program within the enforced system may be trained to counter the longer term attacks of that kind.

An approach for a neural network based mostly intrusion detection system, supposed to classify the conventional and attack patterns and also the form of the attack, and has been conferred. It ought to be mentioned that the long coaching time of the neural network was largely thanks to the massive range of coaching vectors of computation facilities. However, once the neural network parameters were determined by coaching, classification of one record was drained negligible time. Therefore, the neural network based mostly IDS will operate as an internet classifier for the attack varieties that it's been trained for. A 2 layer neural network is employed for the classification of on-line and off-line records. Though the classification results were higher within the 3 layer network, application of an easier neural network is additional economical memory wise From the sensible purpose of read, the experimental result merely that heap of innovations may be drained the sphere of artificial neural network based mostly intrusion detection systems. The enforced system solved a four category drawback. However, its more development to many categories is clear-cut. As a potential future development to this study, one will embrace additional attack situations within the dataset. Sensible IDSs ought toem brace many attack varieties. So as to avoid unreasonable complexness within the neural network, an initial classification of the affiliation records to traditional and general classes of attacks will be the primary step. The records in every class of intrusions will then be more classified to the attack varieties.

The system doesn't fully protect network from Intruders, however IDS helps the Network Administrator to trace down anomalies on the net whose terribly purpose is to bring your network to a breach purpose and create it liable to attacks. This system is trained solely on the famed attacks. In future the system will be trained on varied network flow options like Flow Count, Average Flow Packet Count, and Average Packet Size etc. for clear and higher classification of traffic with low false positive and false negative rate. This will be extended by incorporating Intelligence into it so as to achieve data by itself by analysing the growing traffic and learning new Intrusion patterns. This system runs on a private host machine. This {may} be extended to create it a network application wherever completely differentcompletely different} modules of a similar system running on different machines may act with one another providing distributed detection and protection.

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Image Compression and Lightweight Android Apps

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ABSTRACT

In Android operating system, to achieve greater performance efficient memory allocation and consumption is required. It is very important to efficiently use and manage the internal and external memory space present inside the mobile operating system. Various techniques have been used and implemented to reduce the memory usage in android. One of the techniques for better utilization of memory is image compression in android. The objective of image compression is to reduce the redundancy of the image and to store or transmit data in an efficient form. Based on this compression will be done on image by keeping its quality intact and the possibility of data loss will be minimal.

Keywords: Image Scaling, Android OS, Application, Memory Consumption, Color Quantization, Predictive coding, Image Compression

I. INTRODUCTION

Nowadays we are facing the increasing use of images in many parts of our life. Smart phones, 3D vision systems, satellites, cameras, medical equipment etc. All of these uses or generate image for different tasks. For example, the images, for competitive examination or profile pictures we need to upload the compressed image. We need to save or transmit these images on our devices, then because of the limitation in disk space and channel bandwidth we almost always need image compression for decreasing the size of data, which must be save or transmit. There are some methods/techniques for image compression based on several criteria and conditions. [1]

Some of these criteria/conditions are compression time, compression ratio, quality of compressed image etc. Image compression is reducing the size of a graphics file in bytes without distorting the quality of the image. [2] The reduction in file size allows more images to be stored in a given amount of disk or memory space as well as reduces the time required for images to transmit over the Internet or downloaded from android. The JPEG method is more often used for photographs, while the PNG method is designed to work for online viewing applications like web browsers so it is fully stream able with a progressive display option. [3] The PNG file format was introduced as a free, open-source successor to GIF. Android SDK multiple drawable directories exist for different screen resolutions. There are low, medium, and high DPI specific directories such as drawable-ldpi, drawable mdpi and drawable-hdpi respectively. This allows you to create images at different DPI to enhance the appearance of your application. [7]

Figure 1. Basic Idea of Compression

II. IMAGE COMPRESSION TECHNIQUE

Image compression is very vast area where new concepts and
methods are used day-by-day. Compression is the art of representing the information in a compact form rather than its original or uncompressed form. In other words, size of a file can be reduced using compression methods. [8] Image compression addresses the problem of reducing the amount of data required to represent a digital image. It is a process intended to yield a compact representation of an image, thereby reducing the image storage/transmission requirements. [6]

A. ADVANTAGES OF IMAGE COMPRESSION

1. It provides a potential cost savings associated with sending less data over mobile phone network.
2. It not only reduces overall execution time but also storage requirements allowing greater performance.
3. It also reduces the probability of transmission errors since fewer bits are transferred.
4. It also provides a level of security against illicit monitoring.
5. It is also important efficiently use and manage the internal and external memory requirements of mobile OS. [11]

B. The image compression techniques are broadly classified into two categories:

1. Lossless Technique
2. Lossy Technique

III. PROPOSED METHOD

A. Color Quantization

By definition color quantization is a process that reduces the number of distinct colors used in an image, usually with the idea/goal that the new obtained image will be as optically similar as possible to the original image. Color quantization is a process of segmenting a color space of an image into color regions. Each region can then be represented by a representative color, generally the process is used to represent a color image using a bunch of representative colors which take fewer bits to represent the image. However, this representation scheme introduces image distortion that need to be minimized. The distortion caused can be calculated as the total quantization error which is actually the sum of squared distances between actual pixel colors and their color representatives. The distance between the color point is measured using Euclidian Distance.

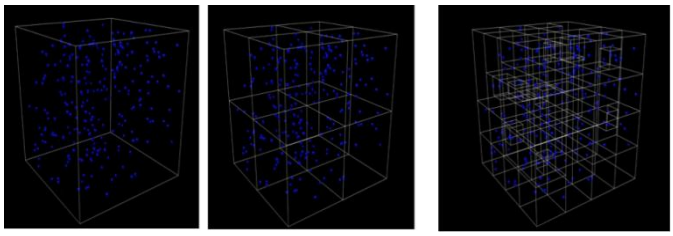

Figure 2. OcTree Representation

The principal methods of implementing color quantization are Octree representation and Euclidian Distance.

Most standard techniques sometimes consider color quantization as a method of clustering points in 3-D space, where the points represent colors found in the original image and the three axes represent the three-color channels. Almost any 3-D clustering algorithm can be applied to color quantization, and vice versa. After the clusters are located, typically the points in each cluster are averaged to obtain the representative

color that all the colors in that cluster are mapped to. The 3-color channels are usually red, green and blue.

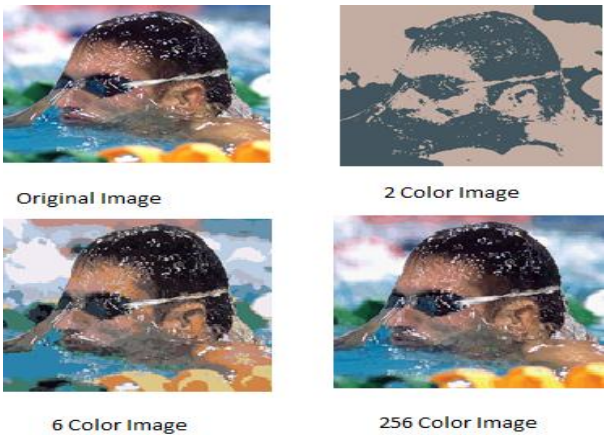

Fig 3: Color Quantized Image 1

B. Advantages of Color Quantization Method

1. Enables efficient compression of certain types of images.
2. Critical for displaying images due to memory limitations.
3. This representation scheme introduces image distortion that need to be minimized.

C. Disadvantages of Color Quantization Method

1. May cause distortion where high definition image is required.
2. Distortion can be minimized by Euclidian Distance.

Figure 4. Color Quantized Image 2

D. Predictive Coding

In Predictive coding, it will calculate the predicate color value of each pixel based on the quantized color of adjacent pixel. It is an approach that achieves good compression without significant overload. This coding scheme will take original image and stores all the RGB values of images into a Matrix, then color quantization is performed on the matrix where the image is divided into number of regions and RGB color values are identified. This RGB color values are stored in matrix format called color histogram matrix according to their RGB color axis of intensity values. From this histogram matrix, a centroid for each region is computed. After Color quantization, predictive coding is used to find the predicate value for each color, this predicate value is calculated according to the location of the current pixel's value.

For most of the images, there are redundancies among the adjacent pixel values of the image matrix; i.e., adjacent pixels are highly correlated. Thus, a current pixel can be predicted reasonably well based on a neighborhood of pixels. The prediction error, which is calculated by subtracting the prediction value from the original pixel, has a smaller entropy than the original pixels. Hence, the prediction error can be encoded with fewer bits. In the predictive coding, the correlation between adjacent pixels is removed and the remaining values are encoded.

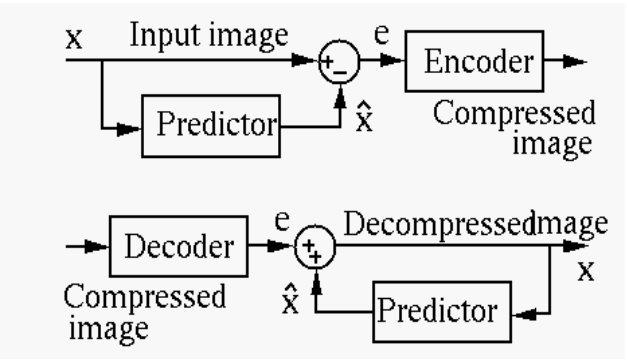

Figure 5. Predictive Coding Block Diagram

Predictive coding is based on eliminating the inter pixel redundancies closely spaced pixels by extracting and code only the new information in each pixel

where the new information explains the difference between actual and predicted pixel values.

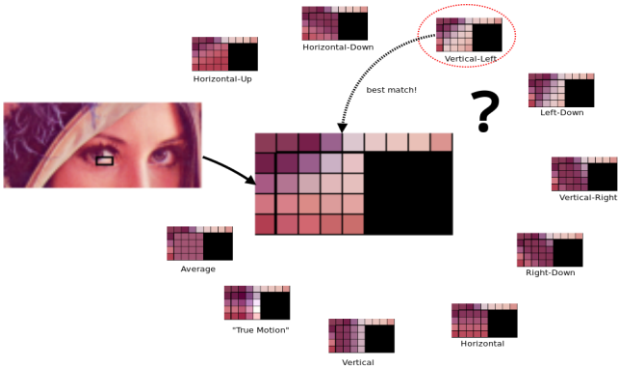

Figure 6. Predictive Coding Pictorial Representation

E. Advantages of Predictive Coding Method

1. Effective method and makes use of histogram and quantization.
2. Easy to implement method.

F. Disadvantages of Predictive Coding Method

1. Drawback is probability of loosy coding and compression.

IV. PROPOSED METHOD IN LIGHTWEIGHT ANDROIOD APPLICATIONS.

In lightweight android apps, the idea of compression is to resize the image and scaling of image is needed. Image scaling is the process of resizing a digital image. Scaling is a significant process that involves a trade-off between efficiency, smoothness and sharpness. In android for images scaling it will consider three factors height of the image, width of the image, resolution of image measured in a DPI. DPI simply means the "Dots Per Inch" in the image. That simply means it's the measure of the resolution of your image based on the number of pixels or dots per inch.

A. Device Oriented Scaling

In device, oriented scaling, it depends upon the different screen sizes and densities of the individual devices. The system performs scaling and resizing to make your application work on different screens, it fit the screen on their devices

B. User Customize scaling

In this type of scaling it depends upon the user what is the scaling factor to compress the image. We can scale the image to reduce the size of images as per the requirement of the user. But, it will reduce the quality of the image. We need to decide the scaling factor, it will not reduce the quality of the image.

C. System Architecture in Context of Image Compression

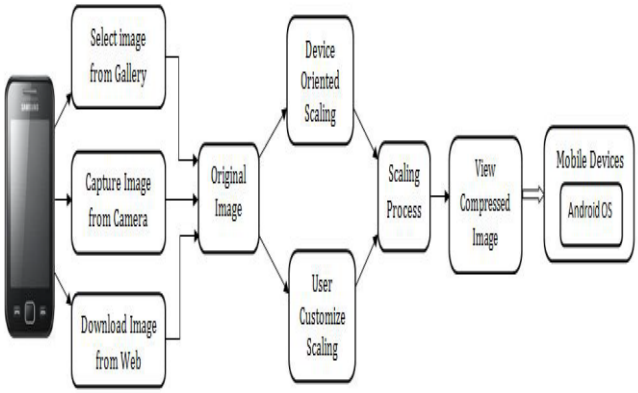

Figure 7. Proposed System Architecture

D. Figurative View of Compression in Android Apps

Class	Name	Density	Factor
Ldpi	Low Density	120 dpi	sp = 3/4 * dp
Mdpi	Medium Density	160 dpi	sp = dp
Hdpi	High Density	240 dpi	sp = 1.5 x dp
Xhdpi	Extra High Density	320 dpi	sp = 2 x dp
xxhdpi	Extra Extra High Density	480 dpi	sp = 3 x dp
xxxhdpi	Extra Extra Extra High Density	640 dpi	sp = 4 x dp

Figure 8. DPI Classes in Android

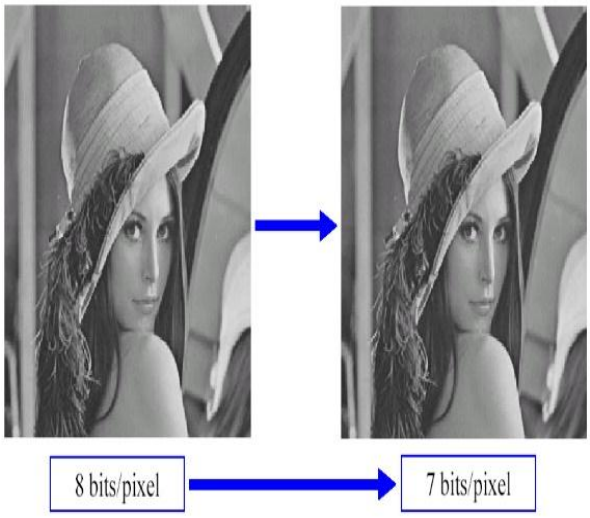

Figure 9. Compressed image in Android

E. Functional Mapping of Original Image and Compressed Image

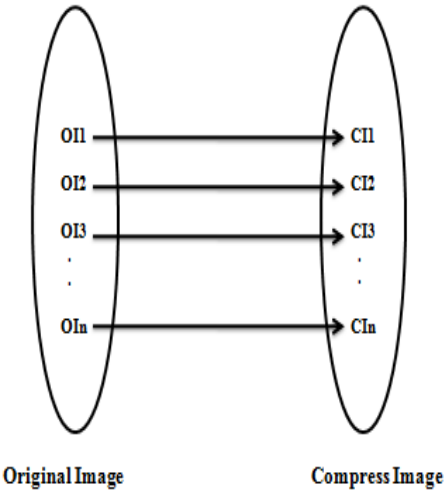

Figure 10. Functional Mapping in Android

IV. CHALLENGES

Image compression is a highly-recommended technique only when you have some quality assessment tools to check for the results as it is a subjective process the error detection and quality assessment becomes a need to verify our works. The main challenge that it faces is the losing of data - sometimes to achieve compression we may lose data so it becomes necessary to know that hoe much compression is needed and how much is beneficial to our project.

V. BENEFITS

Memory allocation and power consumption goes hand in hand and requires to be optimized in this high-tech era therefore the need of lightweight apps arises. Because of these kinds of apps peaks in the areas of memory and power has seen significant changes. Some benefits of the project work can be seen in following areas.

a. Battery life.
b. Transmission time and data consumption.
c. Memory requirements.
d. Performance issues.

VI. FUTURE WORK

The future of lightweight android apps has a rise in tide kind of scenario it may establish base for future improvement techniques in memory requirements and will fulfill needs for optimization processes.

VII. CONCLUSION

Image processing has wide verity of applications leaving option to the researcher to choose one of the areas of his interest. Lots of research findings are published but lots of research areas are still untouched. Moreover, with the fast computers and signal processors available in the 2000s, digital image processing has become the most common form of image processing and generally, is used because it is not only the most versatile method, but also the cheapest.

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Machine Vision Algorithms implementation in Ruby

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ABSTRACT

In current scenario, machine vision systems (at least machine vision algorithms(MVA)) are preponderantly implemented using statically typed programming languages such as C, C++, or Java. However, statically typed languages are not suitable for development and maintenance of large scale systems. Dynamically typed languages are generally not considered while choosing a programming language due to their lack of support for high-performance array operations. This review paper presents efficient implementations of MVA with the dynamically typed programming language Ruby. The Ruby programming language is used in this paper review because it offers the best support to meta-programming from other conventional programming languages. A Ruby library-Hornetseye is reviewed for performing array operations as portion of this paper. It is shown that the library eases brief implementations of MVA that are commonly used in industrial automation. That is, this paper is about implementing machine vision systems in different way.The performance of general operations in ruby is compared with the performance of equivalent C/C++ programs to validate the approach.

Keywords: Ruby, Machine Vision Algorithms, Dynamic Programming Language

I. INTRODUCTION

Machine vision is a vast field and in many cases there are various independent approaches solving a specific problem. Also, it is oftentimes difficult to preconceive which particular approach will give the best results. Therefore it is significant to maintain the agility of the system to be able to implement necessary changes in the concluding stages of a project.

A traditional application of computer vision is industrial automation. That is, the cost of implementing a machine vision system eventually needs to be recovered by savings in labour cost, increased productivity, and/or better quality in manufacturing. However, statically typed programming language such as C, C++, or Java are still mostly used to implement machine vision systems. Development and maintenance of large scale systems using a statically typed language is much more expensive compared to when using a dynamically typed languages.

This paper shows how the dynamically typed programming language Ruby can be used to reduce the cost of implementing machine vision algorithms. A Ruby library is reviewed which facilitates rapid prototyping and development of machine vision systems.

The downside of using a compiled language is that a developer is required to make changes to the source code, save them in a file, compile that file to create a binary file, and then re-run that binary file. In contrast, interpreted languages o er considerable savings in development time. In an interpreted language the developer can enter code and have it run straight away.

II. RUBY PROGRAMMING LANGUAGE

The Ruby programming language is an interpreted, pure object-oriented, and dynamically typed general purpose programming language. Furthermore Ruby sup-ports closures and meta-programming. Also Ruby has a straightforward API for writing extensions. Finally Ruby currently is on place 11 of the Tiobe Programming Community

Index.. Ruby is a multi-paradigm language and it is inspired by Perl, Python, Smalltalk, Eiffel, Ada, and Lisp. Ruby supports the following language features:

- Object-oriented
- Single-dispatch dynamic typing
- Exception handling
- Garbage collection (i.e. managed environment)
- Mixins
- Closures
- Continuations introspection
- Meta programming
- Reification.

Software integration in Ruby is easy because:

- ✓ interfacing with native code for writing extensions is simple.
- ✓ classes can still be modified after declaration.
- ✓ Ruby uses duck-typing, i.e. two objects are compatible if they support the same methods and properties.

The design philosophy of the Ruby programming language follows the following principles:

- Brevity: The language is expressive so that programs written in that language are succinct.
- Conservatism: Ruby sticks to traditional control structures to reduce the cost of adoption.
- Simplicity: The Ruby programming language supports simple solutions.
- Flexibility: Ruby should adapt to the user instead of the user adapting to Ruby.
- Balance: The Ruby programming language tries to achieve a balance between all these concepts.
  - Energy/cost consumed,
  - Time/cost to network partition,
  - Variation in node power levels,
  - Cost/packet ,and
  - Maximum node cost

III. STATICALLY TYPED LIBRARIES

Most computer vision libraries are implemented in the statically typed C/C++ language. However C++ has a split type system. There are primitive types which directly correspond to registers of the hardware and there are class types which support inheritance and dynamic dispatch. In C++ not only integers and floating point numbers but also arrays are primitive types. However these are the most relevant data types for image processing. To implement a basic operation such as adding two values so that it will work on different types, one needs to make extensive use of template meta-programming. That is, all combinations of operations, element-type(s), and number of dimensions have to be instantiated separately. For example the FrameWave1 C-library has 42 explicitly instantiated different methods for multiplying arrays. For this reason most libraries do not support all possible combinations of element-types and operations.

Static typing not only leads to an explosion of methods to instantiate. A related problem caused by static typing is that when a developer wants to modify one aspect of the system, the static typing can force numerous rewrites in unrelated parts of the source code (Tratt and Wuyts, 2007). Static typing enforces unnecessary “connascence” (a tech-nical term introduced by Weirich (2009)) which interferes with the modularity of the software. In practise this causes problems when implementing operations involving scalars, complex numbers, and RGB-triplets.

OpenCV: It (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. The library consist of more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms.

IV. STATICALLY TYPED EXTENSIONS

Some computer vision libraries come with bindings in order to use them as an exten-sion to a dynamically typed language. For example for the OpenCV2 library there are Python bindings (PyCV3) as well as Ruby bindings (opencv.gem4).This allows one to use a statically typed extension in an interpreted language and it becomes possible to develop machine vision

software interactively without sacrificing performance.Open classes and dynamic typing make it possible to seamlessly integrate the functionality of one library into the application programming interface (API) of another. However supporting all possible combinations of types and operations with a statically typed library is hard (see Section 3). In practise most computer vision extensions only provide a subset of all combinations. n general it is not possible to instantiate e cient implementations of all the possible combinations of operations and compile them ahead-of-time. dynamic typing facilitates much more concise code than static typing.

V. DYNAMICALLY TYPED LIBRARIES

There are a number of active free and open source software projects in the area of machine vision. These contain ITK, NASA Vision Workbench, OpenCV, OpenVidia, Camellia, PyGPU, and Gamera to name only a few. Machine vision systems require software for handling video and image files, accessing cameras, and visualizing results. To keep the size of the project manageable it is mandatory to make use of existing software projects. Although open source packages and libraries are available for free, integrating it requires significant time and effort.

To port all required software to Ruby is desirable so as to take full advantage of the language properties. However for input and output (e.g. capturing camera images and displaying videos) it is necessary to interface with native code. In addition it is necessary to implement computationally expensive parts of the code in C/C++ as long as there is no sufficiently strong run-time optimizer for Ruby.
The quickest way to integrate an existing C/C++ library into Ruby is to use the bindings-generators. However simply making the static data types of a C/C++ library visible in Ruby is insufficient for fully exploiting the features of Ruby. An array data type to handle multi-dimensional arrays with elements of a single type was implemented in Ruby library HornetsEye, inspired by NArray.

NArray: NArray is an Numerical N-dimensional Array class. Element types supported are 1/2/4-byte Integer, single/double-precision Real/Complex, and Ruby Object. This extension library incorporates fast calculation and easy manipulation of large numerical arrays into the Ruby language. It has features similar to NumPy, but NArray has vector and matrix subclasses. NArray provides fast element-wise operations combined with methods to manipulate single elements or subarrays. However in contrast to NArray our data type is largely implemented in Ruby and thus allows definition of custom element-types.

HornetsEye: HornetsEye is a real-time computer vision library for the Ruby programming language. HornetsEye is maybe the first free software project providing a solid platform for implementing real-time computer vision software in a scripting language. The library could effectively be used in industrial automation, robotic applications, and human computer interfaces. It is an extension for Ruby which facilitates rapid development of machine vision software and and provide a high amount of flexibility without sacrificing real-time capabilities.

VI. PERFORMANCE

Comparison of HornetsEye with NArray and C++:
Figure 6.1 shows the time required for running the operation “m + 1” for arrays of different size. The array “m” is single-precision floating point array with 500 500 elements.

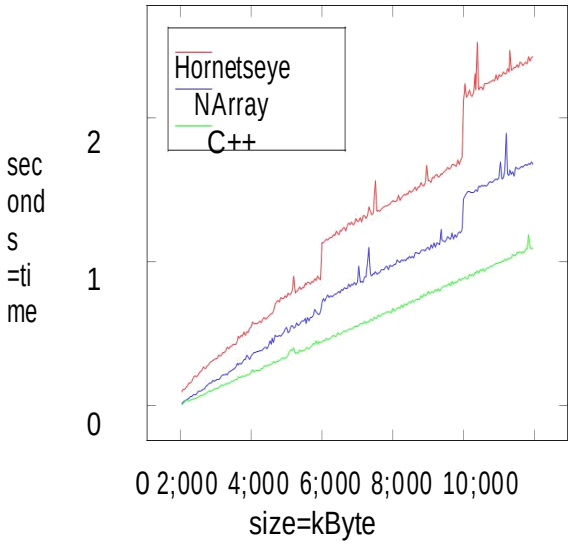

Figure 6.1. Processing time of running "m + 1" one-hundred times for different array sizes

Code Size of Programs: Ruby implementation is significantly shorter and the semantics of Ruby is simpler. Ruby+Hornetseye requires half as many lines of code as the Python+OpenCV implementation. Also the semantics of the Ruby implementation is much more concise.

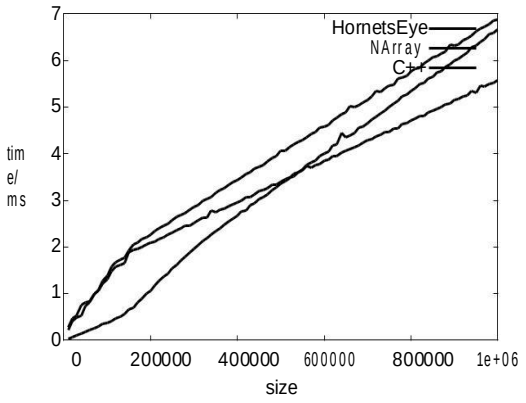

Figure 6.2. Speed comparison for array-scalar multiplication

Contrary to common belief, an interpreted language can be faster than a static implementation. Table Ishows that the garbage collector of Ruby can be faster than the static memory management of a naive C++ implementation.

Table 1

	Mimas/Boost	NArray	HornetsEye
constructor	2.7 ms	8.4 ms	7.8 ms
m.fill(1)	2.7 ms	2.7 ms	2.8 ms
m*m	6.8 ms	10.0 ms	8.1 ms
m*2	6.7 ms	8.9 ms	7.2 ms
subarray	3.0 ms	2.2 ms	3.7 ms

The C++ library seems to be much faster when copying arrays or when filling them with a value is required. This is probably due to the fact that neither NArray nor HornetsEye are currently making use of the highly optimized routines of the C++ standard template library.

The C++ implementation is much faster for small sizes than both Ruby implementations. The reason is that the array manipulations in Ruby and the garbage collector have a larger overhead. For larger arrays the benefits of the garbage collector become dominant.For bigger arrays HornetsEye is the most efficient implementation.

VII. CONCLUSION

Existing free and open source software (FOSS) for machine vision is predominantly implemented in C/C++. Albeit the performance of machine code generated by C/C++ compilers is high, the static type system of the C++ language makes it exceedingly difficult to provide a complete and coherent basis for developing machine vision software.It is hard to support all possible combinations of operations and native data types in a statically typed language. Therefore most libraries implemented in such a programming language only support some combinations (e.g. OpenCV and NArray). In contrast Ruby already comes with a set of numeric data types which can be combined seamlessly.

The contribution of this paper is a machine vision system which brings together productivity and performance by implementing machine vision algorithms in ruby. The dynamic programming languages facilitates concise and flexible implementations which means that developers can achieve high productivity. It is presented how the library reviewed in this paper can competitively perform to implement machine vision algorithms.

VIII. FUTURE WORK

Although in this review paper, the Ruby programming language was used, machine vision field could significantly benefit from any dynamic programming language which offers equal or stronger

for meta-programming support. Meta-programming is the ability of program to change itself during run-time. This facilitates implementation of optimization algorithms which would be hard to do in currently popular programming languages. Possible future work is the development of efficient libraries for dynamic languages out of conventional approaches.

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A Review on Solid Waste Management using Smart-Bin

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ABSTRACT

Urban India is world's third largest waste generator, hence proper planning is required to dispose the trash. Trash in waste containers are not collected on time which leads to garbage over flowing. It has serious hazardous problems on the environment leaving the place untidy and unhygienic. There has to be proper management techniques for efficient garbage collection. This paper describes the waste management techniques using technologies like GIS, GPS, RFID, etc. It would be easy to calculate the fill level estimations using these Techniques, according to the input of smart system efficient route can be decided for garbage collection and would help to reduce the human intervention in waste management.

Keywords: GIS, GPS, RFID, Solid Waste, RFID.

I. INTRODUCTION

In India due to modernization the amount of waste generated is increasing day by day. In the era of technology, new techniques are applied in almost every field but the basic areas of sanitation are left out. In most cases the garbage collection is still carried out in same traditional ways. Waste can be categorized such as mineral waste, organic/inorganic waste, radioactive waste, biomedical waste, agricultural domestic waste, etc. It is very difficult to segregate various types of waste. All the waste ultimately is being dumped into municipal bins, irrespective of its type. The waste collection centres from where it is collected by the municipalities to be further thrown into landfills and dumping areas. There are various ill-effects caused due to untreated organic waste which leads to diseases. Non-biodegradable E-waste causes landfills. Radioactive waste has many health hazards. Improper disposal and management of solid waste affects all aspects of the society, namely physical, economical and environment. Cleaning of garbage bin at proper intervals is the necessary solution but manually monitoring them at regular intervals is a tedious job. Ignored waste in the surroundings invites flies, mosquitoes, rats etc. This leads to unhygienic conditions. Animals grazing on this waste or near such areas can pass on diseases through food chain. The waste which is not collected can clog storm water run-off leading to formation of sluggish and stagnant water bodies. These water bodies then become breeding space for disease causing bacteria. Waste thrown near water bodies leads to contamination of water. To suppress the increase in waste we need to develop an efficient and robust solid waste management system that can uplift the present system as well as be time and cost effective.

II. LITERATURE REVIEW

A. SMART AND WIRELESS WASTE MANAGEMENT AN INNOVATIVE WAY TO MANAGE WASTE AND ALSO PRODUCE ENERGY

The model proposed in this paper helps to identify the level of garbage using ultrasonic sensors which will be interfaced with ultrasonic conditioning chip and it will be located on the top of dustbin. 4 load cells were used in case if ultrasonic sensor fails to give input. Input from sensors will be processed by the microcontroller using signal processing algorithms and the processed input will be sent municipal office through SMS using a GSM modem so they will get SMS to pick up the waste. GPS module is installed to detect the location of dustbin.

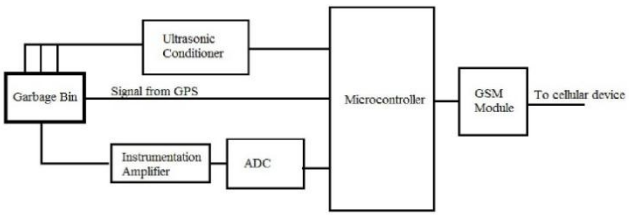

Figure 1. Block diagram for Smart Garbage Bin

[Also describes the separation of plastics from solid waste which is a tedious and difficult task for Municipal Solid Waste(MSW) Uses Near infrared (NIR) reflectance spectroscopy for separating five types of plastics namely polyethylene terephthalate (PET), high density polyethylene (HDPE),polyvinyl chloride (PVC), polypropylene (PP) and polystyrene. But it does not detect the black colour plastic bags and PET bottles with plastic caps. After separation of Plastics from solid waste intends to use Biogas plant.

Biogas is naturally extracted from organic waste. Biogas helps to produce electricity and heat. An alternative to this is the up gradation of biogas to bio methane, which can be supplied to natural gas supply. The by-product of food waste is to be subjected to process in which the materials are heated up to 70 degrees for an hour to the kill bacteria. An agitator is mixed into a homogeneous material. This process can be repeated every hour. When a uniform mixture is obtained, then the material can be pumped into a fermenter through a macerator in a sealed atmosphere, which ensures that no impurity enters it. Bacteria break down into individual enzymes and other components, which results in biogas. The advantage of this process over other process includes low energy expenditure and higher level of efficiency. All organic acids get decomposed during fermentation process. The nutrients remain intact and can be better absorbed by plants.

B. SMARTBIN: "SMART WASTE MANAGEMENT SYSTEM"

[3]Presents a system to detect a fullness of a dustbin using sensors and wireless mesh networks reducing duty cycle. Collected data is analysed to obtain litter bin utilization and seasonality information with which contractors are able to make better decisions.

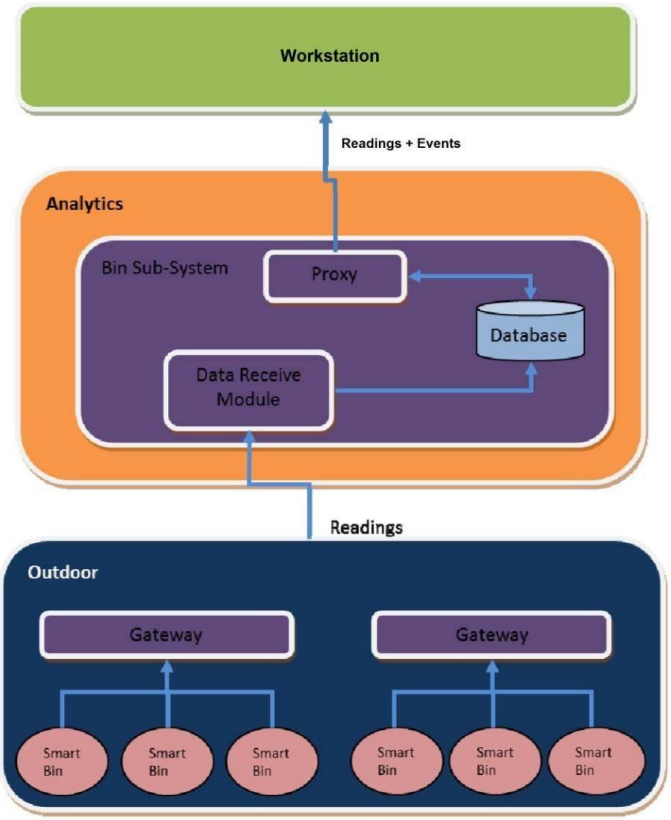

Figure 2. Smart-Bin system architecture

The architecture shows the gateway nodes which will forward the data received from sensors to backend server via an internet connection. Wireless communication model is attached to the sensor node which has a low power and low bandwidth and the sensor node was deployed with a less battery power. At the backend the analytics module collects, processes and compares against rules and generates events upon exceeding threshold.

Subsystem sends information to workstation. Each bin will be visualized using a graphical user interface. Upon receiving the information the gateway forwards the data to backend server. The sensor node was also equipped with Global Positioning System (GPS) to obtain location information and wireless mesh network was implemented at the nodes to extend the coverage of Smart Bin. Total 11 Smart Bins were deployed in the area, duty cycle and this technique was employed to maximize the operational time of the system. Data of six months was collected, the average delivery ratio of a system is 99.25%.

C. VERSATILE SCALABLE SMART WASTE-BIN SYSTEM

Waste bin consists of the sensing units, an active RFID tag for data aggregation and transmission. Also they have provided a protective enclosure for sensors and RFID tags .Ultrasonic sensors are used as they provide most suitable solution. The waste-Bin system interacts with an active RFID reader. Ultrasonic Sensor provides distance of nearest object since waste is irregular in shape thus objects may occupy the bin space in different arrangement. But there is difference between the highest level of the bin and the actual fill percentage of it and this result can be obtained by considering combination of two sensors such that their areas will not overlap during detection. Number of sensors depends on the size of bin.

The proposed system consists of two units:

1) The Field Unit: It is mounted on the bin and has an RFID tag, ultrasonic sensors and external power source.

2) The Mobile Sink: It consists of RFID tags and a small-form-factor computer.

The RFID reader reads the tags and collects the information. The application on the mobile sink is responsible for receiving the information from the field units and, if needed it forwards this information to upper management systems. Thus we can conclude that the fill-level estimation method using ultrasonic sensors provides accurate results.

Figure 3. Real Time Smart-Bin Status

III. METHODOLOGY

Solid waste management in Pune is done by collecting, transporting, storing, processing and disposing of waste from bins that are located at different locations. Some people also burn the garbage in the open. Hotel trucks, bulk refuse carrier and ghanta trucks that are used for the collecting solid waste across city. The collection routes are usually predefined, according to routes waste is collected and transported using garbage trucks and mini tempo to storage stations. Almost 600 vehicles are engaged every day of various capacities for waste management. PMC (Pune Municipal Corporation) has combined an integrated approach with a decentralized waste management strategy that encourages NGOs and private sector participation. At transfer stations the waste is segregated manually by PMC or SWACH (Solid Waste Handlers and Collectors' Society) workers and transported to dumping stations. Due to improper and incomplete information about the waste segregation affects the environment and the garbage dumping process. There is no system designed for monitoring the bins or keeping track of the garbage collecting vehicles and thus lacks coordination between garbage authority and garbage vehicle drivers. There is also a lack of communication between local people and Municipal Corporation about the problems related to garbage. The bins present in the nearby locality are not regularly collected which leads to overflowing of bins. Most of the solid waste generated is dumped into the landfill, dumping sites, and yards or outside the city. As these sites are not covered, it becomes breeding space for rats, flies and other diseases. The PMC has one waste processing plant at Hanjar working at full capacity. Around 1,500 to 1,800 metric tons of waste is generated in the city every day of which 1,000 metric tons is processed in Hanjar. The total e-waste generated in Pune is about 2584 tons and in PimpariChinchwad region is about 1032 tons.

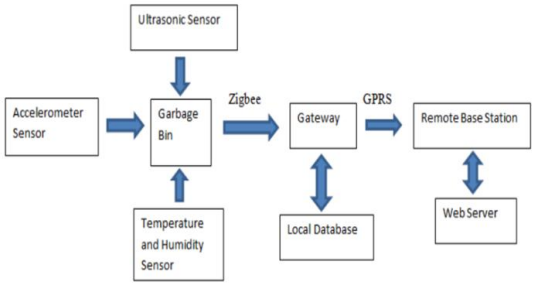

Figure 4. Smart-Bin Methodology

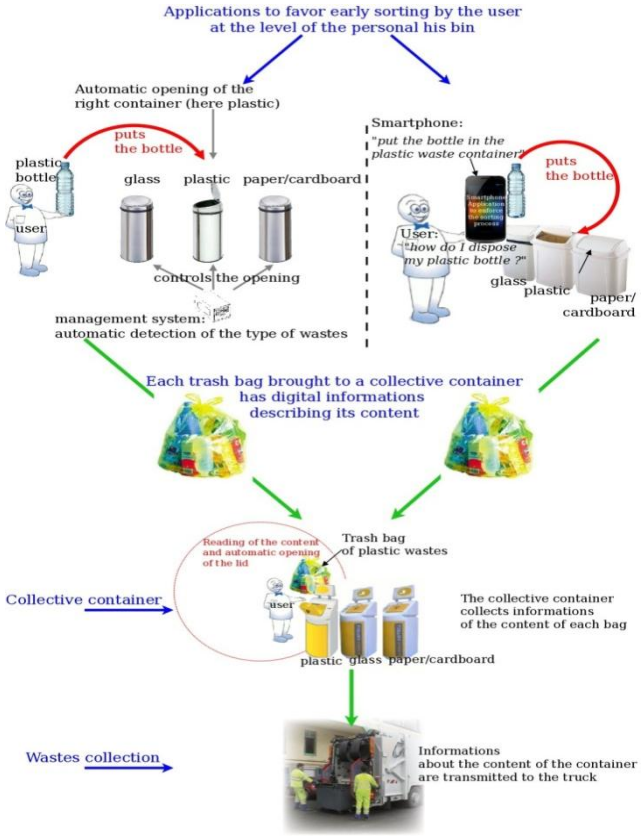

Figure 5. Smart-Bin Methodology

IV. CONCLUSION

With the increase in population and the lack of good waste management system, collection of solid waste is becoming a major issue. The models which are described in this paper are innovative and solves the problem of overflowing garbage bins using latest technologies like RFID, GSM, and GPS but has many drawbacks such as lack of accurate real time system and analysis of collected garbage and visual representation of garbage collection.

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Intelligent Transportation System Contingent on Internet of Things

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ABSTRACT

Due to population growth, the problem of traffic management and congestion are also increasing at an alarming rate. Therefore, in order to oversee the mentioned problem, we require a system which provides with the help of advanced technologies. Intelligent Transportation Systems (ITS) is the coherent application of computer, electronics, vehicle sensing communication technologies and management strategies to help in monitoring and managing traffic flow, reducing congestion, providing optimum routes to travelers, enhancing productivity of the system, and saving lives, time and money. This paper comprises of ITS architecture, its lead enabling technologies, ITS user services and applications. In addition to this, it also includes IoT's role in implementing the ITS with the help of agent technology, its benefits and world-wide pioneers of ITS.

Keywords: Internet of Things (IoT), Intelligent Transportation System (ITS), Sensors, Embedded Electronics, User services, Applications, Architectures, Enabling Technologies, RFID, Wireless Sensor Networks, Agent Technology, ITS Techniques.

I. INTRODUCTION

With increasing number of vehicle ownership, it has become very difficult to manage the existing transportation system and it leads to various problems like congestion, inflation in accident rates and delay in reaching destination. ITS is boon to provide solution to these problems.

Intelligent transportation system (ITS) is a application or a platform which seeks to yield services related to different means of transport and traffic management and enable various users to be well informed and make safer, more synchronized, and 'smarter' utilization of transport networks. ITS is the application of computer technology to the transport sector. ITS systems gather data related to the transport system, process it, and then use the processed data to improve the management of the transport system. It gives the transport user with more and important information on which their transport decisions are based. It is being implemented and used in the developed countries like Japan, Europe etc since last two decades in some or the other way. This area is considered as a part of the Internet of things. Crucial information generated by the vehicle on roads and presented to the traveler. This collected data analyzed to obtain the traffic flow condition so as to predict the traffic flow. Thus, advanced traffic monitoring is

unrolling into an Intelligent Transportation based on IoT.

II. ARCHITECTURE

Mobile Computing, Wireless Communications and remote sensing has led to the development of ITS as promising technology which endow the distribution of different applications related to safety of road, traffic monitoring. The high level architecture of ITS includes following three communication domains. These are –

A. In vehicle Domain

Connected vehicles are provisioned with electronic control unit(ECUs), wireless-enabled on-board units (OBUs), a trusted platform module (TPM) and an application unit (AU). ECUs collect information about the vehicle's location, speed, heading, vehicle size, etc. and the context of its immediate environment (e.g., the number of neighboring vehicles, local road traffic conditions, etc.) and control its functionality. These ECUs link by exchanging messages with the OBU and AU, and form an in-vehicle network (also known as the on-board network). For running one or multiple applications, which are rendered by remote service providers (SPs), and exchange information with other nearby ITS entities using the communication capabilities of the OBU. For this reason AU is responsible.

B. V2X domain

The information gathered at the vehicles' OBUs, are exchanged with nearby ITS entities (e.g., OBUs, RSUs, etc.) using various vehicular communication technologies (V2X), including: (i) vehicle-to-vehicle (V2V) communications between neighboring vehicles (or OBUs) using a dedicated short-range communications (DSRC) technology;(ii) vehicle-to-infrastructure (V2I) communications between the surrounding OBUs and RSUs, and vice versa; and (iii) vehicle-to-pedestrian (V2P) communications between the OBUs/RSUs and the surrounding pedestrian as shown in Figure 1.

C. The infrastructure domain

It includes the trusted third parties (TTP), such as vehicles manufacturers, the service providers (SPs) and the trust authorities (TA). The fixed RSUs are generally not fully trusted and subordinated by the TA and can be considered as a bridge between the V2X and infrastructure domains[1].

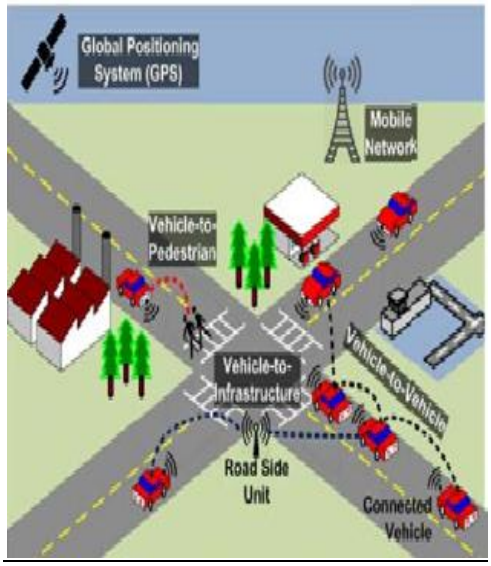

Figure 1. ITS V2X Communications

III. MAJOR BRANCHES OF ITS

There are various categories of ITS under which many applications are present such as-

1. Advanced Traveler Information System (ATIS) It helps in providing both en- route and pre-trip information to the driver and traveler to make better decisions regarding trip departures, optimum routes, and available means of travel. It does this through technologies, such as internet, telephones, cellular phones, television, radio, etc. Application are Real-time Traffic Information, Route Guidance / Navigation Systems and Roadside Weather Information Systems.

2. Advanced Traffic Management System (ATMS)

ATMS is one of the most widely used branches of ITS. It is a tool used by traffic police department to control traffic by monitoring the flow of traffic and making appropriate decisions. Applications are - Real-time

Traffic Status, Dynamic Traffic Control, Incidence Response.

3. Advanced Public Transportation System (APTS)

APTS is concerned with raising operational efficiency of all public transportation modes and increasing ridership by making the transportation system more reliable. Applications are- Real-time Status Information for Public Transit System, Automatic Vehicle Location

4. Emergency Management System (EMS)

This is the latest research field in ITS. It reduces the fatality rate in accidents by providing various technologies that helps in emergency conditions. Application are - GIS based Emergency Response Management System for Mysore City, India[2].

Apart from these major user service, there are some other subsidiaries of ITS which are as mentioned below-

5. ITS-Enabled Transportation Pricing Systems (ITS-ETPS)

Ex- Electronic Toll Collection, Variable Parking Fees.

6. Fully-Integrated Intelligent Transportation (FIIT)

There are some applications such as Collision Avoidance ,Intelligent Speed Adaptation

7. Commercial Vehicle Operations (CVO)

Real time applications are Traceability and safety of commercial vehicles such as trucks, vans, and taxis, CV electronic clearance, Automated road side safety inspection, On-board safety monitoring administrative process

8. Advanced Vehicle Control Systems (AVCS)

Example includes Collision Warning of the vehicles

9. Advanced Rural Transportation System (ARTS)

Provide Information about Remote roads via Radio[5].

IV KEY VALIDATING ITS STANDARDS

A. Wireless Communications-

Radio modem communication on UHF and VHF frequencies are widely used for short and long range communication within ITS. IEEE 802.11 protocols are used to accomplish the short-range communications of 350 m. Long range communications have been suggested using infrastructure networks such as WiMAX (IEEE 802.16), Global System for Mobile Communications (GSM), or 3G.

B. Global Positioning System (GPS)-

GPS receivers are embedded in vehicles on-board units receives signals from different satellites to determine vehicles position. Location can usually be determined to within ten meters. It is the technology used for navigation and route guidance systems.

C. Dedicated- Short Range Communications (DSRC)-

It is a short- to medium-range wireless communication channel specifically outlined for automotive uses. DSRC entitled two-way wireless communications between the vehicle (through embedded tags or sensors) and roadside equipment (RSE).

D. Wireless Networks

It provides rapid communication between vehicle and roadside but its range is of few hundred meters. WiBro is used along with WiMax for communication in South Korea.

F. Mobile Telephony-

3G and 4 G mobile telephone networks can be used for transiting information. It is easily available in the town and along major roads.

G. Radio wave/Infrared Beacons-

It uses 5.8GHz DSRC wireless technology. Japan'sVehicle Information Communications System (VICS) uses radio wave beacons on expressways and infrared beacons on roadways to communicate real-time traffic information.

H. Roadside Camera Recognition-

To identify vehicles license plate, cameras are used based on Optical Character Recognition (OCR) technology. This information retrieved is passed to back office servers in digital form , which assess and

post charges to drivers for their use of roadways within the congestion zone..Ex-London

I. Probe Vehicles or Devices-

Some countries use so-called "probe vehicles" that send their speed and location to a central traffic operations management center to identify congested locations. Ex.-Beijing

J. Sensing technologies-

Advancement in IT and telecommunication along with RFID(Radio Frequency Identification) has led to the improved Intelligent Transportation system. Sensors are placed onto the road to detect the RFID plate and count the number of vehicles[1].

V.INTERNET OF THINGS

IoT can be used to build a world where all intelligent objects of our everyday life are linked to the Internet and made to interact with each other with negligible human interference to reach a common goal. The term IoT is devised by Kevin Ashton. The building block of sensing and communication technologies of IoT are Wireless Sensor Network(WSN) and RFID-based network linked together through internet or other technology and protocol. Wireless network is connected to multiple RFID and sensors and work with each other to exchange data with the physical world to fulfill specific tasks.[4] Sensors management system and also sensors help to find out the vacant parking space nearby and mobile app is used to request the vacant parking slot and through this the driver gets to know about the available space over WIFI. In this way, the parking assistance is provided [3]. As shown in figure:

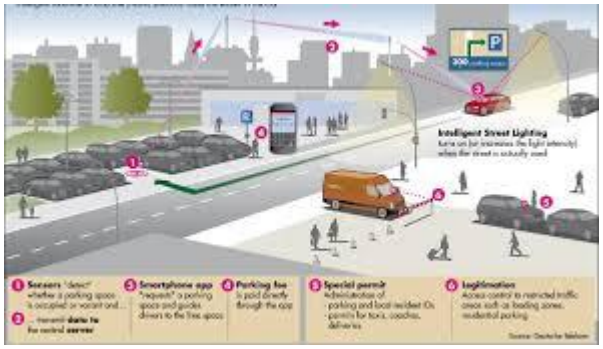

Figure 2. IoT based smart parking assistance.

VI.CONCLUSION

This paper highlights ITS as the most prominent and emerging area through which transportation monitoring can be done so as to reduce congestion, reduce accidents , increasing safety and throughput, information dissemination etc. It put together all the aspects of ITS relating to each other in one or the other way. Also ITS has never ending scope and it will evolve greatly in future.

VII.REFERENCES

The heading of the References section must not be numbered. All reference items must be in 8 pt font. Please use Regular and Italic styles to distinguish different fields as shown in the References section.Number the reference items consecutively in square brackets (e.g. [1]).

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A Review on Cloud Computing and its Security Issues

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ABSTRACT

Cloud computing is the development of parallel computing, distributed computing, grid computing and virtualization technologies which define the shape of a new era. For the sharing resources that contains software, applications, infrastructures and business processes, cloud computing is the main key. Cloud computing is a significant advancement in the delivery of information technology and services. Cloud computing offers compelling advantages in cost, speed, and efficiency. Cloud computing has recently reached popularity and developed into a major trend in IT. This paper focuses on the deployment model of cloud which consists of private cloud, public cloud, hybrid cloud, community cloud .This paper also focuses on architectural components of cloud which consists of Saas, Paas, Iaas. This paper also focuses on security issues and security challenges.

Keywords: Cloud Computing, virtualization, deployment, architectural

I. INTRODUCTION

In Cloud Computing the word cloud (also phrased as "the cloud") is used as a metaphor for "the Internet," so the phrase cloud computing means "a type of Internet-based computing," where different services — such as Servers, storage and applications — are delivered to an organization's computers and devices through the Internet .Cloud computing is a set of IT services that are provided to a customer over a network on a leased basis and with the ability to scale up or down their service requirements. Usually Cloud Computing services are delivered by a third party provider who owns the infrastructure [1].The exponential growth in the volume of data and information lead to problems in management, controlling effective and high costs of storage operation, where organizations are having problems: data retrieval and preparation and backups, and other acts of data. Therefore seeking companies and business organizations at the present time to achieve the highest return on their investments in technology through the planning and implementation of virtualization technologies and cloud computing, in order to protect data and manage more effectively and efficiently [2].

II. DEPLOYMENT MODEL OF CLOUD

In the cloud deployment model, networking, platform, storage, and software infrastructure are provided as services that scale up or down depending on the demand as depicted. The Cloud Computing model has four main deployment models which are:

A. Private Cloud:

Private cloud is a new term that some vendors have recently used to describe offerings that emulate cloud computing on private networks. It is set up within an organization's internal enterprise datacenter. In the private cloud, scalable resources and virtual applications provided by the cloud vendor are pooled together and available for cloud users to share and use. It differs from the public cloud in that all the cloud resources and applications are managed by the

organization itself, similar to Intranet functionality. In addition, private cloud offers hosted services to a limited number of people behind a firewall, so it minimizes the security concerns some organizations have around cloud. Private cloud also gives companies direct control over their data. In addition, private cloud offers hosted services to a limited number of people behind a firewall, so it minimizes the security concerns some organizations have around cloud. Private cloud also gives companies direct control over their data [3]

B. Public Cloud:

A public cloud is one based on the standard cloud computing model, in which a service provider makes resources, such as applications and storage, available to the general public over the Internet. Public cloud services may be free or offered on a pay-per-usage model.

Public clouds are less secure than the other cloud models because it places an additional burden of ensuring all applications and data accessed on the public cloud are not subjected to malicious attacks. Examples of a public cloud include Microsoft Azure, Google App Engine. The public model offers the following features and benefits:

- Ultimate scalability: cloud resources are available on demand from the public clouds' vast pools of resource so that the applications that run on them can respond seamlessly to fluctuations in activity
- Cost effective: public clouds bring together greater levels of resource and so can benefit from the largest economies of scale.
- Reliability: the sheer number of servers and networks involved in creating a public cloud and the redundancy configurations mean that should one physical component fail, the cloud service would still run unaffected on the remaining components.
- Flexibility: there are a myriad of IaaS, PaaS and SaaS services available on the marke which follow the public cloud model and that are ready to be accessed as a service from any internet enabled device.

C. Hybrid Cloud:

Hybrid cloud is a cloud computing environment which uses a mix of on-premises, private cloud and public cloud services with orchestration between the two platforms [5].

A cloud that is setup using a mixture of the above three deployment models each cloud in a hybrid cloud could be independently managed but applications and data would be allowed to move across the hybrid cloud. Hybrid clouds allow cloud bursting to take place, which is where a private cloud can burst-out to a public cloud when it requires more resources.

D. Community Cloud:

A community cloud in computing is a collaborative effort in which infrastructure is shared between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.) whether managed internally or by a third-party and hosted internally or externally .

This is controlled and used by a group of organizations that have shared interest. The costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realized.

A cloud environment operating according to this model may exist locally or remotely. An example of a Community Cloud includes Facebook [6]

III. ARCHITECTURAL COMPONENTS OF CLOUD

According to the different types of services offered, cloud computing can be considered to consist of three layers: software as a service (SAAS), platform as a Service (PAAS), and infrastructure as a Service (IAAS). Infrastructure as a Service (IaaS) is the lowest layer that provides basic infrastructure support service. Platform as a Service (PaaS) layer is the middle layer, which offers platform oriented services, besides providing the environment for hosting user's applications. Software as a Service (SaaS) is the topmost layer which features a complete application offered as service on demand.Cloud service models are commonly divided into SaaS, PaaS, and IaaS that exhibited by a given cloud infrastructure.

A. Software as a Service (SaaS)

Cloud consumers release their applications in a hosting environment, which can be accessed through networks from various clients (e.g. Web browser, PDA, etc.) by application users. Cloud consumers do not have control over the cloud infrastructure that often employs multi-tenancy system architecture, namely, different cloud consumers' applications are organized in a single logical environment in the SaaS cloud to achieve economies of scale and optimization in terms of speed, security, availability, disaster recovery and maintenance. Examples of SaaS include SalesForce.com, Google Mail, Google Docs, and so forth[7].

B. Platform as a Service (PaaS) :

This is where applications are developed using a set of programming languages and tools that are supported by the PaaS provider. PaaS provides users with a high level of abstraction that allows them to focus on developing their applications and not worry about the underlying infrastructure. Just like the SaaS model, users do not have control or access to the underlying infrastructure being used to host their applications at the PaaS level. Google App Engine5 and Microsoft Azure6 are popular PaaS examples[8].

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C. Infrastructure as a Service (IaaS)

Cloud consumers directly use IT infrastructures (processing, storage, networks and other fundamental computing resources) provided in the IaaS cloud. Virtualization is extensively used in IaaS cloud in order to integrate/decompose physical resources in an ad-hoc manner to meet growing or shrinking resource demand from cloud consumers. The basic strategy of virtualization is to set up independent virtual machines (VM) that are isolated from both the underlying hardware and other VMs. Notice that this strategy is different from the multi-tenancy model, which aims to transform the application software architecture so that multiple instances (from multiple cloud consumers) can run on a single application (i.e. the same logic machine). An example of IaaS is Amazon's EC2.

IV. ARCHITECTURAL COMPONENTS OF CLOUD

There are some key security challenges which are:

Authentication: Throughout the internet data stored by cloud user is available to all unauthorized people. Henceforth the certified user and assistance cloud must have interchangeability administration entity.

Access Control: To check and promote only legalized users, cloud must have right access control policies. Such services must be adjustable, well planned, and their allocation is overseeing conveniently. The approach governor provision must be integrated on the basis of Service Level Agreement (SLA).

Policy Integration: There are many cloud providers such as Amazon, Google which are accessed by end users. Minimum number of conflicts between their

policies because they user their own policies and approaches.

Service Management: In this different cloud providers such as Amazon, Google, comprise together to build a new composed services to meet their customers need. At this stage there should be procure divider to get the easiest localized services.

Trust Management: The trust management approach must be developed as cloud environment is service provider and it should include trust negotiation factor between both parties such as user and provider. For example, to release their services provider must have little bit trust on user and users have same trust on provider[10].

V. SECURITY IN CLOUD

Based on the investigation security and privacy concerns provided by companies nowadays are not adequate, and consequently result in a big obstacle for users to adapt into the cloud computing systems. Hence, more concerns on security issues, such as availability, confidentiality, data integrity, control, audit and so on, should be taken into account.

Top seven security issues in cloud computing environment as discovered by "Cloud Security Alliance" CSA are:

- ✓ Misuse and reprehensible Use of Cloud Computing.
- ✓ Insecure API.
- ✓ Wicked Insiders.
- ✓ Shared Technology issues/multi-tenancy nature.
- ✓ Data Crash.
- ✓ Account, Service & Traffic Hijacking.
- ✓ Unidentified Risk report.

Misuse and reprehensible Use of Cloud Computing :Hackers, spammers and other criminals take advantage of the suitable registration, simple procedures and comparatively unspecified access to cloud services to launch various attacks like key cracking or password.

Insecure Application Programming Interfaces (API): Customers handle and interact with cloud services through interfaces or API's. Providers must ensure that security is integrated into their service models, while users must be aware of security risks.

Wicked Insiders: Malicious insiders create a larger threat in cloud computing environment, since consumers do not have a clear sight of provider policies and procedures. Malicious insiders can gain unauthorized access into organization and their assets.

Shared Technology issues/multi-tenancy nature: This is based on shared infrastructure, which is not designed to accommodate a multi-tenant architecture.

Data Crash: Comprised data may include; deleted or altered data without making a backup; unlinking a record from a larger environment; loss of an encoding key; and illegal access of sensitive data.

Account, Service & Traffic hijacking: Account or service hijacking is usually carried out with stolen credentials. Such attacks include phishing, fraud and exploitation of software vulnerabilities. Attackers can access critical areas of cloud computing services like confidentiality, integrity and availability of services [11].

VI. CONCLUSION

This paper discussed the deployment model and architectural component of cloud computing. It also addressed challenges and issues of cloud computing in detail. In spite of the several limitations and the need for better methodologies processes, cloud computing is becoming a hugely attractive paradigm, especially for large enterprises. Cloud Computing initiatives

could affect the enterprises within two to three years as it has the potential to significantly change IT.

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A Review on Security and Privacy in Application of IOT in Smart City

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ABSTRACT

From Stone Age to Bronze Age to 21[1st] century, mankind has made a remarkable development. Whether it is a field of science & technology or literature they have achieved excellence. Today we are living in a "computer dependent" world and are on our way to enter a new era of technology known as "Internet of Things" commonly known as IoT. IoT is a system of interconnected devices over network embedded with electronic device and, sensors which enables the exchange of data between the devices. Use of wireless sensors has led to the gather of large amount of data in Smart City infrastructure and IoT may come handy in managing these data easily. Till now we have mostly seen human to human type of communication or human-machine type of communication but IoT provides machine to machine type of communication.

Keywords: Internet of Things, Smart City, Security & Privacy.

I. INTRODUCTION

The Internet of Things (IoT) is a coming-of-age technology which will bind together everyday's physical objects embedded with microcontroller, transmitter, receiver, sensor, and protocols which will enable them to share data and communicate with each other over internet. Thus it will provide us an easy access and interaction with devices such as home appliances, surveillance cameras, sensors, vehicles etc which stores enormous amount of data. In this way enormous amount of data will be on our fingertips.

There has been an increasing trend of people moving toward urban areas in recent years because of employment opportunities, lifestyle and more. Thus challenging the existing system to manage the services for the increasing population and in this way forming what is so called "Smart City". There is no formal or widely accepted definition of smart city.

Wikipedia defines smart city as-
"A smart city is an urban development vision to integrate multiple information and communication technology (ICT) and Internet of things (IoT) solutions in a secure fashion to manage a city's assets – the city's assets include, but are not limited to, local departments' information systems, schools, libraries, transportation systems, hospitals, power plants, water supply networks, waste management, law enforcement, and other community services.".[4]

Smart city is, basically a concept in which cities makes the use of technologies connected over intelligent network to address challenges. These challenges may be related to parking, street light, transportation,

traffic, safety, waste management, service quality, security, water management, education system, healthcare system and more.

Thus the smart city concept aims to make the efficient use of public resources, improving and increasing the quality of services provided to the citizen and on the same time reducing the operational cost of these services.

Since Internet of Things connects devices, infrastructure, vehicles, appliances and more. Thus make it possible to make cities so called "smart" and more efficient by improving infrastructure, generating more cost effective municipal services, enhancing public transport by providing ways to reduce traffic and keeping citizens more engaged and productive.

The combination of technology with that of the physical world and communication between them can simplify the lives of citizens. Since according to a report from Cisco System, 60% of the world population will reside in cities by the year 2050, so transforming city into smart city should be our first preference. [5]

According to Forbes top 10 smart cities in the world are – New York, London, Paris, San Francisco, Boston, Amsterdam, Chicago, Seoul, Geneva and Sydney.
Some of the companies which provide smart cities solution worldwide are IBM, Cisco, Intel, and Silver Spring Network etc.

There are various terms related to the Internet of Things:[6]

Internet Protocol Version 6(IPv6) -
As IPv6's huge increase in address space, it is an important factor in the development of the Internet if Things. According to Steve Leibson(occasional docent at the Computer History Museum), the expansion of address space means that "after assigning an IPV6 address to every atom on earth, still we will have enough addresses left to do same for another 100+ earths." In simple words, we can easily assign IP address for every "thing" on the planet. An increase in the number of smart nodes, as well as the amount of upstream data the nodes generate, is expected to raise new concerns about data privacy and data security.

6LoWPAN -
6LoWPAN is a acronym that combines of the Internet Protocol (IPv6) and Low-power Wireless Personal Area Networks (Low PAN). This concept allows for the smallest devices with limited processing ability to transmit information with a battery life that lasts for years.

General Packet Radio Service (GPRS) -
A wireless communications process 2G, 3G and 4G cellular networks which supports a number of bandwidths and provides data rates of 56-114 kbps. As cellular companies need more advanced and effective network, GPRS network may be more cost-effective for IoT networks on basis of privacy and security purpose

Machine to Machine (M2M)-
It is a vast term that describes technology that permit one connected device to communicate for exchanging information with another connected device, without any human efforts.

II. APPLICATION

A.Traffic light Control

Traffic light control systems are used to monitor and control the flow of automobiles running on roads. They aim to make smooth motion of vehicles in the transportation routes. However, multiple traffic light systems' synchronization at adjacent intersections creates a complicated problem. However a system based on PIC microcontroller that evaluates the traffic density using IR sensors and accomplishes dynamic timing slots with different levels can be helpful. Moreover, a portable controller device is designed to solve the problem of emergency vehicles stuck in the overcrowded roads.

B. Smart Education

Albert Einstein said," Education is not the learning of facts, but the training of mind to think". So by making the education system smart, we can actually make the thinking process smart.

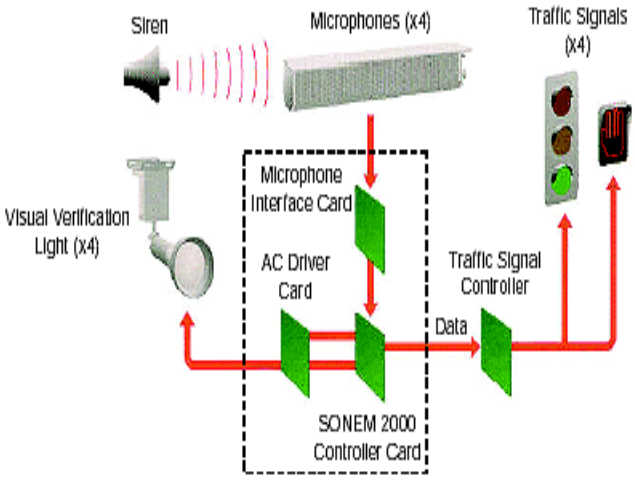

Figure 1. Traffic Light Control

Progress and enhancement of life and modern society demands the changes in today's educational infrastructure, which are traditionally very slow because of the existing education system.

Technology benefitted us in every way possible right form communication to education. Improving the quality and the enhancement of teaching and learning through the use and implementation of new trends of technology and IT enabled education is the primary target of higher education system.

Smart education, a concept that describes learning in digital age, has gained increased attention.

C. Intelligence Building

Building and home automation systems have usually been implemented only in high-level offices and buildings. The modern home entertainment systems could easily be combined with other sensors and actors within a building, thus forming a fully interconnected and smart environment. . Web- based smart energy metering and localization and mapping of energy consumption will be one of the IoT applications.

Figure 2. Intelligence Building

D. Waste Management

Municipal solid waste management (MSWM) is one of the major environmental problems in Indian. Improper management of municipal solid waste (MSW) causes hazards to inhabitants. Many studies have found that about 90% of MSW is not treated scientifically and then is dumped in open dumps and landfills, creating hazardous effects to public health and the environment. Various adopted treatment technologies for MSW are critically reviewed, along with their advantages and limitations. Recycling is a resource recovery practice that refers to the collection and reuse of waste materials such as empty beverage containers. Recycling is the process of making new objects from the material the item, which is being recycled, is made of. Kerbside collection process can be adopted to collect the material for recycling from general waste using dustbins and collection vehicles.

III. WORKING OF IoT [3]

The concept of Internet of Things lends to fabulous ideas. This concept provides internet based communication between physical objects, sensor and controllers. The connecting gadgets of the IoT such as computing hardware, including processors (with embedded programming telling what to do), sensors to gather various information (such as temperature, chemical levels, moisture, light, motion, heart rate and body movement) and communication hardware that can exchange signals.

Working of IoT mainly revolves around these components – sensors and devices, connectivity, data processing and user interface.

A. Sensors and devices

Devices with the help of sensors and other tech collect data from their environment. A device can be consists of one or more sensors to gather information. For example Phone is a device which is consists of many sensors like camera, GPS etc.

B. Connectivity

The data collected is then sent to cloud. A cloud is a data storage model in which data is maintained, managed and made available to the user. The sensors and devices can be connected to the cloud with the help of wifi, Bluetooth, satellite, internet.

C. Data processing

Now software performs some kind of operation on the data as per the requirement of the user, once data is uploaded on the cloud. It then resends the processed data to the devices or sensors at the user's end.

D. User interface

Here the processed data is made useful in some way to the user and may be communicated to the user through email, text, notification, alert etc. User can also proactively check the system for the result. User can also perform some action and affect the system. For example opening and closing the door, checking the temperature etc through an app or web browser.

User can also provide some predefined rule to automatically perform these actions.

IV. PRIVACY AND SECURITY [2]

a. Data Confidentiality

Confidentiality is somewhat equivalent to privacy. Confidentiality is done in order to prevent important and sensitive information from reaching the wrong

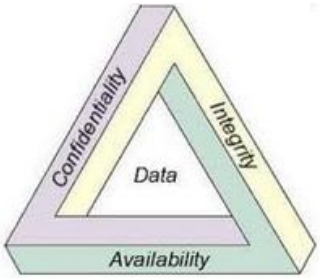

Figure 3. The CIA triad

people. On the same time making it sure that the right person gets the information thus restricting the access to the authorized person only. It is a process of providing confidence among the users about the privacy of their data. There are many methods to provide data confidentiality. Data encryption converts data into cipher text which makes it difficult to access for unauthorized persons. Two-step verification authenticates by testing two dependent component and allows the access only if both the components pass the authentication test. Biometric verification uniquely identifies each person.

b. Data Integrity

Data during its transition period may be changed by some unauthorized person, and the process is commonly referred as cybercrime, or it may get affected by some other factors such as crash of server or electromagnetic disturbance. Thus data integrity refers to the process of maintaining the accuracy of data and protecting it from being modified by some unauthorized person. Common method to provide data integrity is cryptography where hashing of received data is compared with the hashing of original data. Other methods includes user access control and file permission.

c. Data Availability

One of the main goal of IoT security is to make data available to the authorized persons whenever and wherever they need it. Any information has values if it can be accessed by authorized person at right time. To ensure availability there should be countermeasures for DoS attack which denies data availability to the users. Backup is the key to data availability.

A. Security And Privacy Concer And Their Measures [2]

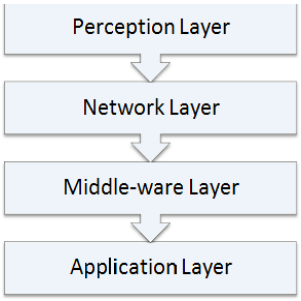

Figure 4. Generic architecture of IoT

Perception Layer

It consists of different types of sensors and other communication tools in order to communicate data between machines by uniquely identifying each object. Due to the lack of proper authentication mechanism in sensors data can be accessed by some unauthorized person and can be modified. Data cloning can also be easily done by any cybercriminal. System becomes vulnerable to spoofing in which attacker gain full control over system through broadcasting false information and making it appear as if it is coming from original source.

Security for this layer may include measures such as- authentication which means providing access only to the authorized person. Data privacy can be achieved through encryption, two step verification or biometric verification. Discovering new threats in advance can help in preventing security breaches. This process is called risk assessment.

Network Layer

This layer transmits the gathered information obtained from the previous layer to an information processing system over a connected network.

Challenges network layer faces are

Sybil attack: the attacker manipulates a node in a network such that that node acquires multiple identities.

Sinkhole attack: compromised node in a network attracts network traffic through its fake routing update. It can be used to launch DoS attack.

Sleep deprivation attack: maximizes the power consumption which eventually cause the node to shut down.

DoS: Network is flooded with useless of information and noises due to which network become unavailable to users.

Malicious code injection: attackers inject malicious code into the node which may cause complete shutdown of the network. Attacker may also get full control over network.

Measures that can be taken are-

Authentication: with a proper authentication process and proper encryption, unauthorized access to the sensor nodes can be prevented which in turn can prevent misuse of data.

Routing Security: routing algorithms can be implemented to ensure the privacy of data that is being exchanged between different devices connected over network.

Data privacy: encryption process, two step verification authentication, or biometric verification can be used to ensure data privacy.

C. Middle-ware Layer

This layer performs automated actions based on the results of the data processed and links the system with the database.

Challenges this layer faces are-

Unauthorized access: Middle-ware Layer provides different interfaces for the applications and data storage facilities. The attacker can easily damage the system by preventing the access to the related services of IoT or by deleting the existing data.

DoS Attack: This is similar to what we have discussed in the previous section.

Malicious Insider: This kind of attack occurs when someone from the inside tampers the data for personal benefits or the benefits of any 3rd party. The data can be easily extracted and then altered on purpose from the inside.

Measures that can be taken are-

Authentication: with a proper authentication process and proper encryption, unauthorized access to the sensor nodes can be prevented which in turn can prevent misuse of data.

Risk assessment: Discovering new threats in advance can help in preventing security breaches. This process is called risk assessment.

Data privacy: encryption process, two step verification authentication, or biometric verification can be used to ensure data privacy.

Intrusion Detection: it provides security solutions by generating alarm on generation of any suspicious

activity by continuously monitoring and keeping logs of intruder's activity which could help to trace the intruder.

D. Application Layer

This layer provides various application of IoT based on the needs of users. Some of the application includes smart city, smart home, smart hospitals, smart education etc.

Challenges this layer faces are-

Spear phishing attack: It is a type of email spoofing attack towards a specific individual, organization or business. The victim is attracted to open email through which the attacker may get control over the system and can also install malware on the targeted system.

DoS Attack: This is similar to what we have discussed in the previous section.

Malicious code injection: Some kind of malicious code is injected into the system in order to steal some kind of data from the user.

Sniffing attack: The attacker can introduce a sniffer application which can corrupt the entire system.

Measures that can be taken are-

Authentication: with a proper authentication process and proper encryption, unauthorized access to the sensor nodes can be prevented which in turn can prevent misuse of data.

Risk assessment: Discovering new threats in advance can help in preventing security breaches. This process is called risk assessment.

Data privacy: encryption process, two step verification authentication, or biometric verification can be used to ensure data privacy.

Intrusion Detection: it provides security solutions by generating alarm on generation of any suspicious activity by continuously monitoring and keeping logs of intruder's activity which could help to trace the intruder.

V. CONCLUSION

This review paer is significant in outlining general information about urban IoT, such as definition and status of IoT, which has become IT topic nowadays, and research institutes participating in related projects build a smart city as part of the future vision of local governments by reflecting the new information paradigm of IoT. A proof-of-concept implementation, deployed in the city of Padova, Italy, is a relevant example of application of the IoT paradigm to smart cities.

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IoT based security in Digital Door Lock

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ABSTRACT

Digital door locks have been widely used as part of the Internet of Things. However, there are reports that digital door locks being opened by invalid users to invade homes and offices. In this study, a digital door lock system that can work with the Internet of Things environment is proposed. It is designed and implemented to enhance security and convenience. In the overall system, there will be two different significant techniques to provide home security. One is to use video technology to see the front door in real time even if the home is empty and another is to provide communication between the door system and smart phone device. Connecting the smart door system with the smart phone through the cellular network, the house owner will have several opportunities such as controlling the house, getting instant video streaming, receiving and sending message, talking to the visitor and starting the alarm system. The experimental results indicate that the proposed system may provide a consistent support and assistance for safe and secure life.

Keywords: Digital Door, Internet of Things, Cellular network, security, smart phone.

I. INTRODUCTION

Over the world, Internet of Things and Machine Interpersonal Communication technologies which were developed for smart home system are becoming well known. The system is developed by using Supported Mobile Communication and Safety Powered Multifunctional Smart Door System. Home automation is one such application where Internet of Things oriented solutions is being implemented to make the secure and convenient living experience. Door lock system is an essential feature in this series of Home appliances which can be remotely controlled. In this work, intelligent door systems with confidential information contained in the digital code and the person's fingerprint is working, depending on the definition of identity.

[4]Recommended door lock system for detecting user ID RFID reader, LCD touch sensor module to determine the condition inside of house is used and finally includes communication module. In many cases, an intruder has tried to penetrate a private area by circumventing the lock. In this study, we will be designing and implement an IoT-based digital door lock to enhance the various security and monitoring functions using IoT technologies. The system is a three tier system based on IoT architecture using micro controller device, cloud and Android application. It aims to enhance several security and monitoring features based on IoT technologies [3].

II. IOT

The Internet of things is the internetworking of physical devices, vehicles, buildings, and other embedded with electronics, software, sensors, act-uators, 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 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 in addition to reduced human.

III. APPLICATIONS OF IOT

Internet of Things has a number of applications some of them are as follow:

Smart Home: Smart Home is one of the most popular IoT application at this moment because it is the one that is most affordable, efficient and easily available. From the Amazon Echo to the apple home automation, there are hundreds of products on the market.

Wearable: Watches are no longer just for telling time. The Apple Watch and other smart watches on the market have turned our wrists into Smartphone holsters by enabling text messaging, phone calls, and more.

IV. DESIGN OF SYSTEM

The main features of the proposed system are as follows. First, it has impact detection and alarm functions. This will help to detect an intruder who tries to open/break the door by applying physical force to the lock. Second, it has an image transfer function. Generally, an attacker who does not know the password will make a variety of attempts[3].

Therefore, when he enters the password the system clicks an image and sends it to the application on the user's phone. Fourth, the system can open the door lock automatically after recognizing a visitor's image. If a visitor does not know the code then he can enter a random code, the door lock system transmits his image to the admin. The user can remotely control the door lock through mobile app after reviewing the image. Fifth, the controller can detect a valid user if he is carrying the mobile device, and will open or close the door lock automatically.

V. OVERALL STRUCTURE OF THE SYSTEM

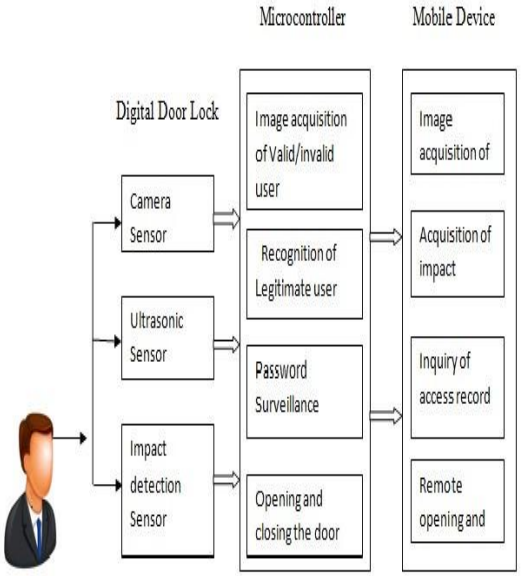

Figure 1. Structure of system

The controller detects physical impacts applied by a visitor, and notifies the user's mobile device. The controller detects that someone is entering the password it uses the camera to capture an image of the visitor. It transfers the image to the user's mobile device[2]. All of the access records are stored in the controller's database, which can be queried by the admin. If a person has lost his key, his image is captured and transferred to the admin by pressing a specific key, the user can then control the door lock remotely after verifying whether the visitor is valid or not. Another important function of the controller is automatically opening or closing the door when the mobile device user is near. When a valid user accesses the gate holding an object, as it is difficult to operate the door lock, the controller communicates with the user's mobile device via Bluetooth and opens the door automatically. The impact information and the invalid visitor image information is sent to the mobile user from the controller, and then the user can take

appropriate action. Further, if the user acquires image information for a valid visitor, it is possible to open or close the door lock remotely. It is also possible to query the incoming and outgoing records.

Pseudo Code

1. Foreach user
2. Input action
3. Switch action
4. Case “password”:
5. If (password is request number then take and send image)
6. Else if password is valid then open the door lock
7. Else if numer of mismatch >= 3 then take and send image
8. Else go to step 2
9. Case “impact”
10. Impact sensor operation
11. If impact value>= threshold value then camera sensor operation
12. Else go to step 2
13. Case “proximity”
14. If distance>=threshold value the mobile device synchronization
15. If valid user then send password, door oprn
16. Else go to step 2
17. Else go to step 2
18. End

VI. IMPLEMENTATION

A microcontroller is required to control the door lock and a Bluetooth module is used for communicating with the mobile device. An ultrasonic sensor is required to recognize a nearby user an impact vibration sensor is also required[2]. OpenWrt is used as the operating system of the system, the program to operate the controller can be written in C, PHP and MySQL are used for the database management, respectively, and UHTTP is used for the web server. Besides, various sensors for proximity and intrusion detection are connected to the system. A camera for capturing an image of users is installed, an impact sensor is attached for detecting an impact by an invalid user, and an ultrasonic sensor is attached to recognize the proximity of valid users[3].

VII. REMOTE CONTROL APPLICATION

The user can query all records of comings and goings from the Log menu. The Capture Log menu is for checking captured information, such as an invader’s image taken by the controller when an error occurs[2]. When an access request is generated by a valid visitor who does not possess the key, the Request menu allows the user to check the image of the requester and open the door. The Remote opening menu allows for remote door operation. The Option menu allows for password management and Bluetooth synchronization menu is a setting menu for automatic opening when approaching the door lock. The left side of the top of the figure is the main menu of the App, the right of the top shows the Bluetooth setup button for proximity open and a keypad for the remote open. The left of the bottom of the figure shows a list of the image information that has been captured by physical shock and the input mistake of password. And the right of the bottom shows an image of the item in the list.

VIII. CONCLUSION

In this paper, a digital door lock with enhanced security functions was designed to work with the Internet of Things. The designed digital door lock
Can sense the impact more than threshold by an invalid visitor and notifies the admin’s mobile device. If an incorrect password is repeated more than a certain number of times, the lock captures an image of the invalid user and transfers it to the mobile device, thus, strengthening the security function.

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A Comprehensive Study of Smart Farm

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ABSTRACT

Agriculture is the important factor development in rise of human civilization, and farming of domestic species which helped in creating food surpluses that nurtured the development of civilization. To produce output with high quality requires a good farm. In today's world, traditional farm alone cannot produce such results. It needs to get upgrade with technology thus enabling farmers to produce previously unseen results. With the advancement in the field of technology, the world around us is shifting towards automation. Automatic systems are being prioritized over manual systems, as they are energy efficient and minimize the need for tedious manual labour.

Keywords: Automation, Wireless Sensor Network, Zigbee, BeagleBone, Router, Access Point

I. INTRODUCTION

This paper aims to raise alternative ways to support farming. Modern farming techniques seek to diminish human involvement, escalate yield, and improve animal health. There are many actors which play a vital role in raising of animals in farm such as economics, quality and consumer safety. The paper attempts to extend automation to the farm level, by using complex and sophisticated home automation techniques, and adjusting them to suit a modern day farm.

Automation makes use of machines, control systems and information technologies to optimize productivity in the production of goods and delivery of services. The Indian farms are slowly beginning to feel the need of the technical advancement to be made in traditional farming methods. Automation in India is advancing at a fast pace, yet agriculture is one area that has seen less technological advancement as compare to the other countries despite having majority of population dependent in this sector. Use of sensor and other devices has made it possible to have technological advancement in almost all the areas. Sensor networks are compact wireless networks of small and low cost sensors, which gather and distributed environmental data. Wireless sensor networks helps in monitoring and controlling of corresponding physical environments from remote area with better efficiency and accuracy. It has applications in a range of fields such as environmental monitoring, climate control, surveillance and many more. Sensor nodes have various energy and computational restrictions because of their reasonable nature and ad-hoc method of implementation. In this paper we have proposed the Wireless sensor network to design the smart environment to monitor and control various climatic parameters contributing to smart farm. Data about livestock and farm can be remotely obtained by

farmer. Various operations such as automatic light control, automatic irrigation control can also be done with the help of system.

II. FEATURES

Features of Smart Farm are as follows

- Automatic lighting Control
- Climate Control System
- Humidity and Moisture Control
- Environment Monitoring System
- Tracking livestock
- Irrigation Control System

A. Automatic light switching system

Counters are used in both the directions to count the number of people entering a room in the farm house. The lights are turned off automatically on reading count zero. The system can also be modified to be timer dependent. In this case, lights will only be switched on when animals are awake and in their enclosures. In the farmhouse, lights will switch off at a preset time. An up-down counter that can change its state in either direction is used to count the number of people entering and exiting the farmhouse rooms. The up mode is counting the number of people entering while the down mode is used to count the number of people leaving the room by decrementing the value of counter. The IR sensor detects motion. When a person exits or enters it detects the interruption and runs the counter in either up or down mode based on selector setting. The count is displayed on a display(LCD). In this circuit, as showed in figure, a pair of infrared (IR) sensor modules is used, for both up and down counting. The pair of IR sensors are horizontally placed at a distance such that, whenever an interruption is observed by the first IR sensor, it increments the counter value. When the count value is more than zero, the lights are switched on. When the value becomes zero, the lights are automatically switched off, thus conserving energy.

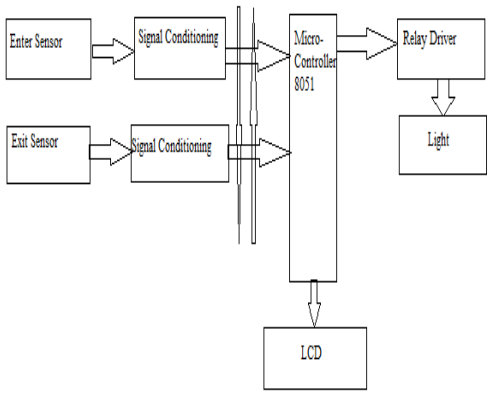

Figure 1. Automatic Light Control

B. Climate control system

An exhaust fan or a heater will get switched on automatically depending on real time readings from a temperature sensor. An 8-bit ADC is sufficient to provide required accuracy for in-house temperature readings. Depending on conditions requirements of cooling down or heating up inside the farm house, the microcontroller decides to switch on the exhaust fan or the heater respectively. It ensures comfortable conditions for livestock without tedious manual monitoring, along with energy conservation. The system can also be used for storage of farm products like milk and eggs, which require ambient temperature conditions to prevent spoilage. In addition, it can also be used in hatcheries to store eggs at required temperature for artificial hatching to ensure quality control. The temperature output can be preset with a keyboard interface to the microcontroller based system. The system has also a

humidity sensor to decide whether increase or decrease humidity.[5]

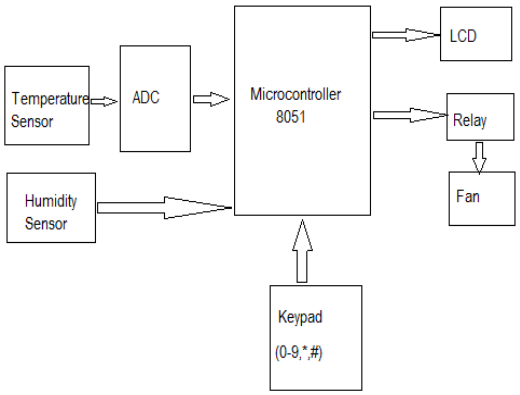

Figure 2. Climate Control System

C. Humidity and moisture control

A humidity sensor circuit is used to detect a change in humidity of the field surrounding and generate an interrupt signal to the microcontroller, which activates the sprinklers with the help of a digital solenoid valve. In the present scenario of water shortage, this system is an efficient and simple way of conserving water used in the farm. Humidity sensor is also used in many places such as hatcheries to maintain ambient temperature for artificial hatching. New born chicks require specific humidity and temperature conditions for their survival and healthier growth. The system has capability to measure different levels of temperature humidity and thus providing the necessary information to the farmers so that early precaution steps can be taken.[4]

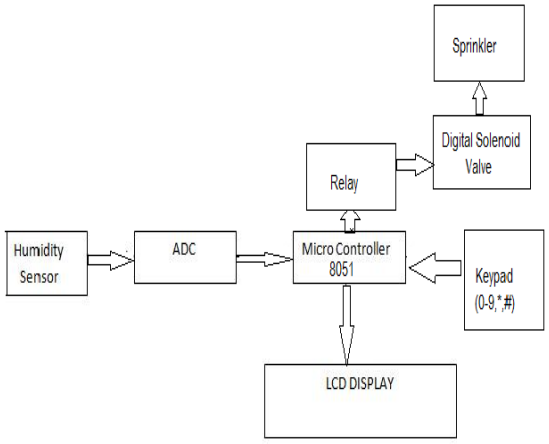

Figure 3. Humidity Control System

D. Environment Monitoring System

There are various problems in the traditional agriculture like weak real-time data acquisition, limitations in monitoring area, excessive manpower etc., The system collects various climatic parameters like temperature, humidity, illumination, voltage etc. from greenhouse and from there it transmits the data to nearest server via GPRS. The system includes a web application which is using Google Maps to show the greenhouse status and provide regular voice and SMS alarm service. Since, it requires lots of power so it is powered by solar and storage batteries. This results that low power system has better scalability and can provide better service.

E. Tracking livestock

The tracking collars are worn on the animal as a collar, and if or when the farmer wants to collect and review that recorded tracking data all they need to do is manually remove the collar and download the stored data, which will allow them to view in retrospect the movements of the livestock.

F. Irrigation Control System

The utilization of proper method for irrigation by drip is very proficient and reasonable. The approach reviews various monitoring system and also proposes an automatic monitoring system model which is using Wireless Sensor Network (WSN) which is useful for the farmers to improve the growth of crops. The system provides proper amount of irrigation to agricultural fields by observing the moisture content of soil. The system automates the process of manually irrigating the fields by switching the pump ON/OFF. It is implemented by using an 8051 series microcontroller, programmed such as to collect input signals that measures moisture content of soil through sensing arrangement.[3]

III. CONCLUSION

This project has proposed to introduce an efficient and advance smart farm system. It has make use of automation into various aspects of the farm. A new system for animal enclosures is put forward to improve the living conditions of livestock, as well as reduce manual labour. It includes an automated light, humidity and sprinkler system. The humidity and moisture control mechanisms make sure the animals are comfortable in the conditions they are kept in, by auto adjusting the settings as per requirement. The system is energy efficient as it helps conserve resources like energy, water and reduces manual labour to a great extent. A GSM module is used to connect all aspects of the modern automated farm. The farm owner has easy access to the system and can control it remotely through his mobile phone. This paper shows that with the use of advance technology to the farm, systems and appliances will be able to communicate in an integrated manner. This will result in convenience, energy efficiency, and quality and safety benefits.[2]

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Cyber Security for the Economy and Protecting Cyber Space Reliant Societies Again Cyber Threats

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ABSTRACT

Internet is essential for development for both social and economic sectors to form vital infrastructures. Due to the increased use of Internet Cyber Threats are evolving and increasing rapidly. Two interrelated objectives of Cyber Security aims for strengthening cyber Security for the economy and protecting cyber space reliant societies again cyber threats. But, to achieve these two objectives in parallel is complex, and probably the main challenge of Cyber Security policy. With this objective, this paper analyses the background, characteristics, current research work, counter measure techniques and future research perspectives of Cyber security. Initially, mobile cloud computing is highlighted and then features and recent survey issues has discussed. Finally future trends have been discussed [1].

Keywords:- Cyber Security, Cyber Crime, Cyber Space, Cloud Services, Ransom Ware

I.INTRODUCTION

In this interconnected world and increased in the use of Internet Cyber Security crimes up 19 times over 10 years.

Cyber Security is a claiming issues that not only affects individuals but Government organizations, big enterprises and armed forces too.

In this increasing interconnected world, every user does not possess knowledge about the technical solution to the problems related to security.

Right from the loss of customer data to the intellectual capital continues despite of the increasingly efforts of IT budgets and sophisticated security solutions.

II. WHAT IS CYBER SECURITY? STRIVING FOR DEFINITION

Cyber Security is the solution which deals with the germinating Cyber Criminals, it is the collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, best practices, assurance and technologies that can be used to protect the cyber environment and organization .The general objectives which Cyber Security comprises of:

- Confidentiality
- Availability
- Integrity

Creating an open, substantial, vital cyberspace which can be used by users safely and that supports open societies [3].

Table 1

	Today	2020
Estimated	7 billion	~8 billion

world population	people	people
Estimated Internet Population	2.5 billion people (35% of population is online)	~5 billion people (60% of population is online)
Total No. of devices	12.5 billion internet connected physical objects and devices (~6 devices per person)	50 billion internet connected physical objects and devices (~10 devices per person)
ICT Contribution to the Economy	~4% of GDP on average for G20 nations	10% of worldwide GDP

III. WHERE ARE WE ON CYBER SECURITY IN INDIA?

More than 50,300 cyber security incidents were faced by many Indian Organizations. There are many cyber security incidents including phishing, probing, website intrusions and defacements, virus/malicious code and denial of service attacks. "Around 10 million customer records were stolen from e-ticketing portal server of Indian Railway Catering and Tourism Corporation (IRCTC) website by Cyber Criminals". "Fraudsters spoofed the email account of Binny Bansal ,chief executive officer (CEO) of Flip kart, and sent two emails to the chief financial officer (CFO) demanding a transfer of $80,000". "A cyber Criminal known as Faisal breached the website of Canara Bank. The attacker defaced the site by inserting a malicious page and blocked some of its payment services". [10]

"RBI has registered a total of 9,500, 13,083, 16,468 and 8,689 cases of frauds involving credit cards, ATM/debit cards and internet banking during the year 2013-14, 2014-15, 2015-16 and 2016-17 (up to December 2016), respectively".[7]

There were 19 DoS attacks that exceeded 100Gbps during the first three month of year.

When referring to Cyber Security in India, we have to believe this that the security incident can happen to anyone at anytime; including us therefore we have to be prepared for our future. To detect malicious mechanism across an entire area, there are few organizations that have crossed maturity sufficient.

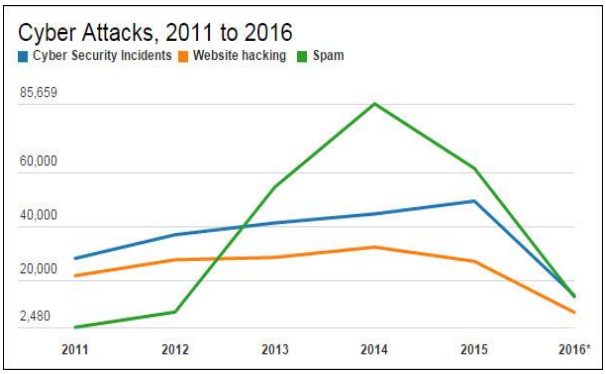

Figure 1. Year wise Cyber Attacks from 2011 to 2016[11]

IV. RECENT SURVEY ISSUES ON CYBER SECURITY TRENDS

“The development and adoption of new national cyber security strategies is an emerging trend characterised by its dynamism”.
Security will continue to escalate around not only securing networks but physical security too.

As per the recent Survey issues, there will be rapid increase in:

- Internal Threats.
- Spending on Business Security will increase.
- Industrial hacks will be increased.
- Increase in Cyber-Defence capacities.
- Ransom ware and extortion will increase [5].

V. PRACTICES AND CONCERN BY GOVERNMENT FOR CYBER SECURITY

"As per the information reported to and tracked by Indian Computer Emergency Response Team (CERT-In), a total number of 44,679, 49,455 and 50,362 cyber security incidents were observed during the year 2014, 2015 and 2016, respectively," Minister of State for Electronics and IT replied to Lok Sabha.

The efforts of Indian Government are also started for the recruitment of Cyber Security experts and partnership with top international Cyber Security Firms[2].

Standardization of Cloud Security:

Full capabilities and potential of cloud services are held by State government, their Cyber Security models will be rigorously transformed. Establishment of Focused Governance Structure: Full capabilities and potential of cloud services are held by State government, their Cyber Security models will be rigorously transformed. each agency should follow three steps namely develop, document, and implementation of its own information security plan should be carried out, which must be approved by the state CISO. Public comment should be made available for the information security plan.[8]

VI. CYBER SECURITY TECHNOLOGIES

Cybercriminal total annual revenue is higher than the drug trafficking.

The top innovative Cyber Security technologies of 2016 and till date are introduced as day by day hackers are getting smarter they are using many other techniques for the violation of data like Man-In-Middle Attack, Memory Scrapling Malware, Bespoke Attack, Spying Software and Google Glass.

Traditional and tool based approaches no longer cut all this threats. Some of the hot technologies are:

1) Context Aware-Behavioural Analytics: Organizations should be aware about the context and examine in which the data has been used i.e. unusual behaviour = nefarious doings.

2) Next Generation Breach Detection: It tells that what will happen if, once the attacker is inside the system instead of focusing on first line of defense. Machine learning and behavioural analytics are combine to detect breaches and trace them [4].

3) Virtual Dispersive Networking (VDN):

Traditional encrypting technologies are cracked by (MiM) attacks and ultimately target the intermediate code. In this message is split into multiple parts, each part is encrypted separately and routes them over servers.

4) Smart Grid Technology:

There are many smart devices which have left vulnerable infrastructure issues in the architecture. In order to avoid this new practical measure and ranges are been implemented.

5) SAML and Cloud:

Many applications are beyond the area of firewall and many other traditional techniques. In order to avoid

this SAML and Intrusion Detection Techniques are combined to control the traffic.

VII. POSSIBLE COUNTER MEASURE TECHNIQUES

Basic Cyber security measures to reduce the exploitable weaknesses and attacks:

Control System Devices should be accurately maintained and eliminate any exposure to external network: No machine or any other control network can communicate directly to other machine or on the Internet.

Implementation of Firewalls and Network Segmentation: With the rise of Internet Of Things many non-Internet connected device such as video camera have been linked to systems and web, so the importance of segmenting have been increased ever.

Security protocols are implemented and number of pathways is reduced then it is very difficult for a threat to enter in the system.

Implementation of System Logging and establishing Role Based Access Controls: By implementation of logging capability it allows for the monitoring of system activity. Establishment of Role-based access control grants limits the ability of users, attackers to the access prone areas.

Maintain Vulnerabilities and implementation of patches and updates:

System of monitoring for and applying system patches and updates should be implemented for the protection of one's organization from attacks and threats.

Developing and enforcing policies on Mobile Devices:

The spread of smart phones and smart devices in the workplace presents notable security challenges. In order to avoid threats and prevent devices from unauthorized access devices should be protected by the passwords .User should be cautious while using one's own device.

VIII. KEY CHALLENGES TO SOCIETY

Every Minute we are seeing about half a million attack attempts that are happening in Cyber Space.

Public and private institutions are the critical infrastructures of our Nation's in the sectors of Government, Defense, Energy, Transportation and finance. Full scale computerization has been opted by many banks for security purpose and due to this it has evolved the concept of e-commerce and e-banking [9].

IX. CONCLUSION AND FUTURE SCOPE

Inherent nature of information technology (IT), results in cyber security issues. Implementation of Cyber Security can be improved by calling two kinds of activities: What is known about improving Cyber Security, develop new knowledge about Cyber security. Focused attention and should be invested adequately for achieving the good degree of cyber security and to prevent one's data and information from the threats. Continuous evolving technology should be tracked globally, as it is a must requirement for Cyber Security. By growing interdependencies among infrastructures, global problems require global solutions, greater efficiency and faster results improves cost-effectiveness too.

It is crucial not only to our national sense of well-being, but also to our national security and economy. Considering the importance of Cyber Security challenges and counter measure techniques have been discussed in future, this will become the fifth utility because it plays major rule in smart city so the future work would focus to explore more control system devices to eliminate the exposure to external network. It will also focus to develop more policies for mobile devices to provide secure communication.

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Google Loons : Balloon Powered Internet Access via Stratosphere

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ABSTRACT

The service of Internet Service Providers (ISP) connect us to the global network via Internet services but is reachable to only one out of three in the world's population. The rest of the Population are not able to get internet access. It is not an easy task to lay the telecommunication lines all around the world to provide internet connection everywhere. As we area aware of that the developing nation cannot afford such a huge sum of money to lay fiber cables, this will not result to a productful solution. Google proposed the project Loon being developed for providing internet access to remote and rural areas. This project is a network of balloons floating in the stratosphere at an altitude of about 20-30 km to create an aerial wireless network with up to 3G-like speeds. In the Loon network, balloons travel around the earth bringing access points to the users. While energy on the balloons cannot be supplied by stable power source or by replacing batteries frequently, the balloons can harvest energy from natural energy sources, e.g. solar energy, or from radio frequency energy by equipping with appropriate circuits. This paper covers the working and designing of Loon balloons, the Loon's Technology, and its advantages in various fields.

Keywords: Stratosphere, user antenna, solar panel, Google Loon Project, wind data, etc.

I. INTRODUCTION

After more than 40 years of development Internet has created a revolution in communication for humans because it allows people to access and exchange information efficiently. Although Internet is highly accessible, approximately60-70%of people worldwide do not have the Internet reported by International Telecommunications Union in June2013.This stems from a fact that many areas such as Africa, Asia, and Pacific, cannot offer Internet connections due to geographical and infrastructure issues. Therefore, the idea of providing Internet connections via wireless networks has become more and more popular.

In wireless Internet, mobile users can connect to the Internet service provider (ISP) through base stations or access points. However, deployment of base stations for every location on the Earth seems to be impossible, e.g., oceans and mountains. Therefore, the idea of providing Internet from the sky was introduced. The early version is based on the satellites, which suffers from high cost and long transmission delay. As a result, the cheaper and faster alternative, i.e. Google Loon project, was proposed. In Loon project access points will be placed on balloons flying at an altitude of about 20km which is safe from bad weather and flights. The balloons will travel around the Earth and form a network of access points for Internet users in remote places. When receiving data from the user, the balloon will find the shortest route to transfer data to the nearest base station on the ground, which will be forwarded to an ISP.

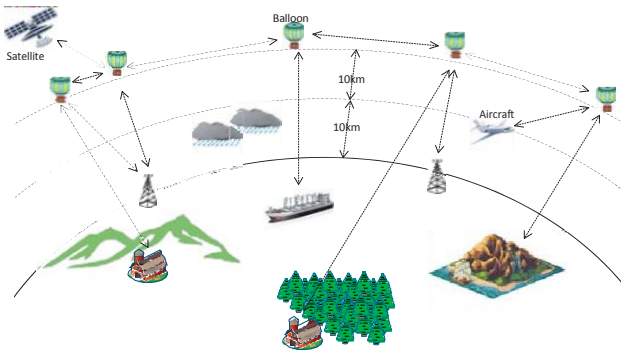

Figure 1. The model of wireless network in the sky

Since the balloons cannot acquire the energy from any stable supplied by stable power source or by replacing batteries frequently, the balloons can harvest energy from natural energy sources, e.g. solar energy, or from radio frequency energy by equipping with appropriate circuits. This seminar will cover the working and designing of Loon balloons, the Loon's Technology, and its advantages in various fields.

Google has taken an initiative and developed Project Loon which is a research and development project having the goal of providing Internet access to rural and remote areas. Google asserts that the stratosphere layer seems advantageous because of its relatively low wind speeds (likewise: wind speeds between 5 and 20 mph / 10 to 30 kmph) and minimum turbulence.

In this paper, we will cover working and designing of Loon balloons, the Loon's technology, its advantages and future scope of Google Loons.

II. THE TECHNOLOGY

In the stratosphere, there are many layers of wind, and each layer of wind varies in direction and speed. Loon balloons go where they're needed by rising or descending into a layer of wind blowing in the desired direction of travel.

Figure 2. Receiver antenna

By collaborating with Telecommunications companies to share cellular spectrum, Google has provided the facility which allow the people to connect to the balloon network directly from their cell phones and other LTE-enabled devices. The signal is then passes through the balloon network and back down to the global Internet on Earth.

Figure 3. Loons moving with wind

Project Loon balloons travel approximately 20 km above the Earth's surface in the stratosphere. Winds in the stratosphere are stratified, and each layer of wind varies in speed and direction. Project Loon uses certain software algorithms to decide where the balloons go and then moves each one into a layer of wind blowing in the required direction. By the process of moving along with the wind, the balloons can be arranged to form one large communications network.

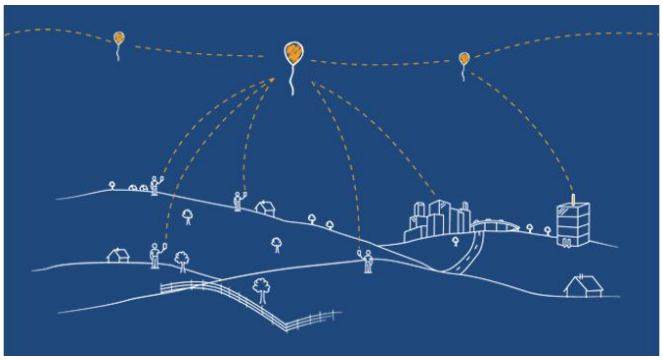

Figure 4. Communication network

III. Components Of Loon

ENVELOPE: The inflatable part of the balloon is called a balloon envelope. Loon's balloon envelopes are made from sheets of polyethylene plastic, and they measure fifteen meters wide by twelve meters tall when fully inflated. When a balloon is established well to be blown out of service, gas is released from the envelope to inflate the balloon down to Earth in a controlled manner. In case forbidden, the balloon drops too quickly. a parachute attached to the top of the envelope is deployed.

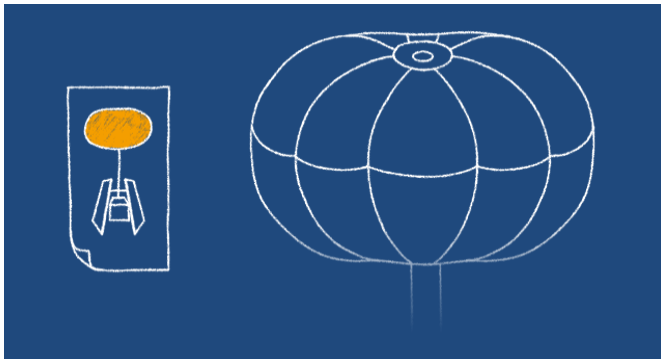

Figure 5. Envelope

SOLAR PANELS: Each balloon's electronics are powered by an array of solar panels. The solar array is mounted at a steep angle to effectively capture sunlight on short winter days at higher latitudes. The array is divided into two parts facing opposite directions to each other which allow us to capture energy in any orientation as the balloons spin slowly in the wind. The panels produce approximately 100 Watts of power in full sunrise, which is sufficient enough to keep Loon's electronics running along with this it also help in charging of the battery for effective use in the night hours. By moving along with the direction of the wind and getting charged in the sun, Project Loon is able to power itself using entirely renewable energy sources.

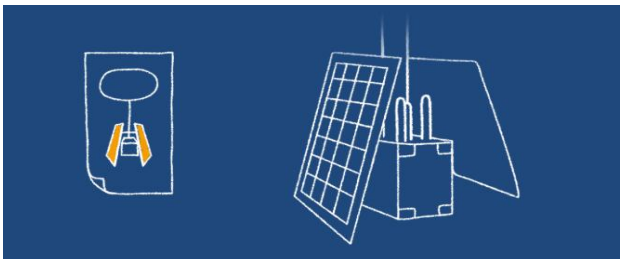

Figure 6. Solar Panels

ELECTRONICS: A small box containing the balloon's electronics hangs underneath the inflated envelope, like the basket carried by a hot air balloon. This box holds circuit boards that control the system, radio antennas to establish communication with other balloons and with Internet antennas on the ground, and lithium ion batteries to store solar power so the balloons can operate throughout the night.

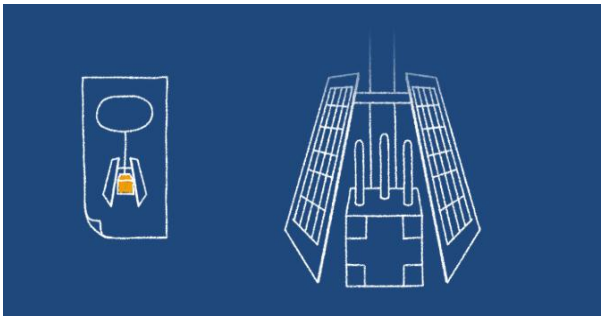

Figure 7. Electronics

IV. ADVANTAGES

Availability of Information: Assuming all the mechanisms of the project are functioning as planned, every single person who has access to some device that has Wi-Fi access would be able to search for almost any form of media online. Farmers in remote corners of third world countries would be able to research and analyze multiple techniques that could increase their yield, a father would be able to stay in touch with his daughter no matter which township either one of them lived in, villagers across an country would be able to transparently examine the country's political scenario and vote appropriately.

Education: With millions of uneducated children all across the world, this program might be able to successfully provide schooling through online classes on topics ranging anywhere from disaster management to literary analysis.

Health and Medicine: With globally available data on disease outbreaks and medical breakthrough, the entire population will be able to adjust to epidemics or adopt new drugs or medications.

Use of Renewable Energy: This will greatly influence and inspire future projects as well. Creating interplay between solar energy to keep proper functioning of the balloon while using wind energy to define its motor controls will help reduce the burden on coal, petroleum and other non-renewable energy sources.

Collaboration: Collaboration between people across the globe will become much easier with the constant connectivity to the each other through the internet, allowing newer more complicated projects to arise.

V. SUMMARY

After the detailed study on the topic, we can conclude that Google Loon's can be used for providing Internet access to remote and rural areas all over the world with up to 3G-like speeds. Given the relatively low winds and minimal turbulence, Google Loons can greatly increase the Internet usage in developing countries.

The planned deployment of Project Loon in Sri Lanka this year is a major step, following a successful trial in New Zealand launched in 2013. It's said that just three of the country's 20 million citizens have any sort of internet access, so even at 3G speeds Google's balloons will make a big difference. If Sri Lanka is a success, then Google's mission to deliver 'internet to everyone' has really just begun.

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Searching A Node In Linked List Using Divide And Conquer Approach

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ABSTRACT

The general idea of this paper is to implement binary search algorithm based on divide and conquer approach on the linked list. To implement the binary search algorithm the nodes of the linked list must be sorted in any order. In case of arrays it is very easy to find out the middle element because of the static and contiguous arrangement of its elements but because of the dynamic nature and random allocation of the nodes it is time consuming task to find out the middle node in sorted linked list. In this paper we have implemented two distinct pointers named, single Step pointer and double Step pointer to find out the middle node.

Keywords: Divide and conquer, Binary Search, middle element, single Step pointer, double Step pointer

I. INTRODUCTION

Binary search is a divide and conquer algorithm and is very widely used. It is specially used when the size of data is very large. If we have very large amount of data and we apply any linear searching algorithm on it, then the process will be everlasting, and as the complexity of linear search is O(n), so the complexity will be very high as the number of input data increases. So, we need to use divide and conquer approach, in which the whole work is divided and then conquered separately. Binary search does the same, it determines the middle element first and then compares it with the key element, and on the basis of that comparison the operation either stops or the algorithm operates on right half or the left half and this process is done recursively until the middle element matches with key. Implementation of this algorithm in arrays is quite easy. But if we talk about linked lists, it is not so straight forward. Determining the middle element is the first step, and in linked lists the nodes are at random locations in memory, so the middle node cannot be directly found. So, here we have used the special approach of dual pointers, in which we have used two pointers, a single Step pointer and a double Step pointer, to determine the middle node.

II. STEPS TO DETERMINE THE MIDDLE ELEMENT

1. First of all, we take two pointers, a singleStep pointer and a doubleStep pointer.
2. Then both the pointers are initialized with head of the linked list.
3. Then the linked list is traversed by both of these pointers.
4. For each step the doubleSteppointer will move twice the doubleStep pointer.
5. In this manner, when the doubleStep pointer will reach the end of list, the singleStep pointer will be pointing to the middle element of the list.
6. And we get the address of middle node through singleStep pointer.

III. ALGORITHM TO FIND OUT MIDDLE ELEMENT

MIDDLE_NODE(startNode, endNode)

1. IF startNode = NULL, THEN
2. RETURN NULL;

(END OF STEP 1 IF CLUASE)

3. singleStep = startNode
4. doubleStep = startNode
5. REPEAT STEPS 6 TO 9 WHILE singleStep != doubleStep,

6. singleStep = doubleStep -> NEXT
7. IF singleStep != endNode, THEN
8. singleStep = singleStep -> NEXT
9. doubleStep= doubleStep -> NEXT
   (END OF STEP 7 IF CLUASE)
   (END OF STEP 5 LOOP)
10. RETURN singleStep

IV. STEPS FOR IMPLEMENTING BINARY SEARCH ON LINKED LIST

1. Firstly, we take two pointers startNode and endNode, and initialize startNode with HEAD and then find last node of list and store that in endNode.
2. Then, we pass these startNode and endNode to the function MIDDLE_NODE and the return value is stored in middleNode.
3. If the info of middleNode matches with the key element, then the process is stopped, else proceed to step 4.
4. If info of middleNode> key, then we need to repeat the above steps for upper half, else proceed to step 5.
5. If info of middleNode< key, then we need to repeat the above steps for lower half.

If the key element is found then the loop will terminate, but if the key element does not exist in the list, then we will get into indefinite loop. If we are handling arrays, then we simply put the condition LOW <= HIGH, but in case of linked list the nodes exists at random locations in the memory unlike in arrays, so loop termination condition will be different. In this process, we continuously divide the array, goes onto the left or right side of middle element on the basis of comparison with key, so if during this process, we get onto a single node parition, whose info does not match with key, then we have to terminate. So, when we have a single node partition, the condition would be, startNode=endNode=middleNode.

V. ALGORITHM FOR IMPLEMENTING THE BINARY SEARCH

BINARY_SEARCH(HEAD, KEY)

1. startNode =HEAD
2. REPEAT STEP 3 WHILE endNode -> NEXT != NULL,
3. endNode = endNode -> NEXT
   (END OF STEP 2 LOOP)
4. REPEAT STEPS 5 TO 17,
5. middleNode = MIDDLE_NODE(startNode, endNode)
6. IF middleNode -> INFO = KEY, THEN
7. PRINT “KEY FOUND”
8. BREAK
9. ELSE IF middleNode -> INFO > KEY, THEN
10. endNode = startNode
11. REPEAT STEP 12 WHILE endNode -> NEXT != middleNode,
12. endNode = endNode -> NEXT
    (END OF STEP 11 LOOP)
13. ELSE
14. startNode = startNode -> NEXT
15. (END OF STEP 6 IF CLAUSE)
16. IF startNode == middleNode AND endNode == middleNode, THEN
17. BREAK;
    (END OF STEP 4 LOOP)
18. RETURN

VI. CONCLUSION

Binary search implementation on Arrays is more easy as compared to Linked List, due to following reasons:

a. The array elements are directly accessible by their locations or indices, while this is not the case in linked list (in which any node is referred by the next pointer of its previous node).
b. The array elements are stored at contiguous memory locations, while linked list elements are stored at random locations in memory.
c. The arrays are static in nature, as its size(elements holding capacity) has to be decided at the time of its definition, while linked list is dynamic, so the nodes can be added or deleted at run time.

Complexity of Binary Search algorithm in case of linked list is high as compared to arrays, as there is an additional algorithm to find out the middle node.

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Cross Platform Application Using Electron Js

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ABSTRACT

Electron is a framework for cross-platform desktop applications using Chromium and Node-Web kit. Electron is a JavaScript framework from GitHub, to build powerful cross platform desktop applications with HTML/JS/CSS. On top of electron, imagine applications developed with existing JavaScript ecosystem and building desktop apps - the outcome will be amazing. It's easy to build cross-platform apps using HTML, CSS, and JavaScript.

Keywords: framework; app; GitHub; ecosystem; Cross platform desktop; Imagine

I. INTRODUCTION

Electron is basically a runtime server base platform that allows you to develop desktop applications using HTML, CSS, and JavaScript.[2] It is an open source framework developed by GitHub. Electron is generally called atom cell. it built for atom editor to handle chromium to Node-Webkit event loop integration and developed native API. Electron js application is works with combining the chromium content framework and NW JS node together in a single processing framework. A variant of Node-Webkit runtime that is focused on desktop native application instead of web servers for different type of operating system. So using electron js we are able to create native desktop application. Electron js create a dynamic process for running the dynamic build application for native creation.

Electron really simple here by combining both frameworks together in a single shell. It's not a complex framework at all. You don't have to learn a lot of conventions in order to start application development with Electron. It's very easy to structure an application using Electron as there is no complex tooling required to set it up. Electron always keeps up to date with chromium and node versions. The chromium used inside Electron is always two weeks behind the latest stable chromium version. It typically includes the latest version of the node and v8 engine. Own strengths and disadvantages will be laid down in this paper.

II. PROBLEM STATEMENTS

A. Development of Application which is work as "cross-platform application"?

[1]"Native" cross-platform apps: Native cross-platform apps are created when you use APIs that are provided by the Apple or Android SDK, but implement them in other programming languages that aren't supported by the operating system vendor.

[2] Native HTML5 cross-platform apps have never gained wide of processing network and compiling because this approach to development results in performance issues when an app's UI is rich in components.

B. Why need to development of cross-platform apps for product owners and developers?

[1] Cost-efficient cross-platform apps are cheaper to build and maintain due to a number of factors. If cross-platform apps are properly developed, at least half of their code can be used across platforms.

[2] One team and one product for two platforms: - Product owners who want a cross-platform application need only one team of developers that are trained in one set of technologies.

C. How modern cross-platform apps good for the end user?

[1] Designing Uniqueness:- Feature of cross-platform development tools providing developers/ designers to create the unique user experience that app users appreciate.

[2] Best for Original: - Quicker development provides product owners with an opportunity to collect user feedback and to secure a patent and a spot in the market.

[3] Greater reach and easier marketing: - cross-platform apps are more useful for many business owners because they provide a wider reach: by creating one application you can use all platforms.

III. DETAILED CONTENT

A. HISTORY

Node-Webkit as a in history desktop applications starts in 2011 with Roger Wang, the developer of Node Webkit. Roger Wang started the node-webkit project naming a simple Node-Webkit module that can create a browser window using Web Kit - the browser engine used by Safari and chromium. Advantage of the node-webkit module is that we can use Node-Webkit APIs inside the webpage and create a native application which is use to renderer the process by child process of system.it is implemented in Node-webkit library which is show all browser data so in history it is not appropriate model for development. After some-time, Roger improved the node-weskit by replacing Web Kit with the chromium embedded framework (CEF).

B. DEVELOPMENT

- Title Development of a hello world application using Electron:- Node-Webkit is installed or not by cmd window and enter the command node -v // it is use to check node version in system
- Installing Node-Webkit :-The easy way to install Node-Webkit is using installer. Follow the instruction www.nodejs.org to download executable file for your operating system. There are a couple of other ways to install Node-Webkit.

Mac

brew install node

Linux

In linux base system the installation of nodejs is assential process of using terminal window so (http://nodesource.com)

curl -sL https://deb.nodesource.com/setup_6.x | sudo -E bash sudo apt-get install -y nodejs

- Installing Electron[1]

Electron is working by npm module so before installation of electron module to have to install the npm. To install npm electron use following command:

- npm install -g electron to install globally electron you can use the command with –g with electron: Globally process of system is include the programming to overall system. It is just system to include full processing system.: Locally - local modules can be installed with the same command, but without the -g flag. The modules will be installed into the current directory. Its scope is limited to the current directory.

C. INTERNAL WORKING OF ELECTRON

Electron is based on Google's chromium project. Electron working with chromium module that is internally working with render process of web page. Chromium can include modules are the core code in C++ needed to render a web page in multi process sandboxed browser process by multithreading.

Electron include the feature of node js, chromium and google V8 engine. Node Js is able to facility to development of web API and Google V8 engine is process the web API. For better understanding let is look into how the chrome browser works.[4]

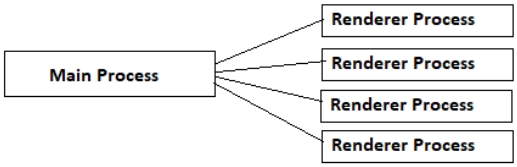

Figure 1. Process Handling by electron JS

- Architecture of Electron JS

Multi-process architecture of chromium because Electron uses a simplified version of chromium's multi process architecture. Modern operating systems are robust because they put an application into different processes that are separated by each other. [5]A crash in one application does not have any impact on another application and it will not affect the integrity of the operating system. In a similar way, Google Chrome uses separate process for each tab to protect overall bugs and glitches from the rendering engine. It also restricts access from each rendering process to others and to the rest of the system. So basically the Chrome browser runs two types of processes. The main process runs the UI and plugin process and tab specific processes which renders the web page. The following figure shows how the multi process architecture works in Electron. The main process can start multiple renderer processes with different URLs loaded into it.

Browser: This is responsible for business logic and data access. It works on its own process called main process. It creates the browser window and corresponding modules to render the web pages.

Renderer - This is responsible for rendering each web page. Each web page renders on its own thread.
Modules that bridge browser and renderer and control application life cycle

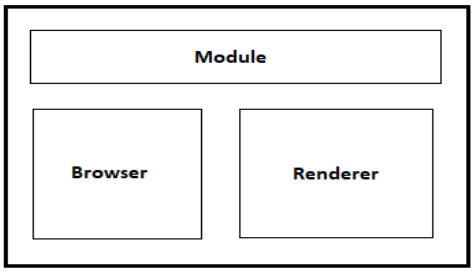

Figure 2. Internal Architecture of electron js

The Main process providing a web page by creating a Browser-Window object for compression of module. Each Browser-Window runs the web page in its own separate renderer process.

Main Process: The main process is responsible for responding to applications life cycle events, starting and quitting the application. it provides the Node-Webkit execution context inside the renderer process, which allows you the lower level operating system interactions from your web pages rendered in the Electron shell.

Renderer Process: The renderer process is responsible for loading the web pages to display the graphical user interface. Each process can load and execute additional JavaScript files in the same process. Each renderer process is isolated and each process cares only about the page running in it.

Process Sharing between renderer and browser: Browser and renderer are separately running processes that communicate using special APIs called chromium inter process communication. IpcMain and ipcRenderer modules are basically event providing the handling the communication between main processes and the renders processes.

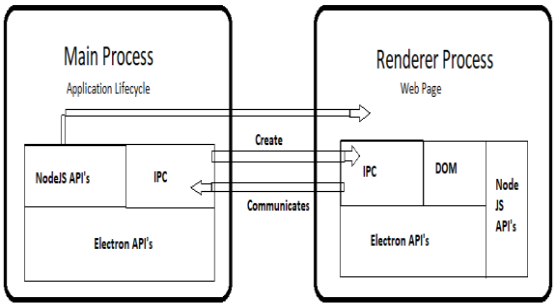

Figure 3. Interposes communication in electron js

D. DESCRIPTION

Process: -

Step 1: Create the basic file of electron

App

package.json

main.js

index.html

If package.json is according process of npm module so automatically the generation of system:

npm init

Package.json file is content the module of system that is used in program if we want to shift our project so no need to copy the npm module we just have to clone that module form GitHub. So [package.json file contain the dependencies.

package.json

```
{       "name"    : "your-app",
        "version": "0.1.0",
        "main"    : "main.js"
 }
```

Step 2: [3]Main.js page is controller the main process of application is file is running into the system and controlling the process of renderer process. Main process is able to create multiple renderer process itself.

```
const electron = require('electron')
// Module to control application life.
const app = electron.app
// Module to create native browser window.
const BrowserWindow = electron.BrowserWindow
// Keep a global reference of the window object, if you don't, the window will
// be closed automatically when the JavaScript object is garbage collected.
let mainWindow

function createWindow () {
  // Create the browser window.
  mainWindow = new BrowserWindow({width: 800, height: 600})
  // and load the index.html of the app.
mainWindow.loadURL(`file://${__dirname}/index.html`)
  // Open the DevTools.
  mainWindow.webContents.openDevTools()
  // Emitted when the window is closed.
  mainWindow.on('closed', function () {
    // Dereference the window object, usually you would store windows
    // in an array if your app supports multi windows, this is the time
    // when you should delete the corresponding element.
    mainWindow = null
  })
}
// This method will be called when Electron has finished
// initialization and is ready to create browser windows.
// Some APIs can only be used after this event occurs.
app.on('ready', createWindow)

// Quit when all windows are closed.
app.on('window-all-closed', function () {
  // On OS X it is common for applications and their menu bar
  // to stay active until the user quits explicitly with Cmd + Q
  if (process.platform !== 'darwin') {
    app.quit()
  }
```

```
})

app.on('activate', function () {
  // On OS X it's common to re-create a window in the app when the
  // dock icon is clicked and there are no other windows open.
  if (mainWindow === null) {
    createWindow()
  }
})

// In this file you can include the rest of your app's specific main process
// code. You can also put them in separate files and require them here. [6]
```

Step 3: Index.html

Index.html page is viewer page on that file we are design the webpage and making the system process to viewer itself. Html page itself is web technology like angular, css and JavaScript page application also collectively information setup.

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8">
    <title>Electron Hello World!</title>
  </head>
  <body>
    <h1>Electron Hello World!</h1>
    We are using node <script>document.write(process.versions.node)</script>,
    Chromium <script>document.write(process.versions.chrome)</script>,
    and Electron <script>document.write(process.versions.electron)</script>.
  </body>
</html>
```

Step 4: Execution of application in debugging mode is using command that is development process in which we can create new window to show the process. Electron.

IV. CONCLUSION

Although Electron is good new technology and a lot of improvements and infrastructural tools are still to come. It is allows building quite good desktop applications and community is doing great progress on providing setup and development in the best and easy and interesting. To build cross platform application electron help to providing capability to improving desktop application.

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Noise Pollution Reduction through Sensors and Digital Image Processing

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ABSTRACT

Noise pollution is one of the major concerns in today's scenario. And one of the major contributors in noise pollution is honking by vehicles. Therefore we are intended to use some sensors and some hardware to reduce the effect of vehicular horns. Here only the intended drivers will get alert while rest of the area will remain undisturbed. We will be using radio waves for transmitting signal and this signal will be send only to intended receiver, receiver will be identified by its unique number plate. To identify the number plate we will be using some digital image processing techniques. The signals will be send by the sender by radio frequency transmitter to the receiver having id same as the number plate. Once the receiver got the signal then two actions will be performed simultaneously. One is horn will be blown inside the car only and the other is the tail light will be blinked to alert the sender that the receiver has heard the horn. Otherwise the sender has the option to use the normal horn.

Keywords: radio frequency, transmitter, receiver, signals, noise.

I. INTRODUCTION

Over In recent year's horns is a major contributor to noise pollution in Indian cities. Experts have warned that chronic exposure to sound beyond 93dB for eight hours can cause irreversible hearing loss. The road transport and highway ministry is considering a proposal to reduce themaximum permissible decibel range of vehicle horns, a move aimed at curbing noise pollution from compulsive honking on Indian roads. [3]

Honking for no reason makes irritation and Researchers says that noise pollution may increase the risk of heart disease, such as coronary artery disease, hypertension and heart failure.

We are applying DIP because the vehicles which we are considering is a moving objects so while scanning the number plate there are chances that the image which we are getting might contain some noise so to remove those noise image processing algorithm are required.

Once we got a clear picture of the number plate we will be sending the signals to the vehicle of that number plate and when that vehicle will receive the signals the horn will be blown inside that vehicle only. And once the horn got blown we can blink the tail light of the vehicles so that sender will get alert that receiver has received the signals and if there is no signals of reception then the sender has the option of using secondary horn(usual horn) that will alert the whole region within the frequency range of the horn.

II. SURVEY

According to the Environment Protection Act, the noise limit prescribed for automobiles is 85dB (decibel).That means increase of 10dB will makes a sound that is perceived to be twice as loud.

According to a survey conducted by Awaaz Foundation in Mumbai, vehicles have been observed to honk at peak levels of up to 108.4dB.

"Honking is a major source of sound pollution and each year around 1.5 crore vehicles are added. If the standards for horns are fixed around 90dB and immediately implemented on new vehicles and in a time-bound manner on older vehicles, the noise pollution due to horns will reduced by 1/6th provided the much-needed relief to people," said Nevatia.

In its recommendations, Deole said, the MPCB suggested to restrict the sound levels for horns at 88dB, while the CPCB felt the sound level for horns should be 95dB. "We will wait for the CPCB to fix the standards and immediately work on0 fixing standards for the state as well," he added. [Indian express]..

III. LITERATURE SURVEY

There are several methods to control the honking such as:

A. Through VANET

The In VANET network each and every vehicle behave like node or a router so that they can communicate with each other. Instead of alerting the whole area in this network the vehicles can communicate with each other over the range of 100-200 m and only the intended vehicles will be alerted. But implementing such system in such a large country will be costly enough and also this method is not efficient for those areas in which this network is not available. [1]

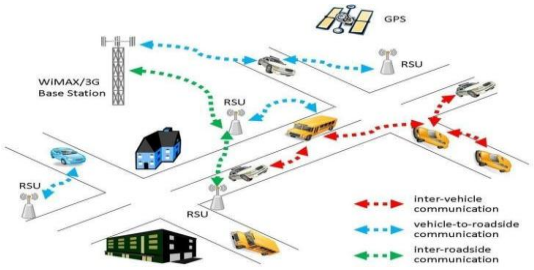

Figure 1. VANET

B. Using Infrared rays

Instead of using VANET if we use infrared waves then this method will be cheap to implement because for emitting infrared waves IR led can be used and for reception purpose IR receivers can be deployed the same transmitter and receiver which is generally found in TV and TV remotes. But if we use this method then the range of horn gets decreased and the sender will not be able to alert the person 50-60 m away from him/her. And the second disadvantage of using this method is infrared ray wave's works on line of sight which means the receiver has to be in straight line and should be sync with transmitter. [6]

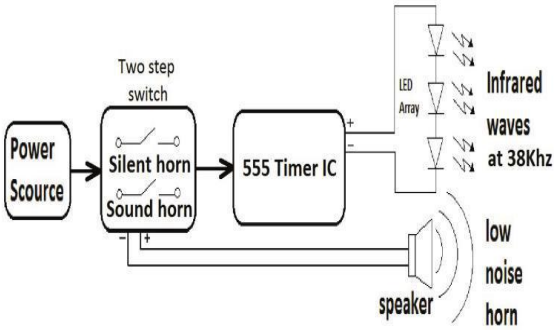

Figure 2. Transmitter block diagram

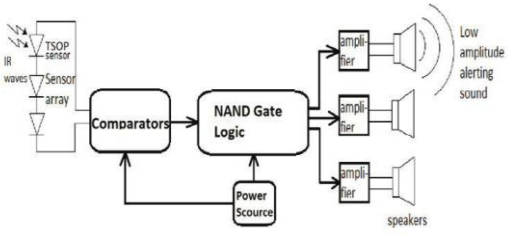

Figure 3. Receiver block diagram

C. Using Bluetooth

By using Bluetooth transmitter and receiver two vehicles can communicate with each other by sending the signal over Bluetooth. The advantage of

using this methodology is it is cheap to implement. But it has its limitation as well, the limited range of Bluetooth makes it useful over short distance but it will not be as useful over large distance such as on highways. [5]

D. Using GPS system

The other alternative is using GPS system to locate the vehicle and sending the signals to the receiver. The at receiver side intensity of the signal gets compared is it is greater than the threshold value then the receiver gets notified and it works accordingly. The main drawback of this system is that when it's come to practical implementation it is quite costly. [5]

IV. ROPOSED METHODOLOGY

Number plate identification and Storing

We will be using digital image processing techniques to identify the number plates uniquely. The number plate will be scanned by the camera installed in front part of the car and since the image acquired by the camera will have noise in it so it will be difficult to identify the numbers uniquely so to remove noise and to identify the numbers image processing is needed. This will include detecting the vehicle and in vehicle we have to identify the required area i.e., number plate after which noise from image acquired through camera will be removed and the numbers in number plate will be identified.

So in wholesome this process will include detecting the vehicle and then capturing the vehicle image. Vehicle number plate region will be extracted using the image segmentation in an image. After which the characters will be recognized by optical character recognition techniques. After reconditioning the numbers this number have to be stored temporary in some place from where retrieval is as fast as possible.

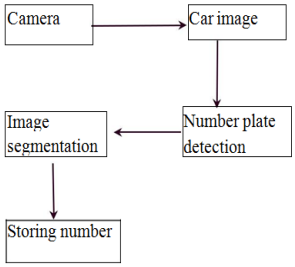

Fig.4 Number detection process

Transmitter Process

Once the transmitter got the numbers form the storage system it will treat that number as the pseudo code. Here the role of transmitter is to combine both the signal and the number and to send this combined code to receiver.

Transmitter contains three blocks

1) Encoder
2) Modulator
3) Storage system

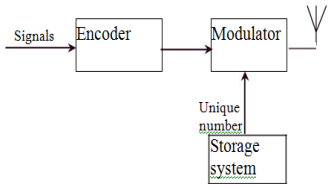

Fig.5 Transmitter Process

Receiver Process

Receiver storage system has predefined value which is same as the number on number plate. So whenever the receiver will receive the signal from the transmitter which contains the signal with pseudo code, then the first thing the receiver will do is to compare the pseudo code with its number and if matched then it will alert the driver about the signal.

Receiver process also include three blocks:

1. De-modulator
2. Decoder
3. Storage system

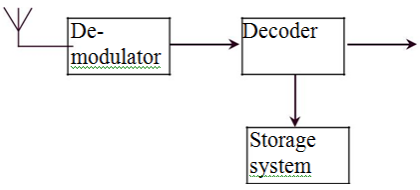

Fig.6 Receiver Process

Alert

When the match occurs the driver on receiver side should get alert of the vehicle behind him so that he/she can take appropriate actions. Not only the driver on receiver side will get alert but also the sender will get alert that the driver on receiver side has received the signal.

The sender can be alerted by blinking of tail light of the receiver side vehicle.

Alternative

If the sender does not get alert back by receiver then he/she has the option of using the secondary horn (usual horn).

ADVANTAGES

This method will be cheap to implement as well as the transmission range of the signal got improved to certain extent.

DISADVANTAGES

Vehicles should be in the range of the camera.
Costly as the processor with good computational speed is required.

V. CONCLUSION

We have successfully implemented this project and we found that the range of this method is better than the infrared rays but it has the limitation that vehicle should be in the range of the camera.

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Augmented Reality: Map with information using Unity-3D

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ABSTRACT

This paper explores the use of Unity3D Vuforia packages to make an application in Augmented Reality for any small area, buildings including colleges, monuments etc. It is described that how map is created in AR along with the information. Results shows that created application is accurate enough to show the information of target image and scanned text in real time environment also able to show the path between source to destination through camera in AR.

Keywords: Unity3D, Vuforia, Target Image, Augmented Reality, Navigation, Map, 3D, A* Algorithm, Mapbox

I. INTRODUCTION

Augmented reality is the integration of digital information with the user's environment in real time. Unlike virtual reality, which creates a totally artificial environment, augmented reality uses the existing environment and overlays new information on top of it[1]. Basically AR is a technology in which registration of 3D objects are done. With this technology user can use their personal mobile device, head mounted display to produce interesting AR environment in 3D around devise in real time. Otherwise AR technology has a broad range of applications including medical, creating 3D model, map navigation, showing information of 3D objects. there are several ways to implement AR applications. This paper uses Unity-3D and vuforia AR packages to establish 3D world, 2D image correspondences (for image target).

This paper describes the implementation of three different modules of an AR application. In which user will be able to use their personal mobile phones to see 3D objects in real world through camera also able to get the detailed information of that object, written text, image and move to destination according to path which is navigated by application in AR.

The rest of the paper is structured as follows: "Background" presents the use of vision-based methods for augmented reality and gives examples from the literature making use of Augmented Reality. "Methodology used" describes a method for creating complete application.

"Method to detect image target" detailed explanation of image target detection. "Method to scan text" describes a method of Text recognition, in this module we have to recognise written text (OCR). "Method to create navigation" describes for navigation use of unity Navigation and Path finding feature and A* algorithm, while "Results" assesses the effectiveness of the A* algorithm and presents the results of augmentation. Finally, conclusions are drawn in for the implemented work.

Figure 1 (a)Image target (b)3D View

II. BACKGROUND

"A Survey of Augmented Reality" by Ronald T. Azuma [8] -

In this paper, the author differentiates the two terms virtual environment [VE] and augmented reality [AR] in terms of real world. In VE, the user delves into

virtual environment and cannot feel real world as in AR, where he can interact with real world. AR bridges or glues virtual and real world. The paper is arranged surveying the combination of VE and AR, interaction of user in real time and registration of 3D space. The AR is widely applicable in many areas. Most useful application which he discusses is Medical (surgery and visualization aid), Machines (assembling, maintaining and repairing), robotics, entertainment etc. He had discussed about the characteristics of virtual environments and in comparison to AR stated rendering process for virtual objects is quiet easy in AR as compared to VE because in virtual environment all the objects need to be rendered virtually whereas in AR only few objects need to superimposed with real world. Example, AR for text, annotation applications etc. The hardware requirements of AR is low but more stringent in case of sensing or tracking applications. The reason for this is registration problem means, two objects must be properly aligned which is the serious need of few applications.

"Recent Advances in Augmented Reality [9]" -
The same author along with others, discussed in this paper about how recent advancements in technology demands AR to be deployable on mobiles and web technologies. As to make extensive use of AR possible to maximum users. He discussed the research contribution of Mohring and Wagner on usage of phones for computer vision in sensing and tracking. He studied about characteristics of web 2.0 and AR 2.0 and compared them. He concluded how AR can be deployed with handheld devices, to generate and share information or user content with others users. But till 2001, the problem of registration was an issue.

The main problem in already existing 2D navigational system that you have to check screen simultaneously with real world so there is a big problem, many time accident happens due to this, and 2nd problem is that you don't have gps system for small colleges and building and you required a guide if you want any information about anything, many time there is language barrier, understanding problem.

So to resolve all these problems we can use Augmented reality. We will use two type of augmented reality, marker less augmented reality and marker based augmented reality, for showing information's we use Marker based augmented reality, which is basically having following characteristics:
1. Combination virtual environment and real world.
2. Real time interaction.
3. Register in 3 Dimension [2]

A. Combination of real and virtual environment

After image detection we have to show outputs, to show output we used 3D object to show any information on image or text also. So for this we have to combine real and virtual environment, which is the main feature of augmented reality.

B. Real time interaction

In this we gather all information of real world using mobile camera or head mounted device using our application in android / iOS, this is cross platform application so we can use any mobile device. We designed gui to interact in real time we have used virtual button which is use gesture detection to interact with application and give input to application.

C. Register in 3 Dimension

In this step we detect our targeted object which are already stored in our database and we have already stored corresponding 3d object for each object target.
In navigational part we will use markerless augmented reality in this we don't require any marker (marker is basically a target which is scanned and play any object) we just have to select our desired location and our app will show navigation to that position for that we will take all gps coordinates and if user will open app then we record his/ her current gps coordinates and show a path. Arrow to destination location gps coordinates it

will check coordinates and compares both coordinates and then show navigation.

III. METHODOLOGY USED

We have used augmented reality with unity 3d (to design gui and use package) and Vuforia AR package to use Augmented reality prefabs and objects. Here are our all module of project:

A. Method to detect image target

Our first module is image target detection, in this module we have to detect our target image, for this we have to enter image in vuforia database then vuforia will change image in black and white image and set marker for image and make a database package and we will use that package as a database and then we design environment for image target detection for that we have to import ar camera, and image target and then we have to set desire output on each image detection. To use this module user have to select image target option and then he have to point his camera to object/ image , then app will convert that image and set marker then compare those marker to all image in database and then load object according to that image.

B. Method to scan text

Our second module is Text recognition, in this module

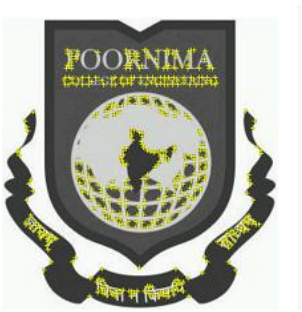

Figure 2. Target image in Vuforia database

we have to recognise written text (OCR). For this we are using text recognition engine of vuforia package. The Vuforia text recognition engine will acknowledge text that's written or rendered in most of the unremarkably occurring line and fount fonts. The supported text designs embody designs that square measure plain, bold, and italic.

We use a glossary, Word lists can even be filtered victimization filter lists to exclude sure words from being detected (using black-list filters), or to permit solely specific words to be detected (using whitelist filters). A set of words is outlined by filter, that the filter is longing for, whereas the filter mode tells Vuforia the way to use those outlined words for filtering. More specifically, two filter modes defines by Vuforia:

A. Black-list mode: If this mode is about, Vuforia can notice all the words within the current thesaurus except those per the filter list.

B. White-list mode: If this mode is about, Vuforia detects solely those words that area unit enclosed at constant time within the current glossary and within the filter list.

Once we recognise text then we can set any output on word found. So if user want to recognize text then he have to point the camera to text and then app will recognize text and check in database for corresponding output. And show it in 3d on screen.

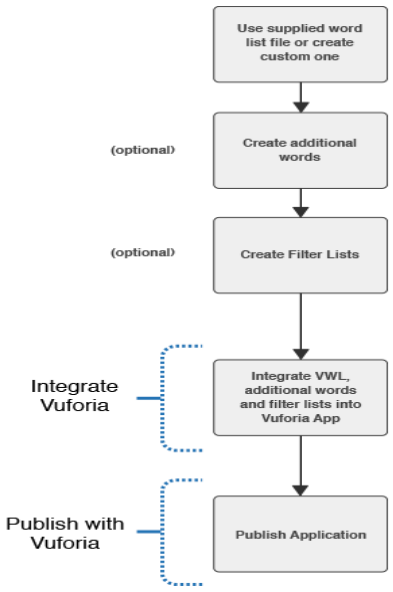

Figure 3. The process for creating an app with text recognition

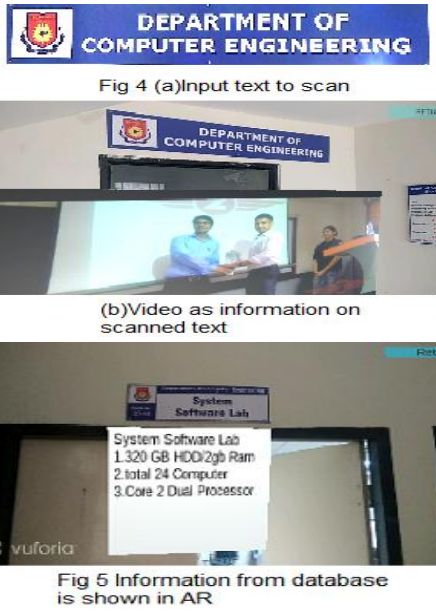

Figure 4 and 5. Showing database in AR

C. Method to create navigation

Our third module is navigation, so for navigation we are using unity Navigation and Pathfinding feature and A* algorithm along with mapbox. For destination and source we are using gps coordinates and to find best , shortest route we are using A* algorithm.

Mapbox

Mapbox is the area information stage for versatile and web applications. We give building pieces to include area highlights like maps, inquiry, and route into any experience you make[5].Mapbox project offered a way to get a reliable facing direction relative to true north so all that was left was to just place the objects in the world[6]. In the case of Mapbox, we do the following [7]:

1) **Geospatial data:** Mapbox utilizes tilesets as a geospatial information arrange while showing maps. Tilesets are a lightweight stockpiling group for both raster and vector information. When you transfer information to Mapbox, it is put away as a tileset.
2) **Styling rules:** When you characterize how your information ought to be styled in the Mapbox Studio style editorial manager, this data is put away in a JSON report that fits in with the Mapbox Style Specification.
3) **Display:** Whether you utilize the Mapbox Maps SDK for iOS or Android on versatile or Mapbox GL JS on the web, we utilize a device assembled Mapbox GL to put the style JSON and the tilesets utilized as a part of the style and draw your guide.

D. A* algorithm

A* Search algorithm is one of the best and most popular technique to find path between two nodes and for graph traversal. It is mostly used to approximate the shortest path between nodes in real-life situations, like- in google maps, games where there can be many hindrances. To better understand this method we can assume a 2D Grid having several obstacles in the path and want to move from a source cell (coloured red below) to destination cell (coloured green below)

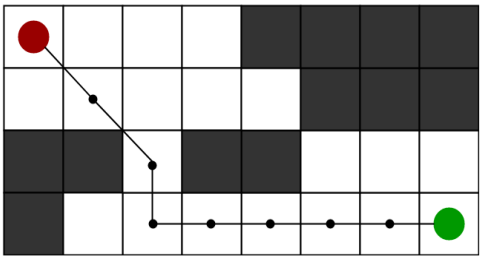

Figure 6. A* Algorithm

In A* Search rule at every step it picks the node per a value-'a' that may be a parameter adequate to the add of 2 alternative parameters – 'b' and 'c'. At every step it picks the node/cell having the bottom 'a', and method that node/cell.

We merely outline 'b' and 'c' as below b = the movement value to maneuver from the supply purpose to a given sq. on the grid, following the trail generated to urge there.

c = the calculable movement value to maneuver from that given sq. on the grid to the ultimate destination.

Algorithm: [4]

Step1. Perform open list initialization

Step2. Perform closed list initialization on the open list,put the starting node

(you can leave its **a** at zero)

Step3. whereas the open list isn't empty

a) notice the node with the smallest amount a on the open list, decision it "q"

b) pop letter of the alphabet off the open list

c) generate q's eight successors and set their folks to letter of the alphabet

d) for every successor

i) if successor is that the goal, stop search

successor.b = q.b + distance between

successor and letter of the alphabet

successor.c = distance from goal to

successor (This is done mistreatment several ways, we'll discuss 3 heuristics-

Manhattan, Diagonal and euclidean Heuristics)

successor.a = successor.b + successor.c

ii) if a node with an equivalent position as successor is within the OPEN list that incorporates a lower a than successor, skip this successor

iii) if a node with an equivalent position as successor is within the CLOSED list that has a lower a than successor, skip this successor otherwise, add the node to the open list finish (for loop)

e) on the closed list, push q finish (while loop)

And for destination and source we are using gps coordinates and to find best, shortest route we are using.

IV. RESULT

Successful creation of an application can be seen in this paper through which the user will be able to view the information of any 2-D image in AR environment. An individual will be able to scan any text or word and then will fetch the detailed information of the same along with 3-D objects if required. The only condition with is application is that the text should be written in plain, bold, and italic.

V. CONCLUSION

It is clear that the Unity3D has great potential in AR applications for creating 3D environment and mapbox to create AR map with its API's. It can also be used in creating an interaction device tracking the path. In this paper, we displayed an application to demonstrate 3D data or principally proposed an approach to consolidate join every one of the scenes utilizing scene administration. This application will be useful to demonstrate route progressively, which can be utilized on huge scale in future. AR guide can converge with google delineate better utilize.

Limitations

- Required a device to use this
- Only able to show details about data which is stored in database

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Ant Colony Optimization Algorithms: Introduction & its Recent Trends

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ABSTRACT

Ant Colony Optimization (ACO) algorithms be-long to the class of meta-heuristic approach to solve hard combinational optimization problems and were introduced in the 1990's. The exhilarating source of ant colony optimization is the foraging demeanor of the real ant colonies. This demeanor of ants is exploited in artificial ant colonies for the search of comparative solutions to discrete optimization problems. ACO algorithms were given by DiCaro & M.Dorigo, in the year 1996. This paper is a review of Ant Colony Optimization with its algorithms in horological order with its recent trends.

Keywords: Shortest Path Algorithms, Meta-heuristics, Ant Colony Optimization, Combinatorial Hard Problems

I. INTRODUCTION

Advancement issues are of prime significance in the mechanical world and in the logical world. Some working cases of advancement issues are in prepare booking, timetabling, shape streamlining, and media transmission organize design[3]. Combinatorial enhancement issues are captivating in light of the fact that they are very simple to state yet are frequently troublesome to understand. A considerable lot of the issues stemming in applications have a place with NP - hard class, that is, it is staunchly trusted that they can't be comprehended to optimality inside polynomials limited calculation time. Therefore, to reasonably take care of extensive occasions of such issues one needs to utilize similar techniques which returns close ideal arrangements in a generally brief time. Calculations of this sort are approximately named heuristics. They primarily utilize some issue particular information to either assemble or to enhance existing arrangements. A meta-heuristic is a collection of algorithmic ideas that can be utilized to constrain heuristic techniques pertinent to various problems[2]. The utilization of meta-heuristics has essentially enhanced the capacity to discover quite brilliant answers for burdensome combinatorial improvement issues in a sensible time. Subterranean insect settlement improvement (ACO) is one of the freshest procedure for estimated enhancement. The rousing wellspring of ACO calculations is genuine subterranean insect states. ACO is enlivened by the ants' searching propensities. At the core of this conduct is the suggested correspondence between the ants by methods for concoction pheromone trails, which empowers them to discover most limited ways between their settlement and nourishment sources. This element of genuine subterranean insect states is misused in ACO calculations for comprehending discrete enhancement problems[4]. This survey is sorted out in an accompanying way. In Section 2 we diagram the inceptions of ACO calculations. In Section 3 we provide a description of various variants

of ACO meta-heuristic in rather general terms, outline some of the most successful ACO variants. In Section 4, we unravel many recent applications of ACO. In Section 5, we call upon the various advantages and disadvantages of ACO algorithms. Finally, in Section 7 we offer conclusions and an outlook to the future of ACO.

II. LITERATURE SURVEY

For the review of ACO algorithms and its recent trends, we have done a brief study of the previous work in the field. In this section, we discuss the various previous accomplishments in this field.

A. Ant colony optimization: Introduction and recent trends[3]

In this research paper, the author first gives a brief description of the origins and the basics of ACO algorithms. The author also provides a detailed insight of various variants of ACO. Finally, the author provides a review of various interesting recent search directions.

B. Ant colony optimization: Introduction and recent trends[3]

In this paper, the author outlines the utilization of Artificial Intelligence techniques to solve problems unsolvable for many years. The author discusses the recently proposed meta-heuristic approach for solving hard combinatorial optimization problems.

C. Review Of Ant Colony Optimization Algorithms On Vehicle Routing Problems[4]

This paper presents the strategy to various versions of ACO algorithm. The author also evaluates the solution cost in bounded time for various estimation-based problems.

D. Review: Applications of Ant Colony Optimization[5]

The author discusses that the relatively new meta-heuristic approach like ACO is great for solving hard combinatorial optimization problems. ACO shows great prominence in "ill-structured" problems like routing.

E. A Review of Ant Colony System Algorithm and its Models[2]

The author reviewed the ant colony for the optimization problems. ACO can be observed as the very first study to showcase the viability of ACO algorithms to attack NP-hard problems.

III. ALGORITHMS

As viewed from various classes of algorithms, ACO algorithms can be classified into diverse classes of approximate algorithms. From artificial intelligence (AI) perspective, ACO algorithms are one of the most successful strands of swarm intelligence. From the operations research (OR) perspective, ACO algorithms belong to the class of meta-heuristics.

A.Ant Colony System

The Ant Colony System (ACS) was the principal change in the first subterranean ant framework to be proposed, presented by Dorigo and Gambardella (1997)[4]. Ants in ACS utilize the pseudo-irregular relative govern: the likelihood for an ant to move from node I to node j relies upon an arbitrary variable q consistently dispersed over [0,1], and a choice parameter; q, at that point, choice of most attainable parts is done that boosts the item is picked. This avaricious lead, of pheromone data which favors abuse, is counteracted the presentation of a differentiating part: the nearby pheromone refresh. Every ant at that point plays out the nearby

pheromone refresh after every development step. For enhancing the hunt performed by resulting ants amid one emphasis, neighbourhood updation is performed. Truth be told, diminishing the pheromone focus on the edges as they are navigated amid one cycle urges ensuing ants to pick different edges and subsequently to create diverse arrangements. Also, due to the neighborhood pheromone refresh in ACS, the base estimations of the pheromone are limited [5].

B. MIN-MAX ant system

MAX-MIN subterranean ant framework (MMAS) is another change, proposed by Sttzle and Hoos (2000), over the first subterranean ant framework thought. The fundamental focuses that recognize MMAS from ant framework are:

1. only the best ant adds pheromone trails
2. the minimum and maximum values of the pheromone are explicitly limited

Note that the pheromone refresh of MMAS is identical, as it is the situation for AS, to every one of the edges while in ACS it is connected just to the edges went to by the best ants. The base esteem is regularly tentatively picked. The most extreme esteem might be figured logically given that the ideal subterranean insect visit length is known[6].

IV. APPLICATIONS OF ACO & CURRENT TRENDS

In the division of NP-hard combinatorial streamlining issues there exists numerous applications. Various applications that were viewed as ahead of schedule in the historical backdrop of ACO is steering in media transmission systems. The early advancement of hypothetical establishment was begun by Gutjahr, who was the first to exhibit merging in likelihood of an ACO calculation. Concerning applications, the utilization of ACO for the arrangement of dynamic, multi-objective, stochastic, consistent and blended variable enhancement issues is a well-known talk topic. Typical applications are the phone, Internet and any issue that can be depicted as traveling salesman problem.

A.Travelling Salesman Problem

The traveling salesman problem is a problem in diagram hypothesis requiring the most proficient hamiltonian cycle a salesman can take through every one of urban communities. No broad strategy for arrangement is known, and the problem lies in NP-hard [4]. The main ACO calculation was known as the Ant framework and it was planned to take care of the traveling salesman

problem, in which the objective is to locate the briefest round-outing to connect a progression of urban areas. The general calculation is moderately reasonable and in light of a set of ants, each making one of the conceivable round-trips along the urban areas. At each stage, the insect moves from one city to another as indicated by a few tenets:

1. It must visit each city exactly once;
2. A distant city has less chance of being chosen (the visibility);
3. The more intense the pheromone trail laid out on an edge between two cities, the greater the probability that that edge will be chosen;
4. Having completed its journey, the ant deposits more pheromones on all edges it traversed, if the journey is short;
5. After each iteration, trails of pheromones evaporate.

To apply ACO to the TSP, we consider the graph characterized by partner the arrangement of urban areas with the arrangement of vertices of the graph.

This graph is called development graph. Since in the TSP it is conceivable to move from any offered city to some other city, the development graph is completely associated and the quantity of vertices is equivalent to the quantity of urban areas. We set the lengths of the edges between the vertices to be corresponding to the removes between the urban communities spoke to by these vertices and we relate pheromone esteems and heuristic esteems with the edges of the graph. Pheromone esteems are changed at runtime what's more, speak to the cumulated involvement of the insect state, while heuristic esteems are issue subordinate esteems that, for the situation of the TSP, are set to be the reverse of the lengths of the edges.[8]

B.Vehicle Routing

The vehicle routing problem (VRP) is a combinatorial optimization and integer programming problem which asks "What is the optimal set of routes for a fleet of vehicles to traverse in order to deliver to a given set of customers". It generalizes the well-known Travelling Salesman Problem (TSP). Ant colony algorithms are known to have a significant ability of finding high-quality solutions in a reasonable time [9]. Often, the context is that of delivering goods located at a central depot to customers who have placed orders for such goods. The objective of the VRP is to minimize the total route cost. In 1964, Clarke and Wright improved on Dantzig and Ramser's approach using an effective greedy approach called the savings algorithm.

V. ADVANTAGES & DISADVANTAGES

Advantages

1. When the graph may change dynamically, ACO has an advantage over simulated annealing and various genetic algorithms
2. ACO is adaptable to real-time changes and can run for a long time
3. Algorithms can be used to find the solution to small problems optimally in bounded time
4. ACO has been applied to a wide variety of real-world applications

Disadvantages

1. If the routing is static in nature such as in case of TSP, ACO still lacks in terms of runtime optimization
2. If there is a node failure and shortest route is restricted, dynamic routing can't be performed

VI. CONCLUSION

We have successfully reviewed the ant colony for the optimization problems. It is neatly understood from the paper about the origin of the ant colony, its basic concepts and its working in the field of computer science. When large-scale problem instance is considered, ACO is a huge success. In this paper, various variations of ACO has been discussed with its working applications. In the opinion of the authors, there exist many possibilities for the valuable future research.

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A Review on Various Techniques of Smart shopping

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ABSTRACT

This paper targeted to reduce the Queue at a billing counter in a shopping complex. The system does the same by displaying the total price of the product kept inside the cart. In this way the customer can directly pay the amount at the billing counter and leave with the commodities he/she has bought. It eliminates the traditional scanning of products at the counter and in turn speeds up the entire process of shopping, also with this system the customer shall know the total amount to be paid and hence can accordingly plan his shopping only buying the essential commodities resulting in enhanced savings. Since the entire process of billing is automated it reduces the possibility of human error substantially. Also the system has a feature to delete the scanned products to further optimize the shopping experience of the customer. The hardware for the test run is based on the Arduino platform and Xbee modules, as both are very popular in small-scale research and wireless automation solution.

Keywords: RFID, Smart shopping, Retail, POS

I. INTRODUCTION

This paper proposes a solid and savvy shrewd shopping basket (SSC) with a brilliant client intuitive interfacing plan. The SSC means to decrease the labor and advance the shopping knowledge for its clients, and in this way it is reasonable for utilize and coordinated into the IoT system of the brilliant shopping center. In the accompanying, the execution of the SSC will be portrayed in detail with the help of vision and remote innovation to give the strength also, usability from the perspective of the client. At last, the trials in a standard shopping center will be led to display the empowering brings about certifiable organization to alarming him to rebates or reminding him about perishables acquired a month prior Despite the fact that enthusiasm for keen shopping baskets is expanding, retailers and shopper bunches have worries about how constant spending criticism will impact shopping conduct. Constant spending criticism animates spending customers to spend more. Interestingly, this criticism drives high spending customers to spend less. Besides, shrewd shopping baskets increment aims for spending customers while keeping them stable for high spending customers. These discoveries underscore central unexplored contrasts amongst spending plan and high spending customers. Also, they have key ramifications for both infra and on the web retailers and in addition application engineers The conventional shopping baskets which are accessible in shopping markets are only trucks with a steel outline proceeding onward wheels. Till now there has been no consolidation of hardware with a specific end goal to help the clients and improve their shopping experience. Though there have been considerable measures of endeavors to modernize the shopping baskets these endeavors are gone for finding the items in the shopping market in lesser time utilizing web servers and different utilities.

The most widely recognized issues confronted sitting idle in the lines for charging as opposed to not being ready to discover their preferred result. Subsequently there is a need to address the most widely recognized issues previously drawing nearer the more unpredictable ones.

II. TECHNOLOGY

Radio Frequency Identification (RFID) is getting the opportunity to be perfect development as another choice to institutionalized label systems. RFID structures give a modified ID system, contingent upon securing and remotely recuperating data using RFID marks or transponders. A RFID tag is a dissent that can be joined to or melded into a thing, animal, or individual with the ultimate objective of unmistakable evidence using radio waves. Chip-based RFID names contain silicon chips moreover, getting wires. In this paper, we have developed a sharp shopping container system that empowers customers to manage their shopping list while shopping and in a manner of speaking pay the bill at the checkout counter The shopping crate can figure normally and demonstrate the total expenses of the considerable number of things inside it. This makes it straightforward for the customer to know the sum he or she needs to pay while shopping and not at the checkout counter.Along these lines the customer can get faster organization at the checkout. The favored angle for the shop proprietors is that they would require a less assistants, which would happen in an immense cut in their costs.

III. METHODOLOGY

The shopping helped handiness is completed in the embedded PC and the tablet PC. The system convenience is for the most part executed in C-based tongue what's more, LabVIEW, to execute the sharp customer instinctive organization additionally, to finish the relationship between the embedded PC and the embellishments, RFID development is among the most dynamic progressions that will shape tomorrow's unavoidable retail bargains. This development offers a fundamental plan of chances which upgrade the shopping knowledge of customers while passing by any self-benefit store. No ifs ands or buts, this advancement is dynamically Promising to the level of a potential substitution the scanner label system as new negligible exertion RFID tag delivering methodologies have created.

A. Smart User Interactive Interface Design

The UI of SSC gives the customer a couple of decisions, for instance, thing looking, diagram, likewise, motorized charging. To encourage the versatile arrangement in the UI, the upheld state machine in light of a lined message handler (QMH) is grasped. Each section of the line or FIFO is considered as an event and is in a manner of speaking set one up time. With the guide of created guide and dead reprisal, the repression of SSC can be invigorated in an iterative way to deal with make customer more viably investigate to another zone. Additionally, the SSC can limit itself against a guide using the RFID readings on the thing marks.

Figure 1. Developed user interface for the SSC, the right picture indicates the map information while clicking Map option.

B. Automatic Billing for Smart Shopping Cart

The splendid shopping structures normally require other Aide remote correspondence structures (especially Insignificant exertion) to perform indoor arranging and thing information broadcasting. Thusly, the twofold gathering mechanical assembly RFID peruser is gotten in the made SSC to recognize the things in the truck (inside getting wire) and out of the truck (external radio wire). The directional accepting wires are used and the yield control from each radio wire is moved up to diminish the disclosure goofs and block between them. The yield control levels are 27dBm and 10dBm from the external gathering mechanical assembly and within radio wire, independently, achieving a correspondence division of around 4m and 30cm. In addition, the external gathering mechanical assembly is in like manner used for indoor arranging, recognizing the territory in help of proposing the shopping plans. The distinguished thing IDs are associated with the database of the merchants, and each the thing information is appeared on the UI of the SSC. The total of procuring can be robotized figured and by then send to the charginggame plan of mall.

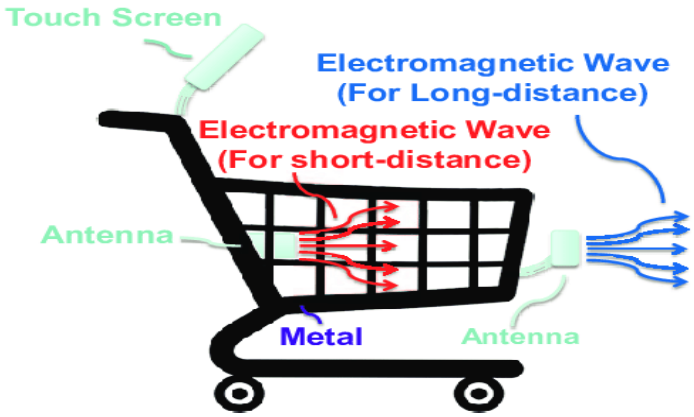

Figure 2. RFID module installed on the SSC

C. Improving Store Management

Utilizing radio-recurrence distinguishing proof RFID information, which demonstrate the situation of a shopping basket through a RFID label connected to the shopping basket. The RFID information contain important data for showcasing, such as shopping time and separation and in addition the number of rack visits. The creators examine clients' obtaining conduct and in-store development data utilizing POS information joined with RFID information. The reason for this examination is to find a promising shopping way that can recognize clients' in store developments by consecutive example examination utilizing RFID information. These shopping ways are extricated utilizing an example mining technique. At long last, shopping ways are utilized as a part of the choice tree examination to create the guidelines that communicated clients' in store developments and buying qualities

D. Improving Commodity Allocation

To have the ability to pass on things accessible to be bought in assorted resigns in a general store remembering the ultimate objective to show signs of improvement advantage for merchants with

considering convenience for buyers is an imperative subject in the retail area. Another technique for allotting product resigns in supermarket in perspective of customers' shopping ways and trades data mining is being used by researchers. Here customers' shopping ways data can be gotten by shopping bin which has RFID marks embedded and shopping trade data can be procured from POS advancement. Through planning what's all the more, mining the nonstop ways data and trades data, the See-Buy Rate - an expected probability to purchase this product when they see the item, can be registered. In light of See Buy Rate, we build advantage progression model to get the perfect distributing plan with thinking about the advantage, bargains volume, and purchase probability of the item.

E. Developed Model

We discuss a creative thought of RFID Based Smart Shopping and Billing. The key idea here is to help a man in customary shopping regarding lessened time spent while acquiring a thing. The standard goal is to give a development Situated, negligible exertion, easily flexible, and harsh structure for supporting shopping vis-à-vis. The made system includes Cart territory revelation unit (CLDU) Server Communication unit (SCU), User Interface what's more, demonstrate unit (UIDU) and Billing and Inventory organization unit (BIMU). CLDU is used to adroitly discover the circumstance of shopping crate inside the shopping business segment to help in obtaining material thing information. SCU will help in setting up and keeping up the relationship of the shopping bushel with the essential server. UIDU will give the customer with UI and BIMU deals with the charging likewise, stock organization as a group with the SCU. These units are fused into an insightful encased. Structure and are attempted to satisfy the value. The splendid shopping bushel will help shorten the checkout lines in this way helping the customers at retail stores.The customers will have the ability to channel the things themselves and the LCD screen on the shopping crate will keep reviving the total. This will wind up being incredibly beneficial for the retail stores as more people will welcome the shopping foundation and come all the more as often as possible to shop. In the headway and discussion of the as these shopping container, we acknowledge that the shopping field is formed in ways/inlets, and each walkway is enough adequately wide for customers with shopping crate to move.

The segment/leave status of the truck and the sound recognizing evidence. Greater the detachment between the walkways/bays, we will require more grounded IR trans collectors. What's more the arranging of these IR trans collectors on the shopping bushel and on the ways will be noteworthy to the most ideal working of shopping crate. Further, as IR advancement manages noticeable pathway.

F. Security Analysis

1. Classification: The imperative charging data exchanged between the keen truck and the server is scrambled utilizing the server or the customer's open key. We additionally demand that the correspondence between the checkout point and the server is secured by unbalanced encryption. Hence, to get the first information in the rush hour gridlock, any outside enemy must have the capacity to break the awry encryption framework, which should not be possible with a non-immaterial likelihood

2. Integrity: In the proposed protocol, the messages sent between the clients, server and the checkout point are all signed with its private key. To break the integrity,

an adversary must be able to forge the private keys of the other entities, which can not be done with a non-negligible probability. Therefore, the integrity of the messages is well protected.

3. Replay Attack Resistance: Since we demand all correspondence messages incorporate a period stamp T, it is hard for an aggressor to play out a replay assailant. On the off chance that a noxious client might want to replay a message from a server that contains a thing's value lower than current value, the brilliant truck can identify that the message is replayed promptly by checking the time stamp. Along these lines, replay assault isn't down to earth.

4. Tag Security: In view of our outline, the security of the RFID labels are all around ensured. Right off the bat, physically pulverizing the labels or obstructing the RFID motion from the tag can be recognized by the scales on the brilliant truck. A minor camera can be introduced on the savvy truck to coordinate with the scale for this capacity: If the keen truck neglects to peruse a tag while the scale or camera recognizes that another thing is put into the truck, it will send a caution. Besides, any revising to the RFID labels will make the mark on the label invalid and will be recognized by the keen truck. Moreover, a substitution of the labels with a phony one doesn't work in light of the fact that the mark of a phony tag isn't substantial. At last, exchanging the labels on diverse things does not work in light of the fact that any physical harm on the carefully designed labels, (for example, peeling off the labels) will break the labels.

IV. SMART SHOPPING SYSTEM

A. Design Goals

Our proposed savvy shopping framework ought to accomplish the accompanying objectives:

1. Navigation for clients: The server ought to have the capacity to find the situation of each shopping basket and guide the client to the thing that he is occupied with. To deal with this, we use the zig-honey bee doors to decide the area of a shopping basket through triangulation system.

2. Items tracking for the store: The server should remain mindful of the status of the things in the store. We propose. Introducing RFID perusers on the racks so that the racks can screen the things and report the tally of the items to the server.

3. Payment check for the store: The clients are not permitted to leave the store until the installment of all things in the shopping basket has been made. To do this, we set a checkout point furnished with UHF RFID peruser at each exit of the store. The checkout point permits just a single shopping basket going through. The checkout point speaks with the server to confirm if the every one of the things in the truck are paid.

B. Challenges

1. Tag Tamper-Proofing (Tag Security): The label configuration must meet the accompanying necessities.

a) Distinguish if a noxious client reworks the labels keeping in mind the end goal to pay less.

b) Distinguish if a noxious client hinders the labels on things and utilizations counterfeit ones.

c) Identify if a pernicious client switches the labels on various things.

d) Distinguish if a malignant client breaks the labels to abstain from paying the cost.

In the segment V, we give a standard of how the labels can be intended for security utilize.

2. Reading Range: To guarantee that a brilliant truck can just read the things that are in it, the energy of the peruser must. be deliberately changed in accordance with avoid things read by another truck adjacent by botch. This should be possible by changing the control on the RFID peruser. The material utilized as a part of the truck likewise matters as metal can piece signals.

3. Communication Security: Prevent the assailants from spying the information or modifying the information sent between the trucks and the server. This is to ensure the privacy and uprightness property of an exchange. An open key crypto framework can be used to tackle this issue.

C. Components

Our proposed smart shopping system consists of the following components:

1. Server: Every one of the things are enlisted to the server before moved to the offering racks. The server store every one of the things data, for example, area and cost, in the database. The server speaks with the various elements in the brilliant shopping framework through Zig-Bee.

2. Smart Cart: As shown in the following components are equipped on the smart cart.

a) Microcontroller: Organizing with RFID peruser, Zig-Bee connector, weight scanner, and LCD touchscreen to play out some basic figuring.

b) Zig-Bee Adapter: Zig-Bee is a minimal effort and low-control convention which costs significantly less vitality than Wi-Fi.

c) Weight Scanner: The weight scanner can quantify the things that are put in the truck to ensure the label analyzes to the best thing.

d) RFID peruser: We use a ultra-high repeat (UHF) RFID peruser which will allow an examining range that is up to 10 meters. By tuning the transmission vitality of the peruser, we can control the examining extent of the peruser.

e) User interface (LCD show): Shows thing information, possible course, charging information, and coupons et cetera.

3. Smart Shelves: The racks are introduced with RFID perusers that screen the status of the things.

4. Smart Checkout Point: The checkout point is presented with a Point of Sale (POS) for the customer to make a purchase. In the wake of making the portion, a customer needs to encounter a gateway presented with a RFID peruser which talks with the server to twofold check if the things are out and out paid. Any overpay or miss the mark on will trigger a caution.

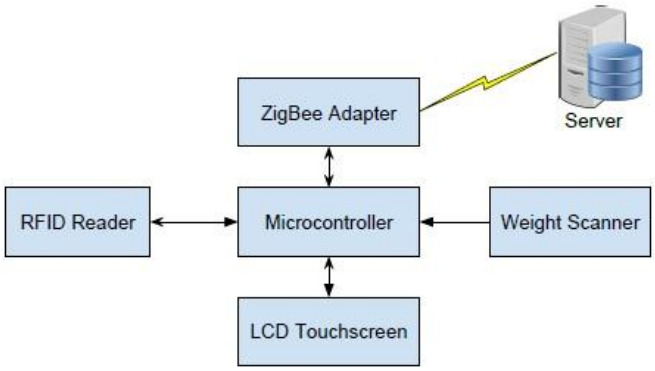

Figure 3. Cart components

V. CONCLUSION

This examination builds up a keen shopping basket which can be connected for general stores and shopping centers. The UI gives the facial acknowledgment work and assistive data to advance

the shopping administration for clients. In expansion, the programmed charging office can keep away from line in the registration process with the goal that the better shopping background for clients can be made. At long last, through the recorded information which interfaces amongst clients and shopping conduct, the proposed SSC shows the exceptionally potential ability to be incorporated into the IoT in general stores and shopping centers. There are a hardly any perspectives that can be incorporated to make the brilliant shopping basket more strong. In the first place, in this venture the dormancy time of the remote correspondence with the server may should be considered. Furthermore, the correspondence isn't exceptionally secure. Another ZigBee module working at the same recurrence can without much of a stretch capture the transmitted information. This issue should be settled particularly with regard to charging to advance shopper certainty. Further, a more refined miniaturized scale controller and bigger show framework can be utilized to give better shopper encounter.

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Blue Eyes Technology with Electric Imp Explorer Kit

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ABSTRACT

The world of technology cannot be always constant. It shows how far the human mind thinks beyond edge of the earth. Every time human mind created something new so, in terms of technology we called it as Research Based Technology. Now the time has to be come where we deploy The Blue Eyes Technology on to the IOT device (Electric Imp Explorer Kit). The main aim of this Research Paper is how to reduce the manpower and improve the efficiency of computer or Smartphone. The Blue Eyes Technology was conceived by the research team of IBM in California since 1997. The Technology have ability to sense and control human emotions through gadgets like Laptop, Smart Television, Smartphone's etc. It give power to computer so, machine start interacting with human beings as an intimate partner and identify their emotions Sad, Happy, Angry, Surprise. The sensors were embedded onto the Emotion Mouse or Expression Glasses which understand the emotions or feelings of human through facial expressions of muscles movement. When the blue eyes technology will extend with "Electric imp Explorer Kit" then the system will able to check the current temperature or humidity of electronic devices like Refrigerator, Television, Laptop as well as current temperature and humidity of the room. The concept of Explorer kit or EyeTribe is the implementation part of this Research Paper.

Keywords: Emotion Mouse, Expression Glass, IBM Almaden Eye Tracker, EyeTribe Tracker, Electric Imp Explorer Kit with imp card 001.

I. INTRODUCTION

The term blue eyes is made from the two words "Blue + Eyes". Blue is basically used for Bluetooth, which enables wireless Communication where as Eye means to obtain the psychological data. It give power to computer so, machine start interacting with human beings as an intimate partner and identify their emotions (Sad, Happy, Angry, Surprise) using Pressure sensor, Temperature sensor and Galvanic Skin Response sensor etc. The sensors were embedded onto the Emotion Mouse or Expression Glasses which understand the emotions or feelings of human through facial expressions of muscles movement. The main aim of this technology is reduce the manpower or balance the coordination between machine and human beings.

Imagine the world when you go to home and see on power button then your laptop will open, the necessary mail will screening automatically all the documents were arranged according to your virtual mind through eyes, machine feels your presence; verifies your identity and starts interacting with you and even it will dial and call to your home in a urgent situations. All the above things will be possible when we were using Eye Tribe Tracker in the blue eyes technology. The blue eyes technology work on the

two hardware portable device that is (a)Data Acquisition Board (b)Central System Unit. The traditional system is working upon the sensors which were embedded into Emotion Mouse or Expression Glasses. It detects the emotion when anyone touch the magical mouse then the psychological data of human is fetched by data acquisition board and transferred to central system unit using Bluetooth connection which show the result of human moods. The same things were happen in Expression Glasses. It detects the emotions with the help of facial movements.

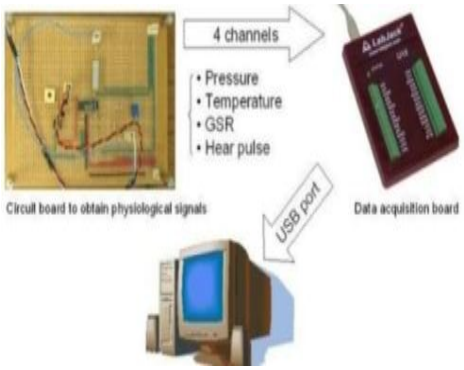

Figure 1. working of overall System

The blue eye technology has ability to read the emotion of human beings with the help of Emotion mouse and Expression Glasses which consists the variety of sensors. In natural world there are some unique identities of every humans like eyes, fingers, speech which help to sense the emotions. It can even understand your emotions at the single touch of the mouse. The blue eyes technology check your presence and starts interacting like a another human beings. For example, It realizes the urgency and dial your emergency contacts, and establishes a connection. The system can understand the feeling of human beings and acquire the knowledge from users mind that what a user wants. The emotion level can be measured by anyone on any system but the problem is that the result is not always accurate because the sensor fetch the psychological data on the basis of surrounding. This was the great challenge since 1995 so, to remove the drawback the IBM introduce the new concept that is called as to be "IBM Almaden Eye Tracker". It was introduce by the IBM Company since 1997. Almaden Eye Tracker capture the ray of eye, for every intensity there is predefined expression for example the intensity between 10-20 is predefined for sad, 60 -70 is predefined for angry. The result of Almaden Eye Tracker is detected easily in a nanosecond and the result is always 100% accurate.[5] www.ibm.almaden.com.

The limitations of IBM Almaden Eye Tracker are:-

- The connectivity of structure is so complex, huge kit are require for connection so it take lot of time for establishing the initial connection.
- The biggest challenge of IBM Almaden Eye Tracker is, only experienced person or specialists with Ph.D.'s can used so it was expensive technology in those time.

Figure 2. IBM Almaden Eye Tracker

II. CHALLENGES IN BLUE EYES TECHNOLOGY

The following are the challenges of Blue Eyes Technology:-

1. After the limitation of IBM Almaden Eye Tracker the blue eyes technologywas no longer to used. No solution was implemented to track the correct way, in 2005 the technology almost gone to extinct.
2. There are so many new technology was implemented like Magic Pointing, Gaze Tracker but all have certain limitation that's was the main cause so, the technology was no longer to used.
3. There are so many Eye Tracker was implemented after the Almaden Eye tracker but no one can fulfill the market strategy.

III. FACTORS WHICH CREATED THE CHALLENGES

I think that poor results aren't the fault of the technology its totally depends upon the researcher mind that how far human work and think.

There are three major factor which created the challenges:-

A. Poor Communication between IT sector and market Poor communication between Information Technology Research Department's which is productivity which create the issue between Research Departments and IT sector. Before launching the products in market it is necessary to check the customer satisfaction, if the technology were not working according to users choice then they not reached up to a final edge and these things are created due to the poor communication in between users and IT sectors.

B. Lack of IT governance- Like the newest or most popular technology may be appealing, so the system be not care about the running technology implementation they switch on to the new technology.

C. Alignment issues- Technology needs to do work properly but due to inappropriate relations among the industry caused the problem of alignment.

IV. SOLUTION TO IMPROVE THE BLUE EYES TECHNOLOGY

The Eye Tribe Tracker eliminates all the challenges of by delivering a platform for self-service that puts the value of "Blue Eyes Technology".

The benefits of Eye Tribe Tracker are:-

- It give response in nanoseconds.
- The result will always accurate.
- Eye Tribe Tracker is a portable device so, there is no need to establish connection.
- No any specialist is required, there is few line of code after that anyone can used.

Eye Tribe is one of the fortune 8 favorite gadgets. The starting price of tracker is 5,000$ and it support c-sharp, java, c++. The tracker enables eye control on display screen allowing eye navigation and control cloud-based data analytics. It was started seven years ago by the four students of IT University at Copenhagen. Sun Alstrup Johansen is the CEO of EyeTribe company. The technology was launched on 10th August 2017 by the Eye Tribe Company. All the impossible things is came to be true after the implementation of EyeTribe Tracker like machine sense your work with the help of eye and start doing work according to that.

Figure 3. Eye Tribe Tracker

Eye tracking is a technology which calculate the eye gaze point of a user as he or she looks around.[4] www.eyetribe.com

Eye tracker is externally equipped on to the gadgets which enables the users to use their eye gaze as an input modality that can be combined with other input devices like mouse, keyboard, touch and gestures.

The eye gaze coordinates are calculated with respect to a screen the person is looking at, and are represented by a pair of (x, y) coordinates.

Figure 4. Fighter Tie Game

In this paper there are two implementation part the first one is EyeTribe Tracker and the second is Explorer Kit. The Electric Imp Explorer kit is basically a IOT(Internet of Thing) device which work on the Bluetooth or Ethernet that's why it is called to be as **Portable Explorer Kit.** It is used to measure the current temperature or humidity of electronic equipment with help of server or Cloud based application. we can measure the readings using electric imp app in smart phone or laptop. It work on Saas (Software as a Service) platform so it can easily accessible from anywhere at any time. If you connect your devices through Explorer kit then you can manage your home automation work from anywhere so, it can reduce the gap between Electronic and Physical world. The Electric Imp Explorer Kit consist the two hardware device for running the application from anywhere.

The hardware devices are:-

1. Explorer Kit:- It is a self-contained connected device. It uses the blink-up process to establish the connection and act as a interface between connected device.

2. Imp card:- It is the sensor which is used to check the current temperature or humidity with the help of approval or alerts which is generated by the Electric Imp application. Imp card have certain extension like(001-010). For every extension there is predefined work. In this paper I am using imp card 001 which is a temperature or humidity sensor.

V. WORKING AND SETUP OF EXPLORER KIT

The smartphone is connected with Explorer kit using blinkup process once the connection is complete the electric imp application start working. The information or data will send in Imp Cloud then it will

trap the receiver and give the result of running process.

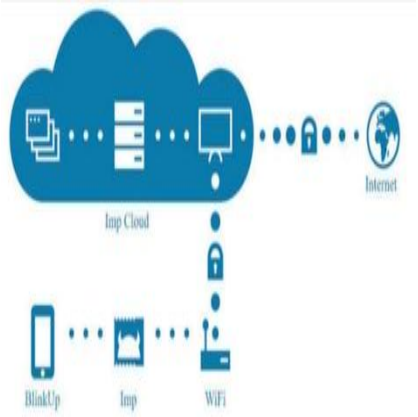

Figure 5. Working module of Explorer Kit

The following are setup of Electric Imp Explorer Kit-

1. Download the electric imp application from playstore- When the app has been downloaded then sign in and login into your account using username and password.

2. Select your Wi-Fi network- After the login in account there are two choice of connection first is from Bluetooth and second is Ethernet then the will send into the imp cloud.

3.Perform a Blink-Up- It tells you to power up your impExplorer Developer Kit with the mini USB cable (connected to either a USB AC adapter or a USB port on your computer). The on-board imp001's status LED will now begin blinking orange if you have a brand new impExplorer Developer Kit, or red if it has been used before for perfect connection it should be stable green.

VI. APPLICATION OF OVERALL SYSTEM

- Now a days games which require co-ordination and Fast reaction like (fruit & Ninja, Fighter Tie).
- Automobile industry for manufacturing the parts.
- Perpetrators were easily caught.
- It reduces the gap between electronic and physical world.
- It manage the "Traffic Collision Avoidance System"(TCAS).
- Used in ship navigation.

VI. FUTURE ASPECTS

The blue eyes technology reduce the gap between electronic & physical world in near future. The aim of this technology is to deploy the human skills on machine so, our work is automatically done. In future it interact with all system and start talking with humans and maintain the coordination between human and machine.

VII. CONCLUSION

The Blue Eyes Technology have certain limitation which was overcame by IBM Almaden Eye Tracker, but the structure of Almaden was giant and complex. So, the concept of Eye tribe Tracker was introduced by Eye Tribe company in 2017. It capture the emotion as well as behavior of humans in just a nanosecond and manage the co-ordination or response. Instead of that it manipulate the work of human like screening of email etc when the Electric imp (IOT) concept added with this technology then it will totally reduce the man power. A kind of sense automation will generated if the Blue Eyes Technology will extend through Electric Imp ExplorerKit.Imagine the world

when you go to home and see on power button then your laptop will open, the necessary mail will screening automatically all the documents were arranged according to your virtual mind through eyes.

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Virtual Keyboard

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ABSTRACT

Nowadays People uses Standard computing devices like Desktop Computers and Laptops to cut back their everyday work, in addition more advanced gadgets like mobiles and PCs. To enhance the mobility and quality individual wants to cut back the dimensions of the devices. Thus most of the mobile devices and hand-held devices contain really small keypads. Individuals who use such a tool find it tough to see the letters on the keypads. With a mobile device, a full size physical keyboard is not compatible. However all of traditional keyboard deficit the accuracy and convenience of a full size keyboard [1].

This paper confers an innovative approach for virtual keyboard to hammer the above mentioned issues, which might be a feasible replacement for fold-up keyboards. The keyboard primarily based on the vision based human-computer interaction concept, image capturing and image processing technique that contains virtual keys adequate to the dimensions of traditional keys within the normal QWERTY keyboard. The final result of the virtual keyboard project was a economical, user friendly and movable virtual keyboard, that sends typed characters to any laptop. This virtual keyboard provides the short touch-typing feedback to the uses[1].

Keywords: Virtual Keyboard, The sensor Module, The IR Light Source, The pattern projector, image processing, camera

I. INTRODUCTION

Machine writing was invented for mechanical typewriters which had the current QWERTY key layout since 1874.This QWERTY interface survived because of its many positive outlooks. QWERTY is widely used keyboard layout on English-language computer and typewriter keyboards. It takes its name from the first six characters present in the far left of the keyboard's top first row of letters.

However, this is not achievable for text entry in smaller computing devices such as PDA's and mobile devices and input to the small devices is becoming an increasingly important factor in development for even more powerful embedded market. Touch typing is an initial method that deploys discrete sensors, or sensed area, or buttons for one or a set of atomic symbols (characters, digits, letters) of a natural language. E.g. common keyboard, the keypad of a mobile phone, on-screen keyboards on PDAs. This definition explicitly consist virtual keypad buttons that only differ from the surrounding physique in that their extent is sensed by some ways for touch by a finger or pointer[2].

A virtual keyboard can be defined as a key-in touch typing device that does not have a physical appearance of the sensing areas that is the sensing area which acts as a button. But not per use but is

programmed to act as one. Therefore, sensing area can be realized with image sensors, finger tracing methods, or a touch pad. The latter is different from a keypad as it does not have a prior designated area for buttons.

Virtual keyboards that employ different sensing areas for each symbol inherently pass the realization of soft keyboard. The basic idea behind creating virtual keyboard is it is confined in space , well designed, handy and really easy to operate too, which results in the perfect solution for cross multilingual text input.

II. SYSTEM ARCHITECTURE

The 3-D range camera is placed several cm over the input surface, with a well-defined angle facing the working place. The suggested system consists of three main hardware modules. The sensor module is mounted on the camera, facing the same area, which would generate the observable feedback for the keyboard and input info [3].

A. Sensor module:-

The sensor module serves as an eye of keyboard perception technology. The sensor module operates but locating users fingers in 3-D space and tracking the deliberated key strokes. Key stroke information is processed and can then be output to host device via a Bluetooth or USB[3].

Figure 1. Sensor Module

B. IR Source (illumination module):-

The IR light source emits a beam of infrared light. This IR light beam is designed to overlie the area on which the keyboard pattern projector is mounted. This is done so as emblaze the users fingers by infra-red light beam. This helps to identifying the hand movements and pressing of keys. The light beam ease in scanning the image. Accordingly information is passed on sensor module which decodes that information[3].

Figure 2. IR Light Source

C. Pattern projector

It presents the image of keyboard. This forecasted image is of standard QWERTY keyboard, with all the keys and control functions as in the keyboard. The projector features a wide-angle lens so that large pattern can be calculated from relatively low heights. In some type of virtual keyboard, a second infra-red beam is not compulsory. A sensor or camera in projector takes up finger movements, and passes the information on sensor modules[3].

Figure 3. Pattern Projector

III. WORKING OF VIRTUAL KEYBOARD

A. Template projection

A template produced by a highly designed and highly efficient projection element with a red diode laser is projected onto the nearby interface surface. The template is not however intricate in the detection process and it is only used as a reference for the user. In an environment, the template can just as easily be printed onto the surface [4]. It shows projection of template (keyboard).Various types of projection elements are obtainable in market.

B. Reference plane illuminations

An IR plane of light is generated on the interface surface. The plane is however located just above and parallel to the surface. The light can't be visible to the user and hovers a few mm above the surface. When a key position is forced on the surface, the light is reflected back from the IR plane in the surrounding of the key and directed towards the sensor module.

C. Map reflection coordinates

The reflected light user correlation with the interface surface is directed through an infra-red filter and imaged on to an image sensor in the sensor module. The sensor chip is made up of a custom hardware which is embedded such as the VIP (Virtual Interface Processing) Core and it is capable of generating a real time determination of the location from where the light was reflected.

Figure 4. Virtual Keyboard

D. Image Processing with MATLAB

Images are worldwide, from every devices like cameras and smart phones to specialized devices for medical imaging, industrial automation, automotive safety and more. Each of these uses for image processing has specific challenges. MATLAB and Image Processing Toolbox provide a flexible

surroundings to explore design ideas and create distinctive solutions for imaging systems.

MATLAB toolbox used in this project is as follows :-

1. Image acquisition Toolbox.
2. Image processing toolbox
3. GUI builds.

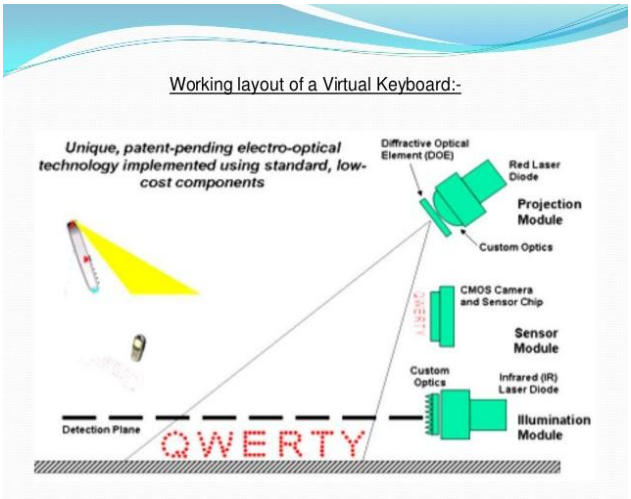

Figure 5. Working Layout

IV. ALGORITHM

1. ycbcr2rgb - to change ycbcr image to rgb.
2. Color based thresholding.
3. Find the logarithmic values of color.
4. Blob detection algorithm - to detect rgb color blob (stickers)[7].
5. Divide keyboard image into a sector.
6. Positioning the stickers with sectors.
7. Find the word of sector.
8. Show the output on command window.

V. ADVANTAGES

1. Highly Portability, accuracy, flexibility.
2. Speed of text entry.
3. Noise less than conventional keyboards.
4. The typing does not require a lot of force. So easing the strain on wrists and digits.
5. They are also made to be water proof and hence less prone to damage when spills occur
6. Maintenance of the laser keyboards is much easier.

VI. DISADVANTAGES

1. Tactile feel is not possible.
2. Dirty screens.
3. Virtual keyboards are hard to get used to. Since it combines of typing in thin air, hence it requires a little practice. Only people who are good at typing can use it efficiently [5].
4. It is very costly ranging from 150-200 dollars.

VII. FUTURE ASPECTS

1. Laser keyboards can be embedded into ATM's.
2. Laser keyboards can be used into space craft's as they are very lighter and smaller.
3. It can be embedded into digital lockers into banks, hostels for entering passwords and digital door lockers based on passwords.

VIII. CONCLUSION

1. A virtual keyboard system based on a true-3d optical range camera is presented.
2. No training is required by the system that automatically adapts itself to the background conditions when turned on.
3. The feedback text and graphics can be integrated with such projector, thus enabling virtual working areas.

4. It is also used in 6th sense technology device in which it is not depends on surface.

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Video De-noising by Different filters for different Noise

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ABSTRACT

In this paper we have adopted various filter technique for removing noise from video. The existence of noise in video gives blurred, snowy appearance. Video contain noise that comes from different electronic sources. Noise reduction is a useful tool to: enhance perceptual quality, increase compression effectiveness, in addition to pattern recognition processes. The quality of video is measured using Mean Square Error, Root Mean Square Error, Peak-to-Signal Noise Ratio and Average Difference. The results were compared to identify the significant filtering technique for de-noising in video applications.

Keywords: Video processing, noise, filtering, MSE, RMSE, AD

I. INTRODUCTION

Noise removal is the challenging task in video processing. The aim of filtering is to remove noise from the video in such a way the "original" video is visible. Image noise is an irregular, undesirable, variance of pixel esteems in picture. Any certifiable sensor is influenced by a specific level of noise, regardless of whether it is thermal or electrical. Thus the measurement of the signal will be corrupt, such that the output data is mixture of signal and noise. There are various filters technique for the removal of Gaussian noise (white noise), Salt & Pepper noise and Speckle Noise. Filtering technique is use to enhance the quality of the picture [1]. Video de-noising is the way toward expelling noise from a Video signal. Video de-noising strategies can be isolated into spatial video de-noising, temporal video de-noising and Spatial-temporal video de-noising. Noise reduction is applied to each individual outline in spatial video de-noising. In temporal video de-noising techniques, noise between outline are minimize. Spatial-Worldly video de-noising strategies utilize a mixture of spatial and temporal de-noising [1].

Noise removal is the difficult task in digital image processing.

The various evaluation parameter on which the quality of video measures are MSE, RMSE, and AD. If the value of MSE, RMSE, AD is low then the value of PSNR is larger and better the enhancement approach [1].

Firstly, the noise detect according to human visual characteristic and then for removing salt and pepper noise, median filter is used and for removing Gaussian noise, spatial-temporal adaptive filter. Experiment shows that it remove mixed noise from image [2]

This paper describe depth about various types of noise model which are helpful in selection of proper noise in image de-noising system [2] .

II. TYPRS OF NOISE

A. Gaussian Noise

It is moreover called as electronic clamor since it rises in intensifiers or locators. Gaussian clamor caused by basic sources, for instance, warm vibration of particles

and discrete nature of radiation of warm inquiries. Gaussian clamor by and extensive irritates the dull regards in mechanized pictures. That is the reason Gaussian commotion show fundamentally made and characteristics by its PDF or institutionalizes histogram as for dark esteem.

B. White Noise

Gaussian property does not implies in white sense. The recurrence space of background noise in the range - _ to +_. It demonstrates that noise control is vast in perfect background noise. In repetitive sound pixel esteem is not quite the same as their neighbour so relationship isn't conceivable.

C. Brownian Noise (Fractal Noise)

Due to Brownian movement Brownian noise is caused. Brownian commotion caused by Brownian movement. Brownian movement seen because of the irregular development of suspended particles in liquid. Brownian noise can likewise be created from repetitive sound.

D. Impulse Valued Noise (Salt and Pepper Noise)

The impulse noise is also called as Salt and pepper noise. Salt and Pepper noise is caused when dust particles is present in the camera. Picture pixel esteems are supplanted by tainted pixel esteems either most extreme 'or' least pixel esteem i.e., 255 'or' 0 individually, if number of bits are 8 for transmission.+

E. Periodic Noise

This commotion is delivered from devices checks, especially in charge movement in the midst of picture acquisition. This commotion has exceptional properties like spatially dependent and sinusoidal in nature at results of specific repeat. It's appears in kind of conjugate spots in repeat space. It can be beneficially removed by using a tight band expel channel or step channel.

F. Speckle Noise

This clamour is delivered from devices impedances, especially in charge movement in the midst of picture securing. This clamour has remarkable characteristics like spatially dependent and sinusoidal in nature at results of specific repeat. It's appears in kind of conjugate spots in repeat space. It can be beneficially cleared by using a restricted band expel channel or step channel.

G. Photon Noise (Poisson Noise)

The presence of this noise is seen because of the measurable idea of electromagnetic waves, for example, x-beams, obvious lights and gamma beams. The x-beam and gamma beam sources transmitted number of photons per unit time. These beams are infused in patient's body from its source, in restorative x beams also, gamma beams imaging frameworks. These sources are having irregular vacillation of photons. Result accumulated picture has spatial and transient arbitrariness.

H. Structured Noise

The presence of this noise is seen because of the measurable idea of electromagnetic waves, for example, x-beams, obvious lights and gamma beams. The x-shaft and gamma pillar sources transmitted number of photons per unit time. These shafts are injected in patient's body from its source, in remedial x bars likewise, gamma pillars imaging structures. These sources are having subjective difference in photons. Result amassed disturbance are irregular, stationary or non stationary and an intermittent in nature. If this commotion is stationary, it has settled sufficiency, repeat and stage. Sorted out commotion caused by blocks among electronic parts. Commotion presents in correspondence redirect are in two segments, unstructured clamour (u) and sorted out commotion (s). Sorted out uproar is furthermore called low rank fuss. In a banner setting it up, is more advantagable (more reasonable) to considering uproar exhibit in a lower dimensionality space.ge has spatial and transitory abnormality.

III. PROPOSED SYSTEM

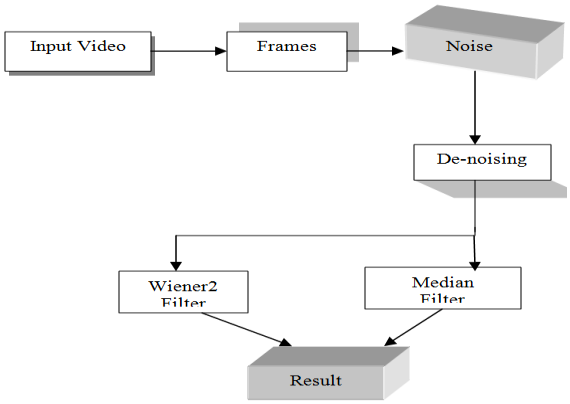


Figure2: Proposed System

In this system, firstly the video is converted into frames. The various noise as Gaussian noise, salt and pepper noise are added on frames. Wiener2 filter and Median filter2 is used to remove noise from that frame. The filtered video is free from noise.

IV. FILTERING TECHNIQUES

A. Wiener2 filter

It performs two-dimensional versatile noise evacuation sifting. Wiener2 low pass channels a force picture that has been corrupted by steady power added substance commotion. Wiener2 employments a pixel-wise versatile Wiener strategy in view of measurements evaluated from a nearby neighbourhood of every pixel. It employments neighbourhoods of size m-by-n to appraise the mean and standard deviation of a picture. Wiener2 gauges the neighbourhood mean and fluctuation around every pixel. This channel is utilized to evacuate the Gaussian commotion. The wiener channel is a picture rebuilding arrangement that can be connected to pictures that have a corruption work and furthermore commotion. The debasement work is given by G(u, v).

B. Median Filter2

Middle Channel stick the photo without getting darkened. Middle Channel is done on a photo grid by finding the centre of the territory pixels by using a window that slides pixel by pixel.

It performs middle separating of the grid An of each two estimations. Each yield pixel contains the centre an impetus in the m-by-n neighbourhood around the relating pixel in the information picture. Medfilt2 pads the photo with zeros on the edges, so the centre regards for the concentrations inside [m n]/2 of the edges may appear to be bent. This channel is used to remove the salt and pepper commotion.

V. EXPERIMENTAL RESULTS

The proposed estimations have been executed utilizing MATLAB. The execution of various commotion evacuation approaches using wiener2, median2 and filter2 channels are analysed and talked about. MSE, RMSE, Promotion are used to analysed the upgrade execution. . The outcome is taken by looking at the execution of Wiener2 Channel, Middle Channel based on PSNR and MSE esteem.

Original Frame (a)

Gaussian noise (b)

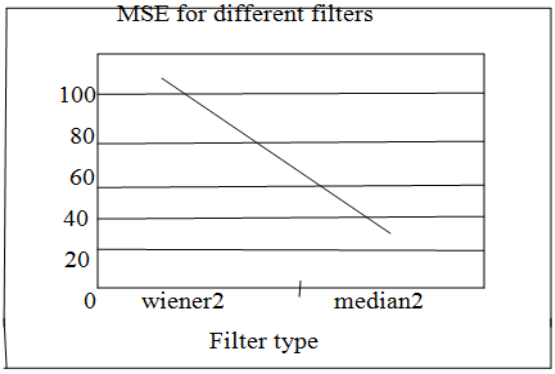
Salt and Pepper Noise (c)

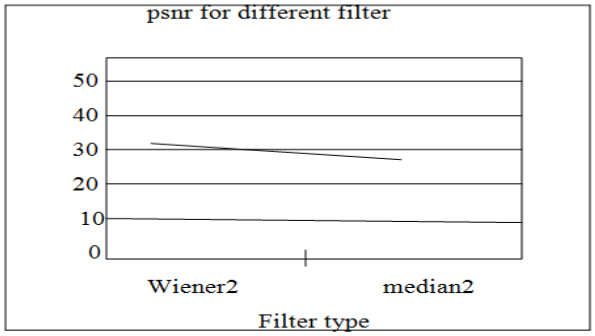
Median2 Filter (d)

Wiemer2 Filter (e)

TABLE 1

S.No	Filter	MSE	PSNR
1.	Wiener2	80.61	30.22
2.	Median2	30.92	29.18





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Search Engine Optimization Techniques

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ABSTRACT

Most Search Engine Optimization is nothing but a practice to attract traffic on the website. SEO makes the website SEO friendly and visible within the top results of the search. It increases the quality of traffic on the website and also the results achieved by the SEO are permanent or long lasting. 70% of SEO is in the hands of developer while designing a website i.e. ON PAGE SEO and the rest 30% is done by applying other strategies i.e. OFF PAGE SEO. This paper comprises the study of techniques which makes the website appear in top 10 results of the searches.

Keywords: traffic; seo technics; seo friendly; on page seo; off page seo

I. INTRODUCTION

Noise Search engine optimisation (SEO for short) is just the method of getting web site guests (or traffic) from “free” or “organic” search leads to search engines like Google or Bing. All major programmes have primary search results that area unit hierarchical supported what the search engine considers most relevant to users. we have a tendency to decision these organic results, as a result of they are free and not driven by paid advertisements. Programme optimisation helps maximize the quantity of holiday makers to a selected web site or page by making certain that the positioning seems high on the list of organic results came by a given programme. [18] [19] Methodology of SEO: Start with pages: The page is that the next level of graininess up from the keyword that may be simply measured.

Pair pages to keywords: Catchphrases square measure still the essential motor of the Website design enhancement strategy, since it's however clients see your pages. and furthermore the positioning of your pages on those watchwords is a crucial metric for connecting execution of the page.

Plan , Execute and Track: Page that is the new focus of the Web optimization Universe. Page-driven planning, execution, and measure implies page changes (not watchword transformations) are the metric of progress. the plan of objectives and furthermore the execution of errands can progress in the direction of that wrap up.

Wire the powerful knowledge sources: All information has importance and associated. Incorporated and revise learning from sources tantamount to Google Website admin Devices and apparatuses like Lofty Web optimization square measure fundamental in an exceedingly Secure Pursuit surroundings. Google Website admin Devices' catchphrase snap and impression knowledge provides halfway perceivability into your prosperity inside the substance of "Watchword (Not Gave)." Back link information offers you a picture of what the web crawlers see concerning not exclusively your site however conjointly your rivals' locales.

Utilize technology to manage information at scale: The right innovation stage licenses you to incorporate data from site examination, back link trackers, social

stages and Google Website admin Instruments. After you will see your rank, catchphrase, social and substance data in far reaching dashboard reports, you'll get laser-sharp perceivability into the achievement of your pages and can be prepared to make determinations on an approach to organize future exercises easily. the right innovation accomplices have profound associations with the web crawlers and make visit item improvements, serving to you keep educated the advancing pursuit scene II.

II. PRINCIPLE OF SEO

SEO could be a promoting discipline centered on growing visibility in organic (non-paid) computer programme results. SEO encompasses each the technical and artistic components needed to boost rankings, drive traffic, and increase awareness in search engines. There ar several aspects to SEO, from the words on your page to the means alternative sites link to you on the online. Generally SEO is solely a matter of creating certain your web site is structured during a means that search engines perceive. SEO is not just concerning building search engine-friendly websites. It's concerning creating your web site higher for individuals too.

[11] Principles of SEO:

A. Keywords:

When you accept making content, grasp the words that individual's square measure victimization to look. Each page ought to be engineered around keywords that square measure most vital to you and your company. Do your school assignment. after you square measure manufacturing pages for your web site, use the simplest keywords on each post. Google helps you together with your keywords. after you start to kind into the search bar on Google, it provides you suggestions of common words or phrases that individuals use in an exceedingly search. If you would like to require it one step additional, you'll use a tool referred to as Google Keyword Planner that may tell you common keywords. it'll tell you true numbers of what percentage average monthly searches square measure occurring with those keywords.

B. Image tags:

folks have pictures everywhere their websites, and that i am perpetually shocked once bloggers do not establish the photographs. Google compartmentalisation sites got to perceive what the image is and once it ought to be served up. You need to tag your pictures. If there area unit none, Google doesn't acumen to spot the image.

C. Meta Description:

Right below your computer address on the search page could be a sentence that is the meta description. this can be a very important outline that tells folks what they'll learn on the page. you would like it to be participating and truthful and prompt folks to click and learn additional. Use call-to-action words similar to "learn" and "visit" to interactfolks and encourage them to search out out why the data on your page is vital to them.

D. Backlinks:

One of the matters that are incredibly valued in website positioning is back links. Back links are incoming hyperlinks from one webpage to any other -- in other words, people linking to your internet site they determine the price in what you are saying. In addition, you will choose to include hyperlinks to supply your readers more useful information and to help build relationships with different bloggers.

SEO techniques

[12] [13] [14] The tactics and methods used for Search Engine Optimization are as follows:

On page SEO is the technique in which the content on the website is modified in order to make it Search

Engine friendly. It includes modifying the text, XML Sitemap, HTML, CSS, Graphics etc.

III. COMPONENTS OF ON PAGE SEO

Following are the components of on page SEO:-

1. Page Title:-

The two web page titles are one of the most necessary search engine marketing factors on the site. Each of your pages & posts have to have its very own special title, which consists of the primary key phrases for that page.

2. Use the key-word phase in URL:

Using the key-word phrase in the URL of your page or put up is convenient to do in Word Press as lengthy as permalinks are enabled. Word Press robotically generates publish slugs from a post's title, and you can edit the slug to contain your exact key-word phrase.

3. The Meta Description:

The META description is generally the short "snippet" paragraph displayed below a link in a Search Results Page. However, relying on the search term, Google will now and again show something different than the META description, highlighting words used in the content that are applicable to the user's search terms.

4.Avoid Keyword stuffing:

Keyword stuffing is repeating the same phrases or phrases so frequently that it sounds unnatural.

5. Internal Linking:

After the web page is optimized, be certain to create hyperlinks lower back to the page from other content material on your website. Look for locations where you point out the keyword phrase on other posts and pages and take that chance to link returned to the web page your are optimizing for that phrase.

IV. Off Page SEO

Off page SEO refers to techniques that may be wont to improve the position of an internet site within the programme results page (SERPs). Many of us associate off-page SEO with link building however it's not solely that. In general, off Page SEO must do with promotion ways – on the far side web site style –for the aim of ranking a web site higher within the search results.

1. Social Media Involvement:

A major Off-page SEO technique is social media engagement. If you would like to create yourbusiness, website or diary common, interact with folks on multiple social media platforms. Social media presence can facilitate grow your business and additionally assist you get additional back links.

2. Social Bookmarking Sites:-

Social bookmarking websites are one of the quality systems to promote your website. When you bookmark your webpage or blog publish on famous social bookmarking websites, you obtain high traffic to your webpage or blog.3.Submissions:- This includes submitting different documents which include:

- ✓ Forum Submissions.
- ✓ Video Submissions.
- ✓ Image Submissions.
- ✓ PDF Submissions.
- ✓ Articles Submissions.
- ✓ Document Sharing.

V. OFF PAGE SEOBLACK HAT SEO TECHNIQUES

Black Hat SEO is most ordinarily outlined as a disapproved follow that yet may increase a page's ranking in a very computer programme result page (SERP). These practices ar against the computer programme's terms of service and might end in the positioning being illegal from the search engine and affiliate sites. a listing of ways and techniques utilized by black hat SEO practitioners are overtly denounced on Google's Webmaster tips and Bing's Webmaster tips.

Components:-

Content Automation

Doorway Pages

Keyword Stuffing

Sneaky Redirects

Link Manipulation

Creating pages, subdomains, or domains with duplicate content

Pages with malicious behavior, such as phishing, viruses, trojans, and other malware

VI. GRAY HAT SEO TECHNIQUES

It is what its title suggests. It's somewhere in the center of white and black and if used by using a professional, can nonetheless be effective. However, it's secure to say that taking a gray hat method is playing with hearth if you're notone hundred percent sure of what you're doing. Components:-.

- ✓ Cloaking
- ✓ Purchasing old domains
- ✓ Duplicate content
- ✓ Link buying

Social media automation and purchasing followers

VII. WHITE HAT SEO TECHNIQUES

White hat SEO is that the opposite of Black Hat SEO. Generally, white hat SEO refers to any apply that improves your search rankings on a look engine results page (SERP) whereas maintaining the integrity of your web site and staying at intervals the search engines' terms of service. These ways keep at intervals the bounds as outlined by Google. samples of white hat SEO include:

Offering quality content and services

Fast site loading times and mobile-friendliness

Using descriptive, keyword-rich meta tags

Making your site easy to navigate

Components:-

Focus on User Experience (UX).

Keyword Research.

Rich and Attractive Content.

Link Building

V. CONCLUSION

This paper shows the study of various Search Engine Optimization methods on various experimental results in order to depict and formulate the best technique and the most efficient one that needs to be undertaken by a person for getting the most proficient outcomes. According to the researches, it can be concluded that for having the website to be in top ten results of the search , one has to follow the best suitable techniques such as the ones enlisted above and the results will be more than satisfactory in terms of increase in traffic, business development, page ranking, web ranking and to be more specific the results will be long lasting or permanent.

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A Comparative Study of Image Compression Techniques

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ABSTRACT

The increase in the amount of images captured per day and uploaded over cloud nowadays requires much more bandwidth then previous few years. The high end enhanced image quality requires more number of bits per pixel which increase the overall size of a single image. We generally need to compress the image before storing and transmitting over the channel. In this paper we shall discuss three algorithms for image compression such as: - Block Truncation Coding (BTC), Discrete Cosine Transform (DCT) and Singular Value Decomposition (SVD). We shall compare the results by using MATLAB as tool by calculating Mean Square Error (MSE), Peak Signal to Noise Ratio (PSNR) and Compression Ratio (CR).

Keywords: Image compression, BTC, DCT, SVD, MSE, PSNR and CR.

I. INTRODUCTION

In this super fast world people do not wish to wait for a second. Similarly in case of image transmission and uploading of image over internet where people are more obsessed about taking pictures from a DSLR whose average size of image ranges from 4-12 Megabytes (MB). A picture of such size needs a higher bandwidth of channel to transmit from one place to another instead it will have higher transmission time. Although it can be possible to transfer such size of file in just blink of eye by applying different compression algorithms to the image.

There is two type of image compression technique such as lossy image compression and lossless image compression.

The loss in term of information required to represent an image comes under lossy image compression where the compressed image losses some of the information as the bits are reduced per pixel in compression.

In lossless image compression the original image is regenerated by the compressed representation of image where there is no loss in the information is seen. Both the techniques applied depending on the requirement of the scenario.

In case of social sites and messaging application lossy image compression can be applied where as in case of official documents and banking details we require lossless image compression.

II. LITERATURE SURVEY

A compression algorithm is one which reduces the size of image in context to bit representation. Compression is none other than encoding of an image

in some other representation and to get it back decoding the compressed image. In the field of digital image processing, a large variety of image compression algorithms have been introduced. Some of them are efficient and being used in different field depending on their requirements. Below is the literature survey on different proposed algorithms for image compression by authors.

In [1], the author uses the adaptive interpolation for image compression and decompression which is computationally inexpensive and reduces the size of image effectively. The author also provided different compression ratios that can be applied based on original image.

In [2], the author performed a new compression technique by combining two algorithms in two step sequence where in first step he used Lempel-Ziv-Welch (LZW) algorithm and in second step the output of first step is input to the second algorithm that is Bose, Chaudhuri and Hoc-quenghem (BCH). The compression ratio was higher than other algorithms.

In [3], the author introduced two new algorithms based on Run length encoding (RLE). He proposed RLE-1 and RLE-2 which gave better result by saving bytes and increasing the compression ratio. Almost 17.88% and 17.75% better CR respectively.

In [4], the author compared five algorithms and their advantages and disadvantages among other algorithms. It was a survey paper on image compression. The compression techniques are wavelet compression, JPEG/DCT, vector quantization, fractal and genetic algorithm.

III. ALGORITHMS

In this paper we shall be working on three algorithms to find out which one is giving better result based on the parameters as compression ratio, MSE and PSNR.

The objective is to reduce the redundant bits by eliminating them from repeating in the image. The algorithms we are working on is lossy compression algorithms.

A. Block Truncation Coding

It is a lossy image compression type of technique for greyscale and also used for colour image compression. The original image is being divided into blocks and after that quantises to reduce the gray levels by keeping the mean and standard deviation similar.

For a two level quantization the formula is given by:

$$y(i,j) = \begin{cases} 1, & x(i,j) > \bar{x} \\ 0, & x(i,j) \leq \bar{x} \end{cases} \quad (1)$$

Here x is the original image where as y is the compressed image block which is calculated based on the mean value.

The compressed image is then transmitted along with the mean and standard deviation to retrieve back the original values. The value of a and b is calculated as such by formula:

$$a = \bar{x} - \sigma\sqrt{\frac{q}{m-q}}$$

$$b = \bar{x} + \sigma\sqrt{\frac{m-q}{q}} \quad (2)$$

Where sigma is standard deviation, m is total frequency of pixel and q is the frequency of pixels greater than mean.

$$x(i,j) = \begin{cases} a, & y(i,j) = 0 \\ b, & y(i,j) = 1 \end{cases}$$

(3)

To reconstruct the image 0's are replaced with a and 1's are replaced with b.

B. Discrete Cosine Transform

In DCT the image is processed in blocks of size 8x8 of different frequencies. DCT is generally used for the process of JPEG images. It is again a lossy image compression technique where compressed block is stored in reduced space. These blocks of image are processed from left to right and top to bottom.

Steps:-

1) First, the image is split into blocks of 8x8 to process quantization.
2) Second, DCT is calculated for each block applying from left to right and top to bottom along the image.

$$D(i,j) = \frac{1}{\sqrt{2N}} C(i)C(j) \sum_{x=0}^{N-1} \sum_{y=0}^{N-1} p(x,y) \cos\left[\frac{(2x+1)i\pi}{2N}\right] \cos\left[\frac{(2y+1)j\pi}{2N}\right]$$

(4)

$$C(u) = \begin{cases} \frac{1}{\sqrt{2}} & \text{if } u = 0 \\ 1 & \text{if } u > 0 \end{cases}$$

(5)

Where p(x,y) is the pixel value of the image represented by matrix p along x and y coordinate and N is the size of the block of DCT.

3) Third, quantization is performed on each 8x8 block of image which in result compresses the size of each block.
4) Fourth, reduced image formed by these blocks are then stored in memory.
5) Fifth, decompression can be done on the compressed image to retrieve back the original image by applying inverse discrete cosine transform (IDCT).

C. Singular Value Decomposition

Image processing and signal processing is being the main field of singular value decomposition as in image processing it works as to reduce noise and image compression and in signal processing to least square fitting. The working of SVD is to decompose the maximum signal energy into few coefficients as per need.

The singular value decomposition takes a matrix A of dimension m*n and decomposes by

$$A = U \sum V^T$$

(6)

Where $\sum$ hold the singular values of A along diagonally, U and V are matrices having dimension m*m and n*n respectively and are orthogonal matrices.

It calculates eigenvalues and eigenvector by A^TA for computing SVD where eigenvector is used to structure the matrix U and singular values are calculated by taking square root of the eigenvalues.

The generated matrix is now a reduced matrix which is decomposed based on the singular values that used to distribute the all values present in matrix A.

IV. METHODOLOGY

The algorithms of BTC, DCT and SVD are being used in MATLAB tool to compare the results of the compression techniques. Matlab is a matrix laboratory tool which is uniquely built for performing operations on matrixes.

The inbuilt libraries are very easy to use and provide a diverse range of functionality to be used by the user. An image is a 2-D matrix which holds the pixel value for each RGB for a color image where as a single value for a gray image.

A graphical user interface (GUI) is being build to visually show how the algorithms showing results by providing a 2-D image. The GUI have 3 section for each algorithm where each section hold the before and after size of original image and compressed image along with the MSE, PSNR and CR.

The traditional image of Lena is used for comparison between all the three algorithms. Also we have performed comparison of 10-15 images to find out which algorithm efficiently gives better result.

A. Block Truncation Coding

The BTC algorithm showed a compression ratio of 1.72 on the image of Lena along with the mean square error of 3.05 and peak signal to noise ratio of 43.32602 dB. The template is shown below.

Figure 1. Compressed result using BTC

We can see that the image is compressed from the size 592.93 KB is reduced by the block truncation coding to 345.08 KB.

B. Discrete Cosine Transform

The DCT algorithm showed a compression ratio of 1.56 on the image of Lena along with the mean square error of 4.26 and peak signal to noise ratio of 41.86888 dB. The template is shown below.

Figure 2. Compressed result using DCT

We can see that the image is compressed from the size 592.93 KB is reduced by the DCT to 379.57 KB.

C. Singular Value Decomposition

The SVD algorithm showed a compression ratio of 1.33 on the image of Lena along with the mean square error of 0.39 and peak signal to noise ratio of 52.26027 dB. The template is shown below.

Figure 3. Compressed result using SVD

We can see that the image is compressed from the size 592.93 KB is reduced by the SVD to 446.20 KB.

V. RESULT ANALYSIS

As the result generated it is quite obvious to analyze and predict that which algorithm performs efficiently and provide good result while compressing an image during storage and transmission.

The factors by which we can define that which algorithm can be used while transmission and which algorithm can be used for storage purpose.

We can say that an image needs to be highly compressed for transmission purpose and for storage purpose we can say that an image needs to be error free such that its mean square error should be minimum so that the compressed image holds the maximum original data.

Below is the table having data of nine images which are mostly used as sample images for image compression and analysis of image compression algorithms. The table has MSE, PSNR and CR for each algorithm BTC, DCT and SVD for each particular image.

The compression ratio (CR) of block truncation coding (BTC) is higher in all the nine images among other algorithms except the image Barbara which have the same compression ratio 2.28 with discrete cosine transform (DCT).

The image compressed by BTC is higher among other two algorithms.

Table 1. Data Obtained By Matlab

Image	Algorithm	MSE	PSNR	CR
	BTC	3.82	42.34378 dB	2.13
Airplane	DCT	6.49	40.04101 dB	1.72
	SVD	0.36	52.65154 dB	1.57
	BTC	12.02	37.36460 dB	1.45
Baboon	DCT	20.33	35.08343 dB	1.18
	SVD	6.15	40.27670 dB	1.04
	BTC	6.09	40.31910 dB	2.28
Barbara	DCT	10.46	37.96867 dB	2.28
	SVD	0.61	50.30531 dB	2.25
	BTC	10.13	38.11078 dB	1.81
Cameraman	DCT	14.06	36.68417 dB	1.29
	SVD	0.04	62.46416 dB	1.4
	BTC	3.05	43.32602 dB	1.72

Lena	DCT	4.26	41.86888 dB	1.56
	SVD	0.39	52.26027 dB	1.33
	BTC	3.45	42.78617 dB	2.11
Pepper	DCT	6.16	40.27114 dB	1.77
	SVD	1.25	47.20961 dB	1.64
	BTC	1.38	46.76361 dB	2.22
Pepper2	DCT	2.48	44.21708 dB	1.24
	SVD	0.17	55.82348 dB	1.15
	BTC	5.13	41.06360 dB	1.98
Sail Boat	DCT	8.85	38.69512 dB	1.61
	SVD	1.63	46.05110 dB	1.48
	BTC	1.69	45.89778 dB	2.11
Tiffany	DCT	3.95	42.20010 dB	1.92
	SVD	0.57	50.63899 dB	1.54

The compression ratio of BTC is higher than DCT and compression ratio of DCT is higher than SVD which is very clear from table 1.

If we talk about mean square error that is the error due to reduction in the information lost while compressing an image. The MSE for algorithm SVD is lesser than other two algorithms that show that this algorithm can compress an image efficiently along with lesser amount of information loss. The least value of MSE is for the image Cameraman with value 0.04 having a compression ratio of 1.4 which is not too bad.

The mean square error for SVD is least than other two and then comes the BTC algorithm which has less error than DCT.

VI. CONCLUSION

In this modern world where people are being more smart and intelligent along with smart gadgets the data transmission really require quick actions so to provide a better experience to the user. In this paper, it is concluded that block truncation coding algorithm is efficient in term of higher compression ratio where as in term of MSE the singular value decomposition have an upper hand.

BTC can be used where there is more focus on transmission rather than what information is present in the image where as SVD can be used for the credentials, banking details and confidential documents where data loss is not tolerated.

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An Experimental Study on Clustering Techniques in Data Mining

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ABSTRACT

Clustering is important in data analysis and data mining applications. Cluster can mean as a conglomerate of data sets which can be seen similar to other data set in the same cluster and also are not similar to the different objects in same clusters.[1]The objective of data mining process is to come out with output of useful and relevant information from a large data set and convert it into an understandable form so that it can be used in future. The Aim of this paper is to identify the high-profit, low error, high efficiency and high-value by one of the data mining technique.

Keywords: Data mining, Simple K means, hierarchical clustering, farthest first

I. INTRODUCTION

Data mining is the phenomenon to analyze the data from different data sources for different perspectives and making the summary of the one into an understandable and meaningful information through various decision producing algorithms. Data mining consists of many functions which have to be performing like it extracts the data and then transform the data, and load transaction data onto the data warehouse system. It store and manage the data in a multi-dimensional database system and present the data in a useful manner and format like a graph or table. It provides the satisfactory data access to business analysts and analyzes the specified data by the application software. Data mining involves the association rule learning, anomaly detection and classification, clustering, summarization and regression. In this paper, we have to do simple clustering analysis by the help of different clustering algorithms [2].Cluster Analysis is a fundamental operation in data and it is an automatic process to find the similar objects from the database. It's important features is that it discovers the patterns in large datasets. To extract the data patterns it used the intelligent methods. Basically in data mining process there are six classes which is anomaly detection, association rule learning, clustering, classification, regression and summarization. There are three stages of clustering in which first raw data is come then clustering algorithm is come after the last stage of clustering is cluster of data.

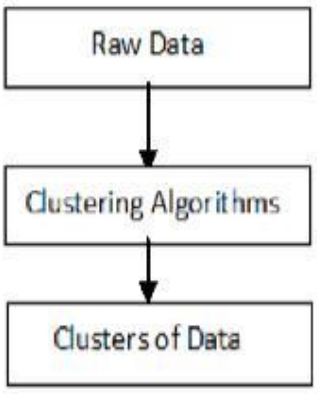

Figure 1. Stages of Clustering

II. LITERATURE SURVEY

Table 1

S. no.	Title of paper	Year of publication	Author's Name	Identified Problem	Methodology
1	Customer Data Clustering	2011	Dr. Sankar Rajagopal	In the real world there are many number of company which having large number of database but it can't manage these dataset.	We apply three algorithm in this paper and purpose of these algorithm is to provide low risk, high value and high profit.
2	Survey paper on Clustering Techniques	2013	Amandeep Kaur Mann and Navneet Kaur	The main problem in the hierarchical clustering algorithm that it don't visit the cluster again after once the visit.	In this survey paper, we have to understand the simply clustering algorithm and analyze the predict results which they produced.
3	Performance Analysis Of Clustering Techniques	2013	Kyle DeFreitas and Margaret Bernard	The main problem in the K Means Algorithm is number of cluster that means we have to define the values of k cluster in starting.	In this paper, we analyze the clustering algorithm and according to that we predict the case based results.
4	Clustering Algorithms in Educational Data Mining	2015	Ashish Dutt, Saeed, and Hamidreza Mahroeian	The main problem is that how the algorithm applied in the education field and produce the result.	The main aim behind in this paper is that to produce the low risk and high profit when we apply the clustering algorithm.
5	Lung Cancer Data Analysis by K-means and Farthest first clustering algorithms	2015	A. Dharmarajan and T. Velmurugan	The main problem of this paper is to identify the how the clustering algorithm apply in the medical field and to identify the yield of the field.	The final outcome of this paper is to analyze the high profit and low risk in the medical field.

III. CLUSTERING ALGORITHM

This Cluster can mean as a conglomerate of data sets which can be seen similar to other data set in the same cluster and also are not similar to the different objects in same clusters. That means the similar data set belong to the same class.To make the clusters for any data set there are so many algorithm which is like hierarchical, K-Means, Farthest First and the Partion Based Clustering Algorithm. These algorithms are mainly used for data mining.

A) Hierarchical Clustering Algorithm-

Hierarchical clustering is one of the method of clustering Algorithm which is used to build a hierarchy of clusters of a particular dataset. The hierarchical algorithms is the connectivity based algorithms of clustering and it mainly build the

clusters gradually of a dataset. Hierarchical clustering Algorithm having two types: First is agglomerative methods, which is the bottom up approach that means all the work has to be done the bottom to top fashion and the second is the divisive methods which is the top down approach that means all the work has to be done in the top to down fashion. The Agglomerative hierarchical clustering algorithm is a bottom up approach and the pairs of clusters are club together and become as one and then moves up the hierarchy and here each observation starts in its own cluster. The Divisive hierarchical clustering splits in the recursive manner and the move down the hierarchy.

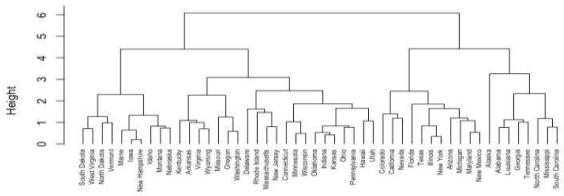

Figure 2. Hierarchical Clustering Algorithm

Advantages of hierarchical clustering

1. It is easy to implement and gives the best result in some cases.
2. Regarding the level of granularity it gives the embedded flexibility.
3. There is no need to require the predefined number of clusters.
4. It accepts any distance which is valid measure.

Disadvantages of hierarchical clustering

1. It is high in the time complexity.
2. It gives error rate high that is efficiency of correctness is low.
3. The main problem in the hierarchical clustering algorithm that it don't visit the cluster again after once the visit.

B) K Means Clustering Algorithm-

K-Means clustering Algorithm divides the n objects of a dataset into the k clusters and the main work in this k mean clustering algorithm is that here each object which having its mean value belongs to the cluster according to the nearest property of value. This Clustering Algorithm will produces the k different clusters which having the good quality. In this algorithm we simply make the two clusters and determine the mean value of each cluster. And analyze the mean value of these cluster set and now we take this mean value and find the new cluster set making this current value of mean value as a reference. and this process has to be continue until the we get two cluster set similar of last two process. That means when we find cluster set of continuously two process is same then our k means algorithm process is completed.

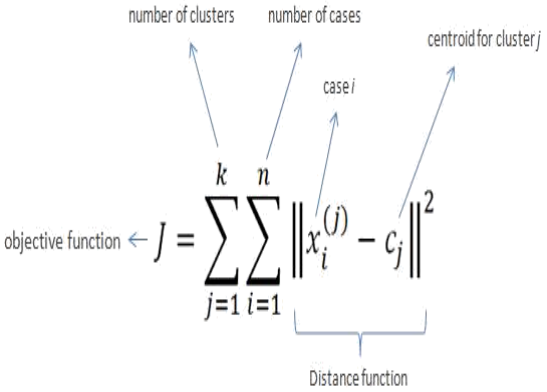

Figure 3

Procedure -

1. Firstly we have to make the k groups of the dataset and here k is the predefined. That mean we make the clusters initially.
2. After that we have to take the k value in the random fashion for making the center of the cluster.
3. And then we assigned the objects according to it's distance that mean which having minimum value from centre having one cluster and which having large value having other cluster. In this we use the Euclidean distance function.
4. Now we calculate the mean value of each cluster for next step.

We have to repeat the steps 2, 3 and 4 until we get same cluster set in consecutive rounds

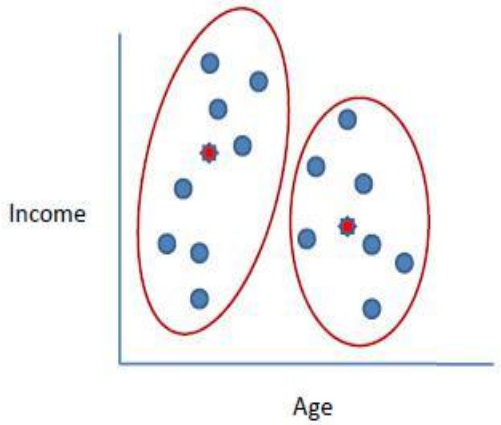

Figure 4

IV. METHODOLOGY

In this paper we have to do a review of clustering and its different Algorithms in data mining. here we used three clustering algorithm in data mining and according to that we analyze the result of these algorithms. The Algorithm which we used in this paper are HIERARCHICAL, K-Means and Farthest First Clustering Algorithm. For determining The Characteristics of these algorithm WEKA tool is used. Weka is a tool which is used for finding the properties and functionality of the algorithms. According to the WEKA tool we analyze the algorithm in terms of time, cluster instance and the efficiency factor. We have to predict the result by taking these factors of the algorithm which we get from the weka tool. Here we take the three different dataset and apply the clustering algorithm and then analyze the result and predict own results of the algorithm according to that factors which we have to take in this paper

IV. RESULT ANALYSIS

Table 2

dataset	Hierarchical Algo			K-Means Algo			Farthest-First Algo		
	Time (sec)	Cluster instanc	efficiency	Time(sec)	Cluster	efficiency	Time(	Cluster	efficiency
Dataset1	0.03	50% & 50%	good	0.02	50% & 50%	best	0.01	68% & 32%	better
Dataset2	6.49	100% & 0%	Not good	0.06	61% & 39%	good	0.05	89% & 11%	better

From Above result analysis table we can see that from all datasets the efficiency of Hierarchical clustering algorithm is not so good and it takes more time to predict the result.[3]And the K-Means clustering algorithm efficiency is good and it gives result in less time as compared to the hierarchical clustering algorithm but the farthest first clustering algorithm gives the result in very less time as compared to all the algorithm and it's efficiency is better. All the algorithm will produce the two cluster instance with different cluster percentages according to its dataset. And the error percentage rate is high in the Hierarchical approach but the correct result with in the short period of time is produced in the Farthest First Clustering algorithm

V. FUTURE SCOPE OF WORK

The main aim of this data mining procedure is to extract information from a large datasets and convert it into an understandable form so that it can be used in future. Clustering algorithm is useful not only for data analysis but for major data mining applications. It is one of the most prominent process of grouping a set of data objects so that the objects, which are similar to each other are usually come in one group and the dissimilar objects are present in other group. Clustering can be performed and executed not only by

a particular and specific methodology but also by the different number of algorithms likewise hierarchical, K-Means and Farthest First Clustering Algorithm. Hierarchical clustering is one of the connectivity based clustering approach and Algorithm hence it takes too long time to predict the result of any datasets. And the K Means clustering algorithm is good and it take less time to produce the result But The Farthest First Clustering algorithm takes lesser time as compared to all the other algorithm to produce the results and the efficiency of this algorithm is quite better in terms of the output generation and the correctness of the result is good.

VI. ACKNOWLEDGEMENT

Our thanks to the head of department, Computer Science and Engineering Poornima Institute Of Engineering And Technology and Mr. Abhishek Dadhich for his encouragement in the course of this work. We say thank you all.

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VLSI Architecture for DSP Application

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ABSTRACT

Most present day arithmetic processors are worked with models that have been settled in the writing, with a considerable lot of the most recent developments dedicated to extraordinary technologies circuits and the utilization of cutting-edge innovations. In particular, the plan of multipliers is basic in digital signal processing applications, where a high number of increases are required. We have limited the number of adders by presenting diverse compressors. The twofold counter property has been converged with the compressor property to grow high request compressors, for example, 5-3 and 7-3 compressors partitioning, simulated annealing, and analytical placement).

Keywords: Compressors, Counters, Xilinx, FPGA

I. INTRODUCTION

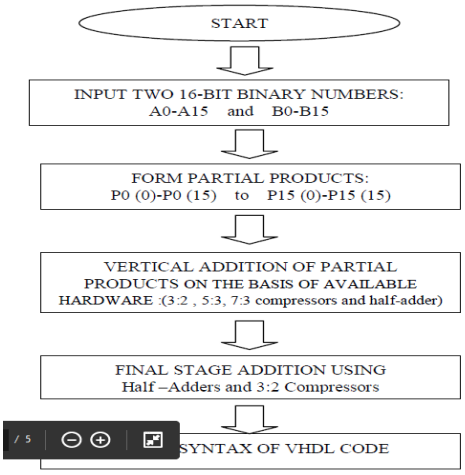
Noise Lately, speed, and in addition zone and power, are the most noteworthy issues in VLSI plan. Pass transistor rationale has been created new progressions in the field of rapid and low-control advanced circuits. Most present day math processors are assembled with models that have been settled in the riting, with a considerable lot of the most recent developments dedicated to unique rationale circuits what's more, the utilization of cutting-edge innovations [1]. In particular, the plan of multipliers are basic in advanced flag handling applications, where a high number of augmentations are required [2].

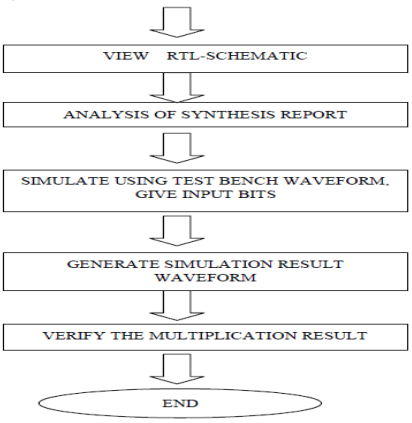
Multipliers are an inescapable piece of frameworks like ALUs, DSPs and different processors. They are regularly the slowest segment of the circuit which restrains the general execution of the framework. Subsequently, decrease of preparing delay has been a noteworthy worry in examine [1]. Wallace tree multipliers are very quick among the accessible multipliers, as they utilize the convey spare expansion calculation, however with the consistently expanding interest for quicker activities, endeavors are being made to make it considerably speedier [2]. The essential procedure of duplication includes three fundamental advances:

1. Generation of partial products
2. Reduction of the partial products
3. Summation of the reduced partial products in order to produce the final product.

The overall delay of the multiplication process may be reduced by applying delay-reduction techniques in any or all of the three stages.

II. PROPOSED ALGORITHM





III. LITERATURE SURVEY

This paper proposes the outline of various VLSI (Very Large Scale of Integration) designs focusing on various exchange offs among the above execution measurements. MIMO innovation has been generally perceived as a promising plan for present day remote interchanges owing to its high information rate and enhanced flag quality [1]. The center of the product is a gathering of mVLSI segments which are fit for executing the required tasks of organic examinations. These segments can be put away in a library of element records, depicted utilizing a basic netlist particular language. VLSI usage of such an arrangement of tenets is effectively workable. The design displayed in this segment receives a course of radix-4 butterfly stages (the last phase of the course is blended radix-4/radix-2 to help additionally FFT transform lengths which are energy of-two); such an approach is reasonable for stream-arranged information handling frameworks found in correspondence and mixed media applications. An outcome of this consistency is that VLSI models of calculation are very reasonable as a methods for measuring the outcomes in silicon zone, a measure of-cost, and figuring time, of engineering decisions inside a chip. Whenever a assortment of computerized advances must be viewed as, each with its-own cost, execution, and useful specialization, such demonstrating was considerably less tractable, or could be completed just at a coarse level.

IV. COMPARISON TABLE OF VLSI ARCHITECTURE

There are four architecture for VLSI. Table shows comparison between them on the various functionality.

- ✓ The VLSI Architecture of a Highly Efficient Configurable Pre-processor for MIMO Detections.
- ✓ VLSI Implementation of High Speed and High Resolution FFT Algorithm Based on Radix 2 for DSP Application.
- ✓ Area Efficient VLSI Architecture for DCT using Modified CORDIC Algorithm.
- ✓ High-speed, area efficient VLSI architecture of Wallace-Tree multiplier for DSP-applications

Table 1

Highly Efficient Configurable Pre-processor for MIMO Detections	**FFT Algorithm Based on Radix 2 for DSP Application**	**DCT using Modified CORDIC Algorithm**	**High-speed, area efficient VLSI architecture of Wallace-Tree multiplier for DSP-applications**
The proposed architecture is completely parallel and outlined in light of the stack task	Fast FFT acrhitecture was gotten by two techniques. The pipeline structure and parallel outline lead us to have fast FFT calculation.	CORDIC utilizes just Shift-and Add arithmetic with table look-as much as execute unique abilities.	They are regularly the slowest part of the circuit which constrains the general execution of the framework.

The calculation plays out a settled number of tasks to identify the flag autonomous of the clamor level and channel conditions	The guideline engineering depends on utilizing a memory to keep info and yield information.	DCT set of guidelines has various projects and is broadly utilized for photo pressure.	Higher request compressors, for example, a 7:3 compressor diminishes the inertness of the circuit and the speed is expanded as way delay is decreased.
This framework is acknowledged in a pipelined systolic exhibit engineering for accomplishing high-throughput	The determination was expanded by coasting point computation amid The FFT procedure.	all the assessment obligations in CORDIC are defined as a pivot of vectors in different Organize frameworks.	we have utilized our compressors in multiplier circuits effectively by actualizing them as parallel counters.

V. CONCLUSION

Distinctive compressors are utilized to accelerate the augmentation process. 4-2 compressors and even 5-2 compressors are accounted for prior yet those are not utilized as a part of multiplier effectively. Here we have utilized our compressors in multiplier circuits effectively by executing them as twofold counters. Higher request compressors, for example, a 7:3 compressor lessens the inertness of the circuit and the speed is expanded as way delay is diminished. We have utilized 3:2, 5:3 and 7:3 compressors supplemented with their counter property to produce total and convey bits appropriately. Exhibitions of multipliers are contrasted and the regular approach where just adders are utilized to include the incomplete items.

VI. FUTURE SCOPE OF WORK

Advance changes in the outline of lessened Wallace-tree multiplier can be accomplished by utilizing adjusted Corner calculation in the age of incomplete item in the main stage. Likewise higher piece duplication can be examined by different techniques for Wallace tree multiplier, for example, The Kogge Stone snake (KSA) which is utilized for fast and Brent Kung snake (BKA) which is utilized to lessen the territory.

VII. ACKNOWLEDGEMENT

Our thanks to the head of department, Computer Science and Engineering Poornima Institute Of Engineering And Technology and Mr. Abhishek Dadhich for his encouragement in the course of this work. We say thank you all.

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Intelligent Monitoring System – A network based IDS

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ABSTRACT

With the introduction of new technologies; new attacks and new infiltration are also emerging in the network. For this, network security became an important part of every network in government and private organizations. Unfortunately, in this digital world it is difficult to hide yourself from attacks and infiltration. In this paper, we developed an intrusion Detection System (DS) which implements the predetermined algorithm of the artificial neural network (ANN) to identify the attack. The system has been developed using java programming Language, which provides the ability to capture packets from Jenpapp.ID identifies basic attacks on the network IDS is easy to install and use on the host machine. Currently it has been developed as host based IDS (HIDS), but it is detected by the network-based IDS (NIDSI Programming Router Multi-Layer Perspectorone (ILP) for infiltration. Most of the previous HIDs are in Off-line mode and mainly on identifying records of normal or unusually the Drit. But here we are classifying records in various categories by identifying the type of attack.

Keywords: Intrusion Detection System, Artificial Neural Network, Multi-layer perceptron, SYN_FLOOD, PING_FLOOD, JPCap

I. INTRODUCTION

Noise Today's network security infrastructure promisingly depends upon Network Intrusion Detection System (NIDS). NIDS provides safety from proverbial intrusion attacks. It's unacceptable to prevent intrusion attacks, thus organization got to be able to handle them. IDS could be a defensive mechanism whose primary purpose is to stay work occurring considering all do able attacks on a system.

Intrusion observation could be a method would not to detect suspicious activity each at network and host level. 2 main ID techniques obtainable anomaly detection and misuse detection. In anomaly based mostly detection system, audit knowledge is employed to differentiate abnormal knowledge from traditional one. On the opposite hand, misuse detection system, additionally known as signature based mostly IDS, uses pattern of documented attacks to match with audit knowledge and determine them as intrusions. Functioning of misuse detection models is during a sense much kind of like that of antivirus applications. Misuse IDS will analyse network or system and compare its activities against signatures of noted intrusions and network behaviours. For recognizing traffic as attack, IDS should be tutored to acknowledge traditional activity. Numerous ways in which obtainable to accomplish this like use of computer science techniques. Audit knowledge used for testing and making rules or outline patterns will be collected from numerous sources like network traffic knowledge, system logs from hosts and system calls from numerous processes. IDS need device. Device is that the system on that Associate in Nursing IDS is put in and running. Network device monitors network

packets like TCP/IP headers, length of association, and range of bytes transferred etc. whereas host device monitors system logs, memory usage on host etc.

Figure 1 demonstrates the traditional IDS model. Here detector element machine generates security events, management console monitors those events and controls detector element. The intrusion detector engine records events logged bye the sensing element into information and generates alerts supported rules from security events.[1]

Figure 1. Traditional IDS Model [1]

Section1 offer the essential introduction regarding the IDS and need/purpose of IDS. In Section II, basic ANN ideas are given. Section III concentrates on dataset use for implementation of the system and classification technique used for characteristic intrusions. Section IV provides general implementation details of the project. Section V concludes the paper with future scope and good thing about system.

A. Purpose of the system

The purpose of the system is to observe bound documented intrusion attacks on the host system and show warnings to the user and conjointly store data relating to the informatics addresses and permit the traffic supported that data [2].

B. Scope of the System

The designed system works on off-line knowledge and on-line knowledge captured via the host machine. Because it uses supervised learning, once the network is trained via back propagation rule, it identifies attacks 100% and no false negatives area unit generated for on-line knowledge whereas off-line is additionally showing smart results

II. C ONCEPTS OF ARTIFICIAL NEURAL NETWORK (ANN) FOR IDS

An artificial vegetative cell could be a machine model impressed from the natural neurons. Artificial neurons primarily consists of inputs (like synapses), that area unit increased by weights (strength of the receptive signals) & then computed by a mathematical relation that determines the activation of the vegetative cell. Another operate (which is also the identity) computes the output of the bogus vegetative cell (sometimes in dependence of a particular threshold). ANNs mix artificial neurons so as to method info [3]. Soft computing techniques deals with partly true and unsure information that makes them engaging to applied for coming up with of IDS. As an example, genetic algorithms are used beside call trees to mechanically generate rules for classifying network connections [4].

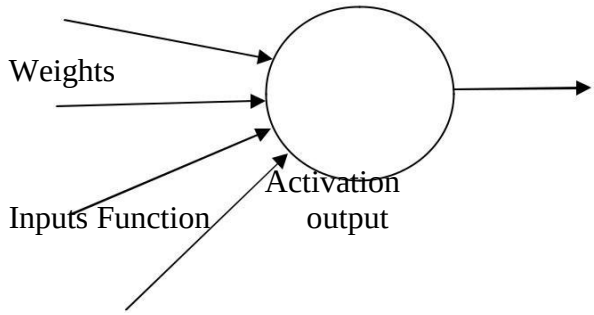

Figure 2. An Artificial Neuron [3]

However ANNs are unit foremost normally used soft computing techniques in IDSs [5][6][7][8][9][10]. Learning method in neural network is actually associate optimisation method within which the parameters of the most effective set of association (weights) for determination a retardant area unit found and includes the subsequent basic steps[6][11]:

1. Present the neural network with variety of inputs vectors (each representing a pattern).
2. Check however closely the particular output generated for a selected input matches the specified output.
3. Amendment the neural network parameters (weights) to raise approximate the outputs.

The most basic use of neural network in IDS is for coaching the network. Once the network is
Trained mistreatment needed learning methodology with Associate in Nursing ANN
Algorithmic program, it's obtainable for capturing information

III. D ATASET USED IN THE SYSTEM

The coaching and learning of the system uses offline and online captured knowledge each. Whereas when implementation, the system uses online packets to notice intrusion. As the system works each in online and offline mode, it considers common attacks like TCP/IP flood, ICMP (ping) Flood, UDP Flood, SYN Flood attack. For offline mode, agency dataset is taken into account. From the downloaded dataset, solely needed 11 options and few records derived in an exceedingly sample file to coach the network and so the testing is finished with remaining knowledge within the file. Equally for online mode, same 11 options are thought about and packets are captured online. These options are loosely categorised into 2 sets.

Set 1 contain options associated with association details of the captured packets like protocol kind, basic flags, length of packet, hop limit etc. whereas set II concentrates on directions used for the association institution. Since solely 11 most vital options are needed for distinctive attack in four categories, the eleven dimension vector is taken into account. For designated options, a numerical worth is attributed. Numerical conversion of feature vector is critical because the input vector for neural network should be numerical. Since the ranges of the option were completely different and this created them in comparable, the option were normalized by mapping all completely different values for every feature to [0,1] range [6].

IV. IMPLEMENTATION OF THE SYSTEM

The system is enforced mistreatment Java programing language. JPCap is employed to capture packets on-line whereas java.io package is employed for reading information from the government agency set. The government agency dataset is split into alittle file for testing purpose, with eleven options extracted from the initial file and concerning one hundred records from every variety of category. Similarly, same eleven options area unit extracted from the web packets and used for coaching the network. In each on-line and off-line mode, same network is trained with totally different input vector. The neural network developed is a pair of MLP with one hidden layer. Whereas developing system, 1st 2 hidden layers were chosen. With 3MLP network, rate of correct classification in off-line mode was ninety two try to in on-line mode, it had been 100 percent whereas with 2MLP, it's eighty eight hopeful for off-line mode and 100 percent for on-line mode and no false negatives were generated.

A. Learning Method and Algorithm Used

Supervised learning method with Feed forward back propagation formula is employed implementing system. In Feed forward neural network, neurons area unit solely connected in forward direction. Every nerve cell in each layer is connected with the neurons within the next layer however no association is back direction. A new neural network may be thought-about wherever neurons area unit totally connected in forward and backward direction that is termed as Hopfield neural network. The term back propagation determines the coaching technique of neural network. Back propagation could be a form of supervised learning technique. During this coaching technique, the network should be fed with sample

Input and its expected output. This output is compared with actual output for given input vector. With this expected output, back propagation coaching

formula calculates the error and adjusts weights of varied layers backwards from the output layer to the input layer. The back propagation and Feed forward algorithm area unit usually used along.

B. System Details

The System is split into essentially 3 parts: Implementation of algorithmic rule, coaching of network and Artificial traffic generator to check network

C. Implementation of Algorithm

In this section the neural network coaching rule i.e. Feed forward Back propagation rule is developed. For this, 3completely different user outlined categories area unit used.

1. Single Neuron category: This category is employed to calculate weight of one somatic cell by assignment some random weight at the start to all or any the dendrites connected to the somatic cell. A random operate is employed to assign random weight to each nerve fibre and everyone these weights area unit accustomed calculate initial weight for each incoming somatic cell.
2. Single Layer category: This category is that the class accustomed calculate weight for every somatic cell during a layer. Associate in nursing array containing weights for every somatic cell during a single layer is made during this layer.
3. Neural Network Class: Neural Network category is that the category that is employed to coach the neutral network exploitation Feed forward methodology.

In this, learning Rate, total variety of layers within the neural network and neurons in every layer is provided. On top of declared category, Single Layer along with Single Neuron category is employed to seek out variety of neurons in every layer in conjunction with initial weight of input layer. Here, variety of neurons in next layer is an added than previous layer and solely output layer area unit having predefined variety of neurons that is up to the amount of output classes supported network demand. Following area unit the varied functions declared within the Neural Network class:

- Set Inputs (): this operate is employed to assign initial weight to the input layer. The weights for the input layer area unit accepted as Associate in nursing argument of kind array with information kind double.
- Limiter (): one.0 / (1 + maths.exp (-x)) formula is employed to input argument provided to the operate.
- Run Network (): This operate is employed to update all the recent values to new set of values. A brief output array is made which is able to store the outputs. At the start every somatic cell in each layer aside from input layer, price zero is assigned as default price. currently the new prices {for each |for each} somatic cell in every layer aside from output layer are going to be calculated by multiplying weights and price of every somatic cell in previous layer so adding them with value of previous layer. Once scheming new price {for each, for each} somatic cell in every layer, bias is else and electrical circuit operate is applied to each somatic cell. These new prices area unit set as output value of each layer.
- Sigma weight Delta() : Back propagation rule wants add of weights increased by delta{for each |for each} somatic celling every layer. This operate is employed to calculate it.
- Train (): this can be one amongst the foremost vital operate within the network. This operate is employed to truly implement back propagation rule. It calls set Inputs () operate to initialize values of input layer and run Network () operate to calculate and update all the initial/default or recent values.

For Back propagation, we'd like to begin from last layer as initial to back propagate once obtaining output price for every layer.

D. Training Network

For coaching network, supervised learning is employed. As we tend to victimisation feed forward technique with back propagation formula, supervised learning is that the best technique to coach the network. Whereas coaching network, the captured packets are monitored by the administrator and so admin can mark the packets either as ok or intrusion. All the packets marked as intrusion by the admin are hold on in AN Object Output Stream category file and an object file are created.

- Update DB (): technique update DB () is employed to make an information file to store all the packets that a marked as intrusions. The tactic write Object from Object Output Stream category of Java in-built category is employed to put in writing those intrusions within the information.
- browse DB() : this can be the tactic accustomed read intrusions from the information file, convert them in packets and so show within the style of packets in table type on the java frame.

E. Artificial traffic generator to test network

To test the network, a man-made traffic generator program is made. This program is employed to come up with all the four style of intrusions i.e. FLOOD_SYN, PING_SYN, UDP_SYN and TCP_SYN attacks. The intrusions generated are captured by the network and can be displayed as intrusions.

V. CONCLUSION

Different types of techniques for intrusion detection area unit studied before the particular implementation of the projected model. The motivation behind the adopted approach for Intrusion Detection conferred within the style is that the strength and capability of Back propagation methodology used primarily for classification. The planning is of IDS is thus versatile that it may be tailored simply for brand new sorts of intrusion. On identification of the signature of the new attack the used algorithmic program within the enforced system may be trained to counter the longer term attacks of that kind.

An approach for a neural network based mostly intrusion detection system, supposed to classify the conventional and attack patterns and also the form of the attack, and has been conferred. It ought to be mentioned that the long coaching time of the neural network was largely thanks to the massive range of coaching vectors of computation facilities. However, once the neural network parameters were determined by coaching, classification of one record was drained negligible time. Therefore, the neural network based mostly IDS will operate as an internet classifier for the attack varieties that it's been trained for. A 2 layer neural network is employed for the classification of on-line and off-line records. Though the classification results were higher within the 3 layer network, application of an easier neural network is additional economical memory wise From the sensible purpose of read, the experimental result merely that heap of innovations may be drained the sphere of artificial neural network based mostly intrusion detection systems. The enforced system solved a four category drawback. However, its more development to many categories is clear-cut. As a potential future development to this study, one will embrace additional attack situations within the dataset. Sensible IDSs ought toem brace many attack varieties. So as to avoid unreasonable complexness within the neural network, an initial classification of the affiliation records to traditional and general classes of attacks will be the primary step. The records in every class of intrusions will then be more classified to the attack varieties.

The system doesn't fully protect network from Intruders, however IDS helps the Network Administrator to trace down anomalies on the net whose terribly purpose is to bring your network to a breach purpose and create it liable to attacks. This system is trained solely on the famed attacks. In future the system will be trained on varied network flow options like Flow Count, Average Flow Packet Count, and Average Packet Size etc. for clear and higher classification of traffic with low false positive and false negative rate. This will be extended by incorporating Intelligence into it so as to achieve data by itself by analysing the growing traffic and learning new Intrusion patterns. This system runs on a private host machine. This {may} be extended to create it a network application wherever completely differentcompletely different} modules of a similar system running on different machines may act with one another providing distributed detection and protection.

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Image Compression and Lightweight Android Apps

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ABSTRACT

In Android operating system, to achieve greater performance efficient memory allocation and consumption is required. It is very important to efficiently use and manage the internal and external memory space present inside the mobile operating system. Various techniques have been used and implemented to reduce the memory usage in android. One of the techniques for better utilization of memory is image compression in android. The objective of image compression is to reduce the redundancy of the image and to store or transmit data in an efficient form. Based on this compression will be done on image by keeping its quality intact and the possibility of data loss will be minimal.

Keywords: Image Scaling, Android OS, Application, Memory Consumption, Color Quantization, Predictive coding, Image Compression

I. INTRODUCTION

Nowadays we are facing the increasing use of images in many parts of our life. Smart phones, 3D vision systems, satellites, cameras, medical equipment etc. All of these uses or generate image for different tasks. For example, the images, for competitive examination or profile pictures we need to upload the compressed image. We need to save or transmit these images on our devices, then because of the limitation in disk space and channel bandwidth we almost always need image compression for decreasing the size of data, which must be save or transmit. There are some methods/techniques for image compression based on several criteria and conditions. [1]

Some of these criteria/conditions are compression time, compression ratio, quality of compressed image etc. Image compression is reducing the size of a graphics file in bytes without distorting the quality of the image. [2] The reduction in file size allows more images to be stored in a given amount of disk or memory space as well as reduces the time required for images to transmit over the Internet or downloaded from android. The JPEG method is more often used for photographs, while the PNG method is designed to work for online viewing applications like web browsers so it is fully stream able with a progressive display option. [3] The PNG file format was introduced as a free, open-source successor to GIF. Android SDK multiple drawable directories exist for different screen resolutions. There are low, medium, and high DPI specific directories such as drawable-ldpi, drawable mdpi and drawable-hdpi respectively. This allows you to create images at different DPI to enhance the appearance of your application. [7]

Figure 1. Basic Idea of Compression

II. IMAGE COMPRESSION TECHNIQUE

Image compression is very vast area where new concepts and
methods are used day-by-day. Compression is the art of representing the information in a compact form rather than its original or uncompressed form. In other words, size of a file can be reduced using compression methods. [8] Image compression addresses the problem of reducing the amount of data required to represent a digital image. It is a process intended to yield a compact representation of an image, thereby reducing the image storage/transmission requirements. [6]

A. ADVANTAGES OF IMAGE COMPRESSION

1. It provides a potential cost savings associated with sending less data over mobile phone network.
2. It not only reduces overall execution time but also storage requirements allowing greater performance.
3. It also reduces the probability of transmission errors since fewer bits are transferred.
4. It also provides a level of security against illicit monitoring.
5. It is also important efficiently use and manage the internal and external memory requirements of mobile OS. [11]

B. The image compression techniques are broadly classified into two categories:

1. Lossless Technique
2. Lossy Technique

III. PROPOSED METHOD

A. Color Quantization

By definition color quantization is a process that reduces the number of distinct colors used in an image, usually with the idea/goal that the new obtained image will be as optically similar as possible to the original image. Color quantization is a process of segmenting a color space of an image into color regions. Each region can then be represented by a representative color, generally the process is used to represent a color image using a bunch of representative colors which take fewer bits to represent the image. However, this representation scheme introduces image distortion that need to be minimized. The distortion caused can be calculated as the total quantization error which is actually the sum of squared distances between actual pixel colors and their color representatives. The distance between the color point is measured using Euclidian Distance.

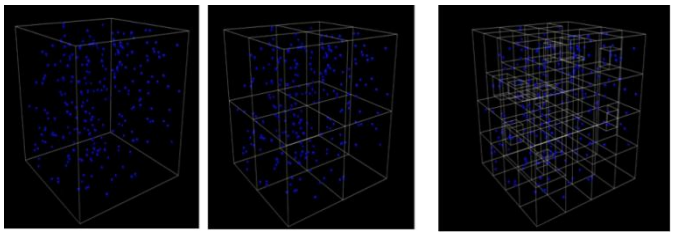

Figure 2. OcTree Representation

The principal methods of implementing color quantization are Octree representation and Euclidian Distance.

Most standard techniques sometimes consider color quantization as a method of clustering points in 3-D space, where the points represent colors found in the original image and the three axes represent the three-color channels. Almost any 3-D clustering algorithm can be applied to color quantization, and vice versa. After the clusters are located, typically the points in each cluster are averaged to obtain the representative

color that all the colors in that cluster are mapped to. The 3-color channels are usually red, green and blue.

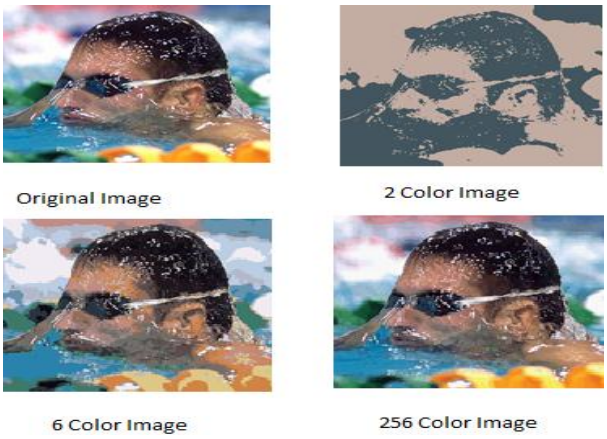

Fig 3: Color Quantized Image 1

B. Advantages of Color Quantization Method

1. Enables efficient compression of certain types of images.
2. Critical for displaying images due to memory limitations.
3. This representation scheme introduces image distortion that need to be minimized.

C. Disadvantages of Color Quantization Method

1. May cause distortion where high definition image is required.
2. Distortion can be minimized by Euclidian Distance.

Figure 4. Color Quantized Image 2

D. Predictive Coding

In Predictive coding, it will calculate the predicate color value of each pixel based on the quantized color of adjacent pixel. It is an approach that achieves good compression without significant overload. This coding scheme will take original image and stores all the RGB values of images into a Matrix, then color quantization is performed on the matrix where the image is divided into number of regions and RGB color values are identified. This RGB color values are stored in matrix format called color histogram matrix according to their RGB color axis of intensity values. From this histogram matrix, a centroid for each region is computed. After Color quantization, predictive coding is used to find the predicate value for each color, this predicate value is calculated according to the location of the current pixel's value.

For most of the images, there are redundancies among the adjacent pixel values of the image matrix; i.e., adjacent pixels are highly correlated. Thus, a current pixel can be predicted reasonably well based on a neighborhood of pixels. The prediction error, which is calculated by subtracting the prediction value from the original pixel, has a smaller entropy than the original pixels. Hence, the prediction error can be encoded with fewer bits. In the predictive coding, the correlation between adjacent pixels is removed and the remaining values are encoded.

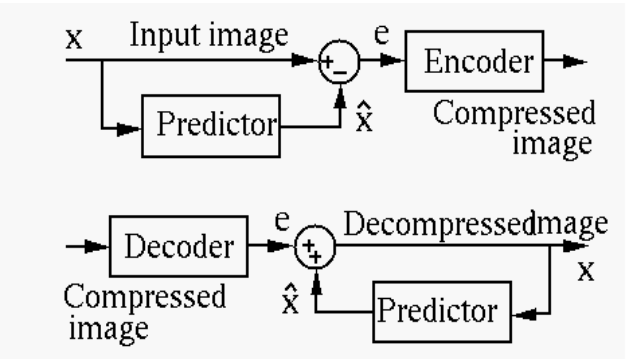

Figure 5. Predictive Coding Block Diagram

Predictive coding is based on eliminating the inter pixel redundancies closely spaced pixels by extracting and code only the new information in each pixel

where the new information explains the difference between actual and predicted pixel values.

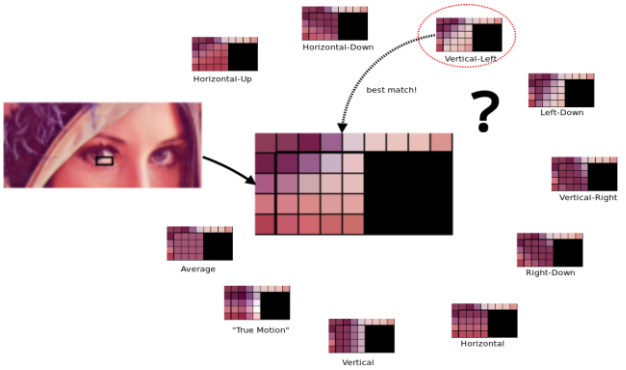

Figure 6. Predictive Coding Pictorial Representation

E. Advantages of Predictive Coding Method

1. Effective method and makes use of histogram and quantization.
2. Easy to implement method.

F. Disadvantages of Predictive Coding Method

1. Drawback is probability of loosy coding and compression.

IV. PROPOSED METHOD IN LIGHTWEIGHT ANDROIOD APPLICATIONS.

In lightweight android apps, the idea of compression is to resize the image and scaling of image is needed. Image scaling is the process of resizing a digital image. Scaling is a significant process that involves a trade-off between efficiency, smoothness and sharpness. In android for images scaling it will consider three factors height of the image, width of the image, resolution of image measured in a DPI. DPI simply means the "Dots Per Inch" in the image. That simply means it's the measure of the resolution of your image based on the number of pixels or dots per inch.

A. Device Oriented Scaling

In device, oriented scaling, it depends upon the different screen sizes and densities of the individual devices. The system performs scaling and resizing to make your application work on different screens, it fit the screen on their devices

B. User Customize scaling

In this type of scaling it depends upon the user what is the scaling factor to compress the image. We can scale the image to reduce the size of images as per the requirement of the user. But, it will reduce the quality of the image. We need to decide the scaling factor, it will not reduce the quality of the image.

C. System Architecture in Context of Image Compression

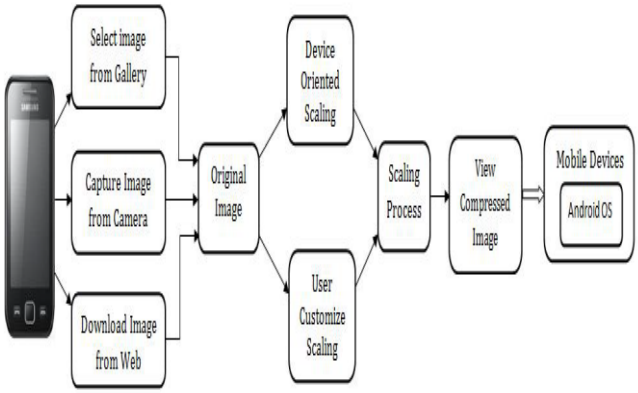

Figure 7. Proposed System Architecture

D. Figurative View of Compression in Android Apps

Class	Name	Density	Factor
Ldpi	Low Density	120 dpi	sp = 3/4 * dp
Mdpi	Medium Density	160 dpi	sp = dp
Hdpi	High Density	240 dpi	sp = 1.5 x dp
Xhdpi	Extra High Density	320 dpi	sp = 2 x dp
xxhdpi	Extra Extra High Density	480 dpi	sp = 3 x dp
xxxhdpi	Extra Extra Extra High Density	640 dpi	sp = 4 x dp

Figure 8. DPI Classes in Android

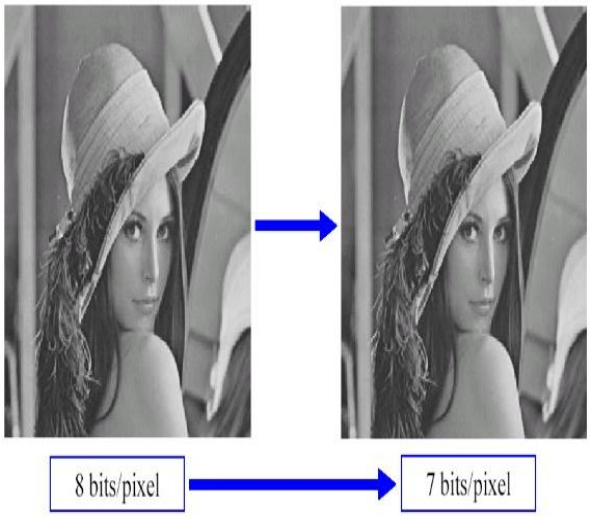

Figure 9. Compressed image in Android

E. Functional Mapping of Original Image and Compressed Image

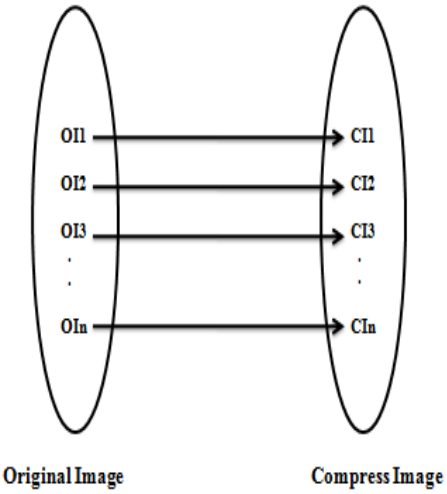

Figure 10. Functional Mapping in Android

IV. CHALLENGES

Image compression is a highly-recommended technique only when you have some quality assessment tools to check for the results as it is a subjective process the error detection and quality assessment becomes a need to verify our works. The main challenge that it faces is the losing of data - sometimes to achieve compression we may lose data so it becomes necessary to know that hoe much compression is needed and how much is beneficial to our project.

V. BENEFITS

Memory allocation and power consumption goes hand in hand and requires to be optimized in this high-tech era therefore the need of lightweight apps arises. Because of these kinds of apps peaks in the areas of memory and power has seen significant changes. Some benefits of the project work can be seen in following areas.

a. Battery life.
b. Transmission time and data consumption.
c. Memory requirements.
d. Performance issues.

VI. FUTURE WORK

The future of lightweight android apps has a rise in tide kind of scenario it may establish base for future improvement techniques in memory requirements and will fulfill needs for optimization processes.

VII. CONCLUSION

Image processing has wide verity of applications leaving option to the researcher to choose one of the areas of his interest. Lots of research findings are published but lots of research areas are still untouched. Moreover, with the fast computers and signal processors available in the 2000s, digital image processing has become the most common form of image processing and generally, is used because it is not only the most versatile method, but also the cheapest.

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Machine Vision Algorithms implementation in Ruby

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ABSTRACT

In current scenario, machine vision systems (at least machine vision algorithms(MVA)) are preponderantly implemented using statically typed programming languages such as C, C++, or Java. However, statically typed languages are not suitable for development and maintenance of large scale systems. Dynamically typed languages are generally not considered while choosing a programming language due to their lack of support for high-performance array operations. This review paper presents efficient implementations of MVA with the dynamically typed programming language Ruby. The Ruby programming language is used in this paper review because it offers the best support to meta-programming from other conventional programming languages. A Ruby library-Hornetseye is reviewed for performing array operations as portion of this paper. It is shown that the library eases brief implementations of MVA that are commonly used in industrial automation. That is, this paper is about implementing machine vision systems in different way.The performance of general operations in ruby is compared with the performance of equivalent C/C++ programs to validate the approach.

Keywords: Ruby, Machine Vision Algorithms, Dynamic Programming Language

I. INTRODUCTION

Machine vision is a vast field and in many cases there are various independent approaches solving a specific problem. Also, it is oftentimes difficult to preconceive which particular approach will give the best results. Therefore it is significant to maintain the agility of the system to be able to implement necessary changes in the concluding stages of a project.

A traditional application of computer vision is industrial automation. That is, the cost of implementing a machine vision system eventually needs to be recovered by savings in labour cost, increased productivity, and/or better quality in manufacturing. However, statically typed programming language such as C, C++, or Java are still mostly used to implement machine vision systems. Development and maintenance of large scale systems using a statically typed language is much more expensive compared to when using a dynamically typed languages.

This paper shows how the dynamically typed programming language Ruby can be used to reduce the cost of implementing machine vision algorithms. A Ruby library is reviewed which facilitates rapid prototyping and development of machine vision systems.

The downside of using a compiled language is that a developer is required to make changes to the source code, save them in a file, compile that file to create a binary file, and then re-run that binary file. In contrast, interpreted languages o er considerable savings in development time. In an interpreted language the developer can enter code and have it run straight away.

II. RUBY PROGRAMMING LANGUAGE

The Ruby programming language is an interpreted, pure object-oriented, and dynamically typed general purpose programming language. Furthermore Ruby sup-ports closures and meta-programming. Also Ruby has a straightforward API for writing extensions. Finally Ruby currently is on place 11 of the Tiobe Programming Community

Index.. Ruby is a multi-paradigm language and it is inspired by Perl, Python, Smalltalk, Eiffel, Ada, and Lisp. Ruby supports the following language features:

- Object-oriented
- Single-dispatch dynamic typing
- Exception handling
- Garbage collection (i.e. managed environment)
- Mixins
- Closures
- Continuations introspection
- Meta programming
- Reification.

Software integration in Ruby is easy because:

- ✓ interfacing with native code for writing extensions is simple.
- ✓ classes can still be modified after declaration.
- ✓ Ruby uses duck-typing, i.e. two objects are compatible if they support the same methods and properties.

The design philosophy of the Ruby programming language follows the following principles:

- Brevity: The language is expressive so that programs written in that language are succinct.
- Conservatism: Ruby sticks to traditional control structures to reduce the cost of adoption.
- Simplicity: The Ruby programming language supports simple solutions.
- Flexibility: Ruby should adapt to the user instead of the user adapting to Ruby.
- Balance: The Ruby programming language tries to achieve a balance between all these concepts.
  - Energy/cost consumed,
  - Time/cost to network partition,
  - Variation in node power levels,
  - Cost/packet ,and
  - Maximum node cost

III. STATICALLY TYPED LIBRARIES

Most computer vision libraries are implemented in the statically typed C/C++ language. However C++ has a split type system. There are primitive types which directly correspond to registers of the hardware and there are class types which support inheritance and dynamic dispatch. In C++ not only integers and floating point numbers but also arrays are primitive types. However these are the most relevant data types for image processing. To implement a basic operation such as adding two values so that it will work on different types, one needs to make extensive use of template meta-programming. That is, all combinations of operations, element-type(s), and number of dimensions have to be instantiated separately. For example the FrameWave1 C-library has 42 explicitly instantiated different methods for multiplying arrays. For this reason most libraries do not support all possible combinations of element-types and operations.

Static typing not only leads to an explosion of methods to instantiate. A related problem caused by static typing is that when a developer wants to modify one aspect of the system, the static typing can force numerous rewrites in unrelated parts of the source code (Tratt and Wuyts, 2007). Static typing enforces unnecessary “connascence” (a tech-nical term introduced by Weirich (2009)) which interferes with the modularity of the software. In practise this causes problems when implementing operations involving scalars, complex numbers, and RGB-triplets.

OpenCV: It (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. The library consist of more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms.

IV. STATICALLY TYPED EXTENSIONS

Some computer vision libraries come with bindings in order to use them as an exten-sion to a dynamically typed language. For example for the OpenCV2 library there are Python bindings (PyCV3) as well as Ruby bindings (opencv.gem4).This allows one to use a statically typed extension in an interpreted language and it becomes possible to develop machine vision

software interactively without sacrificing performance.Open classes and dynamic typing make it possible to seamlessly integrate the functionality of one library into the application programming interface (API) of another. However supporting all possible combinations of types and operations with a statically typed library is hard (see Section 3). In practise most computer vision extensions only provide a subset of all combinations. n general it is not possible to instantiate e cient implementations of all the possible combinations of operations and compile them ahead-of-time. dynamic typing facilitates much more concise code than static typing.

V. DYNAMICALLY TYPED LIBRARIES

There are a number of active free and open source software projects in the area of machine vision. These contain ITK, NASA Vision Workbench, OpenCV, OpenVidia, Camellia, PyGPU, and Gamera to name only a few. Machine vision systems require software for handling video and image files, accessing cameras, and visualizing results. To keep the size of the project manageable it is mandatory to make use of existing software projects. Although open source packages and libraries are available for free, integrating it requires significant time and effort.

To port all required software to Ruby is desirable so as to take full advantage of the language properties. However for input and output (e.g. capturing camera images and displaying videos) it is necessary to interface with native code. In addition it is necessary to implement computationally expensive parts of the code in C/C++ as long as there is no sufficiently strong run-time optimizer for Ruby.
The quickest way to integrate an existing C/C++ library into Ruby is to use the bindings-generators. However simply making the static data types of a C/C++ library visible in Ruby is insufficient for fully exploiting the features of Ruby. An array data type to handle multi-dimensional arrays with elements of a single type was implemented in Ruby library HornetsEye, inspired by NArray.

NArray: NArray is an Numerical N-dimensional Array class. Element types supported are 1/2/4-byte Integer, single/double-precision Real/Complex, and Ruby Object. This extension library incorporates fast calculation and easy manipulation of large numerical arrays into the Ruby language. It has features similar to NumPy, but NArray has vector and matrix subclasses. NArray provides fast element-wise operations combined with methods to manipulate single elements or subarrays. However in contrast to NArray our data type is largely implemented in Ruby and thus allows definition of custom element-types.

HornetsEye: HornetsEye is a real-time computer vision library for the Ruby programming language. HornetsEye is maybe the first free software project providing a solid platform for implementing real-time computer vision software in a scripting language. The library could effectively be used in industrial automation, robotic applications, and human computer interfaces. It is an extension for Ruby which facilitates rapid development of machine vision software and and provide a high amount of flexibility without sacrificing real-time capabilities.

VI. PERFORMANCE

Comparison of HornetsEye with NArray and C++:
Figure 6.1 shows the time required for running the operation “m + 1” for arrays of different size. The array “m” is single-precision floating point array with 500 500 elements.

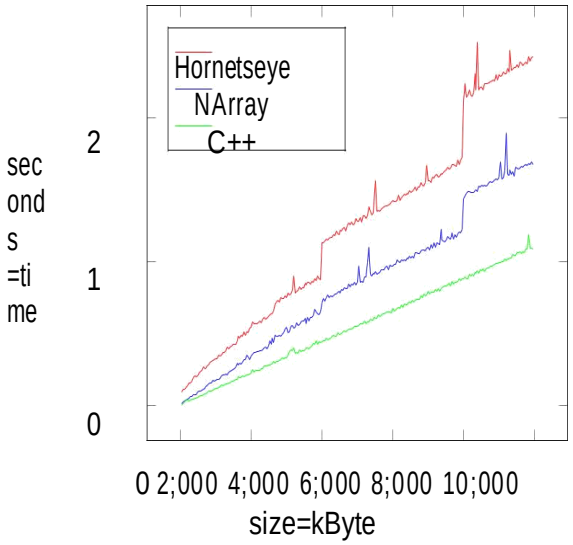

Figure 6.1. Processing time of running "m + 1" one-hundred times for different array sizes

Code Size of Programs: Ruby implementation is significantly shorter and the semantics of Ruby is simpler. Ruby+Hornetseye requires half as many lines of code as the Python+OpenCV implementation. Also the semantics of the Ruby implementation is much more concise.

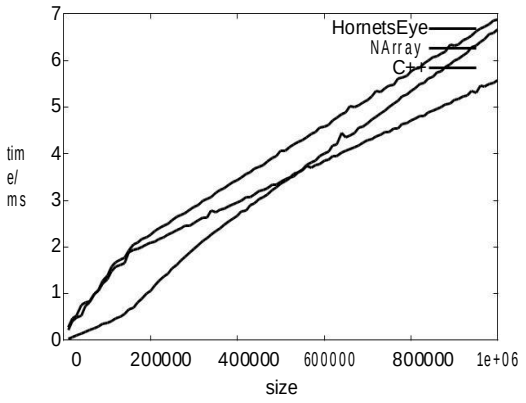

Figure 6.2. Speed comparison for array-scalar multiplication

Contrary to common belief, an interpreted language can be faster than a static implementation. Table Ishows that the garbage collector of Ruby can be faster than the static memory management of a naive C++ implementation.

Table 1

	Mimas/Boost	NArray	HornetsEye
constructor	2.7 ms	8.4 ms	7.8 ms
m.fill(1)	2.7 ms	2.7 ms	2.8 ms
m*m	6.8 ms	10.0 ms	8.1 ms
m*2	6.7 ms	8.9 ms	7.2 ms
subarray	3.0 ms	2.2 ms	3.7 ms

The C++ library seems to be much faster when copying arrays or when filling them with a value is required. This is probably due to the fact that neither NArray nor HornetsEye are currently making use of the highly optimized routines of the C++ standard template library.

The C++ implementation is much faster for small sizes than both Ruby implementations. The reason is that the array manipulations in Ruby and the garbage collector have a larger overhead. For larger arrays the benefits of the garbage collector become dominant.For bigger arrays HornetsEye is the most efficient implementation.

VII. CONCLUSION

Existing free and open source software (FOSS) for machine vision is predominantly implemented in C/C++. Albeit the performance of machine code generated by C/C++ compilers is high, the static type system of the C++ language makes it exceedingly difficult to provide a complete and coherent basis for developing machine vision software.It is hard to support all possible combinations of operations and native data types in a statically typed language. Therefore most libraries implemented in such a programming language only support some combinations (e.g. OpenCV and NArray). In contrast Ruby already comes with a set of numeric data types which can be combined seamlessly.

The contribution of this paper is a machine vision system which brings together productivity and performance by implementing machine vision algorithms in ruby. The dynamic programming languages facilitates concise and flexible implementations which means that developers can achieve high productivity. It is presented how the library reviewed in this paper can competitively perform to implement machine vision algorithms.

VIII. FUTURE WORK

Although in this review paper, the Ruby programming language was used, machine vision field could significantly benefit from any dynamic programming language which offers equal or stronger

for meta-programming support. Meta-programming is the ability of program to change itself during run-time. This facilitates implementation of optimization algorithms which would be hard to do in currently popular programming languages. Possible future work is the development of efficient libraries for dynamic languages out of conventional approaches.

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A Review on Solid Waste Management using Smart-Bin

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ABSTRACT

Urban India is world's third largest waste generator, hence proper planning is required to dispose the trash. Trash in waste containers are not collected on time which leads to garbage over flowing. It has serious hazardous problems on the environment leaving the place untidy and unhygienic. There has to be proper management techniques for efficient garbage collection. This paper describes the waste management techniques using technologies like GIS, GPS, RFID, etc. It would be easy to calculate the fill level estimations using these Techniques, according to the input of smart system efficient route can be decided for garbage collection and would help to reduce the human intervention in waste management.

Keywords: GIS, GPS, RFID, Solid Waste, RFID.

I. INTRODUCTION

In India due to modernization the amount of waste generated is increasing day by day. In the era of technology, new techniques are applied in almost every field but the basic areas of sanitation are left out. In most cases the garbage collection is still carried out in same traditional ways. Waste can be categorized such as mineral waste, organic/inorganic waste, radioactive waste, biomedical waste, agricultural domestic waste, etc. It is very difficult to segregate various types of waste. All the waste ultimately is being dumped into municipal bins, irrespective of its type. The waste collection centres from where it is collected by the municipalities to be further thrown into landfills and dumping areas. There are various ill-effects caused due to untreated organic waste which leads to diseases. Non-biodegradable E-waste causes landfills. Radioactive waste has many health hazards. Improper disposal and management of solid waste affects all aspects of the society, namely physical, economical and environment. Cleaning of garbage bin at proper intervals is the necessary solution but manually monitoring them at regular intervals is a tedious job. Ignored waste in the surroundings invites flies, mosquitoes, rats etc. This leads to unhygienic conditions. Animals grazing on this waste or near such areas can pass on diseases through food chain. The waste which is not collected can clog storm water run-off leading to formation of sluggish and stagnant water bodies. These water bodies then become breeding space for disease causing bacteria. Waste thrown near water bodies leads to contamination of water. To suppress the increase in waste we need to develop an efficient and robust solid waste management system that can uplift the present system as well as be time and cost effective.

II. LITERATURE REVIEW

A. SMART AND WIRELESS WASTE MANAGEMENT AN INNOVATIVE WAY TO MANAGE WASTE AND ALSO PRODUCE ENERGY

The model proposed in this paper helps to identify the level of garbage using ultrasonic sensors which will be interfaced with ultrasonic conditioning chip and it will be located on the top of dustbin. 4 load cells were used in case if ultrasonic sensor fails to give input. Input from sensors will be processed by the microcontroller using signal processing algorithms and the processed input will be sent municipal office through SMS using a GSM modem so they will get SMS to pick up the waste. GPS module is installed to detect the location of dustbin.

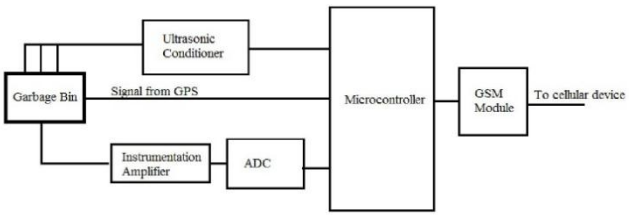

Figure 1. Block diagram for Smart Garbage Bin

[Also describes the separation of plastics from solid waste which is a tedious and difficult task for Municipal Solid Waste(MSW) Uses Near infrared (NIR) reflectance spectroscopy for separating five types of plastics namely polyethylene terephthalate (PET), high density polyethylene (HDPE),polyvinyl chloride (PVC), polypropylene (PP) and polystyrene. But it does not detect the black colour plastic bags and PET bottles with plastic caps. After separation of Plastics from solid waste intends to use Biogas plant.

Biogas is naturally extracted from organic waste. Biogas helps to produce electricity and heat. An alternative to this is the up gradation of biogas to bio methane, which can be supplied to natural gas supply. The by-product of food waste is to be subjected to process in which the materials are heated up to 70 degrees for an hour to the kill bacteria. An agitator is mixed into a homogeneous material. This process can be repeated every hour. When a uniform mixture is obtained, then the material can be pumped into a fermenter through a macerator in a sealed atmosphere, which ensures that no impurity enters it. Bacteria break down into individual enzymes and other components, which results in biogas. The advantage of this process over other process includes low energy expenditure and higher level of efficiency. All organic acids get decomposed during fermentation process. The nutrients remain intact and can be better absorbed by plants.

B. SMARTBIN: "SMART WASTE MANAGEMENT SYSTEM"

[3]Presents a system to detect a fullness of a dustbin using sensors and wireless mesh networks reducing duty cycle. Collected data is analysed to obtain litter bin utilization and seasonality information with which contractors are able to make better decisions.

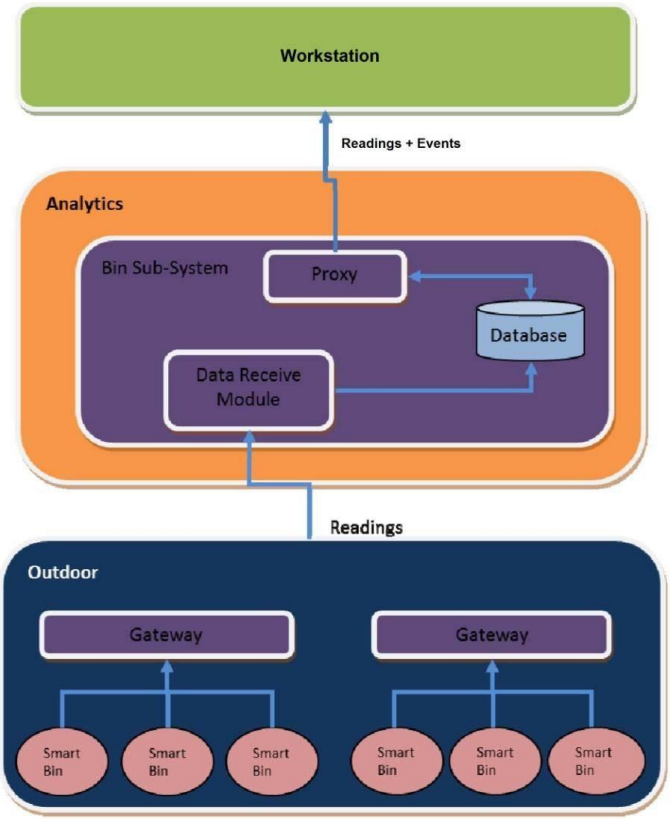

Figure 2. Smart-Bin system architecture

The architecture shows the gateway nodes which will forward the data received from sensors to backend server via an internet connection. Wireless communication model is attached to the sensor node which has a low power and low bandwidth and the sensor node was deployed with a less battery power. At the backend the analytics module collects, processes and compares against rules and generates events upon exceeding threshold.

Subsystem sends information to workstation. Each bin will be visualized using a graphical user interface. Upon receiving the information the gateway forwards the data to backend server. The sensor node was also equipped with Global Positioning System (GPS) to obtain location information and wireless mesh network was implemented at the nodes to extend the coverage of Smart Bin. Total 11 Smart Bins were deployed in the area, duty cycle and this technique was employed to maximize the operational time of the system. Data of six months was collected, the average delivery ratio of a system is 99.25%.

C. VERSATILE SCALABLE SMART WASTE-BIN SYSTEM

Waste bin consists of the sensing units, an active RFID tag for data aggregation and transmission. Also they have provided a protective enclosure for sensors and RFID tags .Ultrasonic sensors are used as they provide most suitable solution. The waste-Bin system interacts with an active RFID reader. Ultrasonic Sensor provides distance of nearest object since waste is irregular in shape thus objects may occupy the bin space in different arrangement. But there is difference between the highest level of the bin and the actual fill percentage of it and this result can be obtained by considering combination of two sensors such that their areas will not overlap during detection. Number of sensors depends on the size of bin.

The proposed system consists of two units:

1) The Field Unit: It is mounted on the bin and has an RFID tag, ultrasonic sensors and external power source.

2) The Mobile Sink: It consists of RFID tags and a small-form-factor computer.

The RFID reader reads the tags and collects the information. The application on the mobile sink is responsible for receiving the information from the field units and, if needed it forwards this information to upper management systems. Thus we can conclude that the fill-level estimation method using ultrasonic sensors provides accurate results.

Figure 3. Real Time Smart-Bin Status

III. METHODOLOGY

Solid waste management in Pune is done by collecting, transporting, storing, processing and disposing of waste from bins that are located at different locations. Some people also burn the garbage in the open. Hotel trucks, bulk refuse carrier and ghanta trucks that are used for the collecting solid waste across city. The collection routes are usually predefined, according to routes waste is collected and transported using garbage trucks and mini tempo to storage stations. Almost 600 vehicles are engaged every day of various capacities for waste management. PMC (Pune Municipal Corporation) has combined an integrated approach with a decentralized waste management strategy that encourages NGOs and private sector participation. At transfer stations the waste is segregated manually by PMC or SWACH (Solid Waste Handlers and Collectors' Society) workers and transported to dumping stations. Due to improper and incomplete information about the waste segregation affects the environment and the garbage dumping process. There is no system designed for monitoring the bins or keeping track of the garbage collecting vehicles and thus lacks coordination between garbage authority and garbage vehicle drivers. There is also a lack of communication between local people and Municipal Corporation about the problems related to garbage. The bins present in the nearby locality are not regularly collected which leads to overflowing of bins. Most of the solid waste generated is dumped into the landfill, dumping sites, and yards or outside the city. As these sites are not covered, it becomes breeding space for rats, flies and other diseases. The PMC has one waste processing plant at Hanjar working at full capacity. Around 1,500 to 1,800 metric tons of waste is generated in the city every day of which 1,000 metric tons is processed in Hanjar. The total e-waste generated in Pune is about 2584 tons and in PimpariChinchwad region is about 1032 tons.

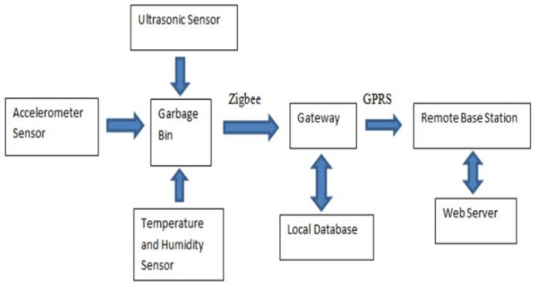

Figure 4. Smart-Bin Methodology

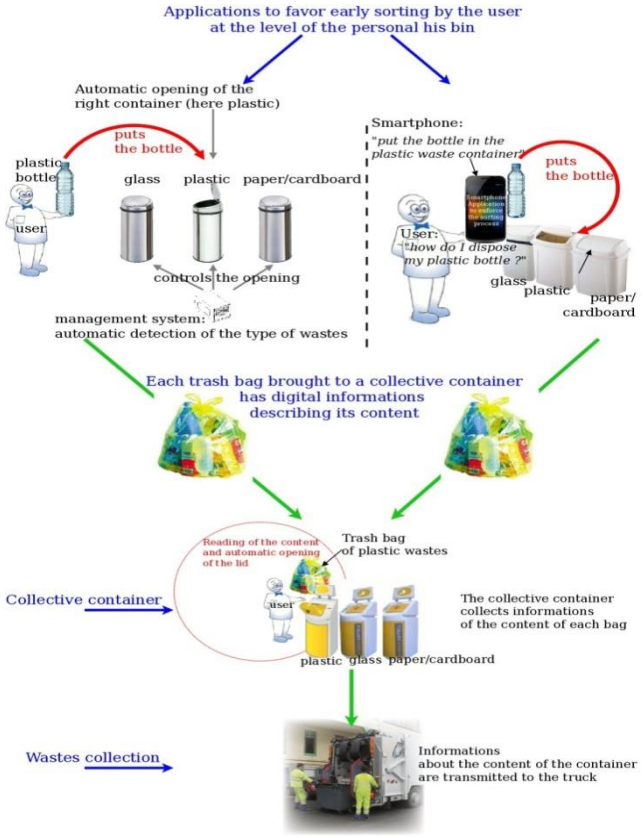

Figure 5. Smart-Bin Methodology

IV. CONCLUSION

With the increase in population and the lack of good waste management system, collection of solid waste is becoming a major issue. The models which are described in this paper are innovative and solves the problem of overflowing garbage bins using latest technologies like RFID, GSM, and GPS but has many drawbacks such as lack of accurate real time system and analysis of collected garbage and visual representation of garbage collection.

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Intelligent Transportation System Contingent on Internet of Things

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ABSTRACT

Due to population growth, the problem of traffic management and congestion are also increasing at an alarming rate. Therefore, in order to oversee the mentioned problem, we require a system which provides with the help of advanced technologies. Intelligent Transportation Systems (ITS) is the coherent application of computer, electronics, vehicle sensing communication technologies and management strategies to help in monitoring and managing traffic flow, reducing congestion, providing optimum routes to travelers, enhancing productivity of the system, and saving lives, time and money. This paper comprises of ITS architecture, its lead enabling technologies, ITS user services and applications. In addition to this, it also includes IoT's role in implementing the ITS with the help of agent technology, its benefits and world-wide pioneers of ITS.

Keywords: Internet of Things (IoT), Intelligent Transportation System (ITS), Sensors, Embedded Electronics, User services, Applications, Architectures, Enabling Technologies, RFID, Wireless Sensor Networks, Agent Technology, ITS Techniques.

I. INTRODUCTION

With increasing number of vehicle ownership, it has become very difficult to manage the existing transportation system and it leads to various problems like congestion, inflation in accident rates and delay in reaching destination. ITS is boon to provide solution to these problems.

Intelligent transportation system (ITS) is a application or a platform which seeks to yield services related to different means of transport and traffic management and enable various users to be well informed and make safer, more synchronized, and 'smarter' utilization of transport networks. ITS is the application of computer technology to the transport sector. ITS systems gather data related to the transport system, process it, and then use the processed data to improve the management of the transport system. It gives the transport user with more and important information on which their transport decisions are based. It is being implemented and used in the developed countries like Japan, Europe etc since last two decades in some or the other way. This area is considered as a part of the Internet of things. Crucial information generated by the vehicle on roads and presented to the traveler. This collected data analyzed to obtain the traffic flow condition so as to predict the traffic flow. Thus, advanced traffic monitoring is

unrolling into an Intelligent Transportation based on IoT.

II. ARCHITECTURE

Mobile Computing, Wireless Communications and remote sensing has led to the development of ITS as promising technology which endow the distribution of different applications related to safety of road, traffic monitoring. The high level architecture of ITS includes following three communication domains. These are –

A. In vehicle Domain

Connected vehicles are provisioned with electronic control unit(ECUs), wireless-enabled on-board units (OBUs), a trusted platform module (TPM) and an application unit (AU). ECUs collect information about the vehicle's location, speed, heading, vehicle size, etc. and the context of its immediate environment (e.g., the number of neighboring vehicles, local road traffic conditions, etc.) and control its functionality. These ECUs link by exchanging messages with the OBU and AU, and form an in-vehicle network (also known as the on-board network). For running one or multiple applications, which are rendered by remote service providers (SPs), and exchange information with other nearby ITS entities using the communication capabilities of the OBU. For this reason AU is responsible.

B. V2X domain

The information gathered at the vehicles' OBUs, are exchanged with nearby ITS entities (e.g., OBUs, RSUs, etc.) using various vehicular communication technologies (V2X), including: (i) vehicle-to-vehicle (V2V) communications between neighboring vehicles (or OBUs) using a dedicated short-range communications (DSRC) technology;(ii) vehicle-to-infrastructure (V2I) communications between the surrounding OBUs and RSUs, and vice versa; and (iii) vehicle-to-pedestrian (V2P) communications between the OBUs/RSUs and the surrounding pedestrian as shown in Figure 1.

C. The infrastructure domain

It includes the trusted third parties (TTP), such as vehicles manufacturers, the service providers (SPs) and the trust authorities (TA). The fixed RSUs are generally not fully trusted and subordinated by the TA and can be considered as a bridge between the V2X and infrastructure domains[1].

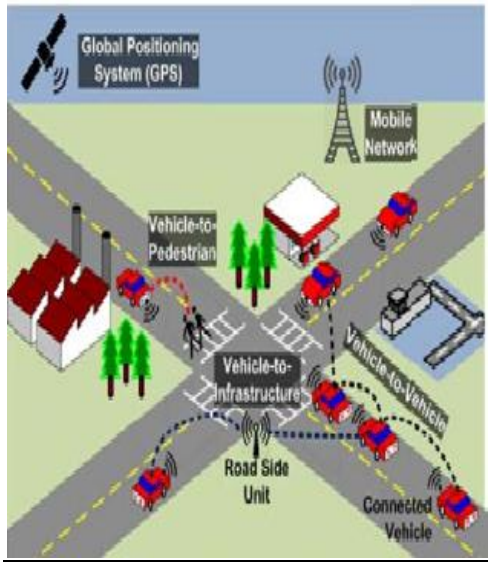

Figure 1. ITS V2X Communications

III. MAJOR BRANCHES OF ITS

There are various categories of ITS under which many applications are present such as-

1. Advanced Traveler Information System (ATIS) It helps in providing both en- route and pre-trip information to the driver and traveler to make better decisions regarding trip departures, optimum routes, and available means of travel. It does this through technologies, such as internet, telephones, cellular phones, television, radio, etc. Application are Real-time Traffic Information, Route Guidance / Navigation Systems and Roadside Weather Information Systems.

2. Advanced Traffic Management System (ATMS)

ATMS is one of the most widely used branches of ITS. It is a tool used by traffic police department to control traffic by monitoring the flow of traffic and making appropriate decisions. Applications are - Real-time

Traffic Status, Dynamic Traffic Control, Incidence Response.

3. Advanced Public Transportation System (APTS)

APTS is concerned with raising operational efficiency of all public transportation modes and increasing ridership by making the transportation system more reliable. Applications are- Real-time Status Information for Public Transit System, Automatic Vehicle Location

4. Emergency Management System (EMS)

This is the latest research field in ITS. It reduces the fatality rate in accidents by providing various technologies that helps in emergency conditions. Application are - GIS based Emergency Response Management System for Mysore City, India[2].

Apart from these major user service, there are some other subsidiaries of ITS which are as mentioned below-

5. ITS-Enabled Transportation Pricing Systems (ITS-ETPS)

Ex- Electronic Toll Collection, Variable Parking Fees.

6. Fully-Integrated Intelligent Transportation (FIIT)

There are some applications such as Collision Avoidance ,Intelligent Speed Adaptation

7. Commercial Vehicle Operations (CVO)

Real time applications are Traceability and safety of commercial vehicles such as trucks, vans, and taxis, CV electronic clearance, Automated road side safety inspection, On-board safety monitoring administrative process

8. Advanced Vehicle Control Systems (AVCS)

Example includes Collision Warning of the vehicles

9. Advanced Rural Transportation System (ARTS)

Provide Information about Remote roads via Radio[5].

IV KEY VALIDATING ITS STANDARDS

A. Wireless Communications-

Radio modem communication on UHF and VHF frequencies are widely used for short and long range communication within ITS. IEEE 802.11 protocols are used to accomplish the short-range communications of 350 m. Long range communications have been suggested using infrastructure networks such as WiMAX (IEEE 802.16), Global System for Mobile Communications (GSM), or 3G.

B. Global Positioning System (GPS)-

GPS receivers are embedded in vehicles on-board units receives signals from different satellites to determine vehicles position. Location can usually be determined to within ten meters. It is the technology used for navigation and route guidance systems.

C. Dedicated- Short Range Communications (DSRC)-

It is a short- to medium-range wireless communication channel specifically outlined for automotive uses. DSRC entitled two-way wireless communications between the vehicle (through embedded tags or sensors) and roadside equipment (RSE).

D. Wireless Networks

It provides rapid communication between vehicle and roadside but its range is of few hundred meters. WiBro is used along with WiMax for communication in South Korea.

F. Mobile Telephony-

3G and 4 G mobile telephone networks can be used for transiting information. It is easily available in the town and along major roads.

G. Radio wave/Infrared Beacons-

It uses 5.8GHz DSRC wireless technology. Japan'sVehicle Information Communications System (VICS) uses radio wave beacons on expressways and infrared beacons on roadways to communicate real-time traffic information.

H. Roadside Camera Recognition-

To identify vehicles license plate, cameras are used based on Optical Character Recognition (OCR) technology. This information retrieved is passed to back office servers in digital form , which assess and

post charges to drivers for their use of roadways within the congestion zone..Ex-London

I. Probe Vehicles or Devices-

Some countries use so-called "probe vehicles" that send their speed and location to a central traffic operations management center to identify congested locations. Ex.-Beijing

J. Sensing technologies-

Advancement in IT and telecommunication along with RFID(Radio Frequency Identification) has led to the improved Intelligent Transportation system. Sensors are placed onto the road to detect the RFID plate and count the number of vehicles[1].

V.INTERNET OF THINGS

IoT can be used to build a world where all intelligent objects of our everyday life are linked to the Internet and made to interact with each other with negligible human interference to reach a common goal. The term IoT is devised by Kevin Ashton. The building block of sensing and communication technologies of IoT are Wireless Sensor Network(WSN) and RFID-based network linked together through internet or other technology and protocol. Wireless network is connected to multiple RFID and sensors and work with each other to exchange data with the physical world to fulfill specific tasks.[4] Sensors management system and also sensors help to find out the vacant parking space nearby and mobile app is used to request the vacant parking slot and through this the driver gets to know about the available space over WIFI. In this way, the parking assistance is provided [3]. As shown in figure:

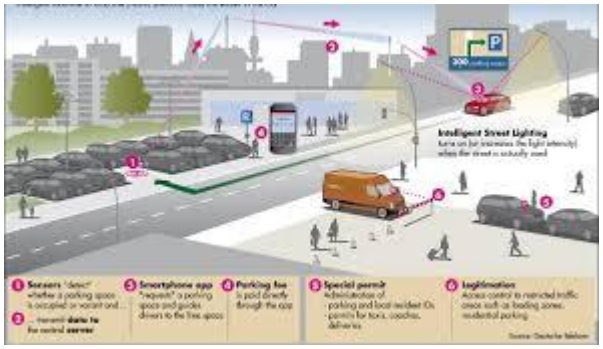

Figure 2. IoT based smart parking assistance.

VI.CONCLUSION

This paper highlights ITS as the most prominent and emerging area through which transportation monitoring can be done so as to reduce congestion, reduce accidents , increasing safety and throughput, information dissemination etc. It put together all the aspects of ITS relating to each other in one or the other way. Also ITS has never ending scope and it will evolve greatly in future.

VII.REFERENCES

The heading of the References section must not be numbered. All reference items must be in 8 pt font. Please use Regular and Italic styles to distinguish different fields as shown in the References section.Number the reference items consecutively in square brackets (e.g. [1]).

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A Review on Cloud Computing and its Security Issues

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ABSTRACT

Cloud computing is the development of parallel computing, distributed computing, grid computing and virtualization technologies which define the shape of a new era. For the sharing resources that contains software, applications, infrastructures and business processes, cloud computing is the main key. Cloud computing is a significant advancement in the delivery of information technology and services. Cloud computing offers compelling advantages in cost, speed, and efficiency. Cloud computing has recently reached popularity and developed into a major trend in IT. This paper focuses on the deployment model of cloud which consists of private cloud, public cloud, hybrid cloud, community cloud .This paper also focuses on architectural components of cloud which consists of Saas, Paas, Iaas. This paper also focuses on security issues and security challenges.

Keywords: Cloud Computing, virtualization, deployment, architectural

I. INTRODUCTION

In Cloud Computing the word cloud (also phrased as "the cloud") is used as a metaphor for "the Internet," so the phrase cloud computing means "a type of Internet-based computing," where different services — such as Servers, storage and applications — are delivered to an organization's computers and devices through the Internet .Cloud computing is a set of IT services that are provided to a customer over a network on a leased basis and with the ability to scale up or down their service requirements. Usually Cloud Computing services are delivered by a third party provider who owns the infrastructure [1].The exponential growth in the volume of data and information lead to problems in management, controlling effective and high costs of storage operation, where organizations are having problems: data retrieval and preparation and backups, and other acts of data. Therefore seeking companies and business organizations at the present time to achieve the highest return on their investments in technology through the planning and implementation of virtualization technologies and cloud computing, in order to protect data and manage more effectively and efficiently [2].

II. DEPLOYMENT MODEL OF CLOUD

In the cloud deployment model, networking, platform, storage, and software infrastructure are provided as services that scale up or down depending on the demand as depicted. The Cloud Computing model has four main deployment models which are:

A. Private Cloud:

Private cloud is a new term that some vendors have recently used to describe offerings that emulate cloud computing on private networks. It is set up within an organization's internal enterprise datacenter. In the private cloud, scalable resources and virtual applications provided by the cloud vendor are pooled together and available for cloud users to share and use. It differs from the public cloud in that all the cloud resources and applications are managed by the

organization itself, similar to Intranet functionality. In addition, private cloud offers hosted services to a limited number of people behind a firewall, so it minimizes the security concerns some organizations have around cloud. Private cloud also gives companies direct control over their data. In addition, private cloud offers hosted services to a limited number of people behind a firewall, so it minimizes the security concerns some organizations have around cloud. Private cloud also gives companies direct control over their data [3]

B. Public Cloud:

A public cloud is one based on the standard cloud computing model, in which a service provider makes resources, such as applications and storage, available to the general public over the Internet. Public cloud services may be free or offered on a pay-per-usage model.

Public clouds are less secure than the other cloud models because it places an additional burden of ensuring all applications and data accessed on the public cloud are not subjected to malicious attacks. Examples of a public cloud include Microsoft Azure, Google App Engine. The public model offers the following features and benefits:

- Ultimate scalability: cloud resources are available on demand from the public clouds' vast pools of resource so that the applications that run on them can respond seamlessly to fluctuations in activity
- Cost effective: public clouds bring together greater levels of resource and so can benefit from the largest economies of scale.
- Reliability: the sheer number of servers and networks involved in creating a public cloud and the redundancy configurations mean that should one physical component fail, the cloud service would still run unaffected on the remaining components.
- Flexibility: there are a myriad of IaaS, PaaS and SaaS services available on the marke which follow the public cloud model and that are ready to be accessed as a service from any internet enabled device.

C. Hybrid Cloud:

Hybrid cloud is a cloud computing environment which uses a mix of on-premises, private cloud and public cloud services with orchestration between the two platforms [5].

A cloud that is setup using a mixture of the above three deployment models each cloud in a hybrid cloud could be independently managed but applications and data would be allowed to move across the hybrid cloud. Hybrid clouds allow cloud bursting to take place, which is where a private cloud can burst-out to a public cloud when it requires more resources.

D. Community Cloud:

A community cloud in computing is a collaborative effort in which infrastructure is shared between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.) whether managed internally or by a third-party and hosted internally or externally .

This is controlled and used by a group of organizations that have shared interest. The costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realized.

A cloud environment operating according to this model may exist locally or remotely. An example of a Community Cloud includes Facebook [6]

III. ARCHITECTURAL COMPONENTS OF CLOUD

According to the different types of services offered, cloud computing can be considered to consist of three layers: software as a service (SAAS), platform as a Service (PAAS), and infrastructure as a Service (IAAS). Infrastructure as a Service (IaaS) is the lowest layer that provides basic infrastructure support service. Platform as a Service (PaaS) layer is the middle layer, which offers platform oriented services, besides providing the environment for hosting user's applications. Software as a Service (SaaS) is the topmost layer which features a complete application offered as service on demand.Cloud service models are commonly divided into SaaS, PaaS, and IaaS that exhibited by a given cloud infrastructure.

A. Software as a Service (SaaS)

Cloud consumers release their applications in a hosting environment, which can be accessed through networks from various clients (e.g. Web browser, PDA, etc.) by application users. Cloud consumers do not have control over the cloud infrastructure that often employs multi-tenancy system architecture, namely, different cloud consumers' applications are organized in a single logical environment in the SaaS cloud to achieve economies of scale and optimization in terms of speed, security, availability, disaster recovery and maintenance. Examples of SaaS include SalesForce.com, Google Mail, Google Docs, and so forth[7].

B. Platform as a Service (PaaS) :

This is where applications are developed using a set of programming languages and tools that are supported by the PaaS provider. PaaS provides users with a high level of abstraction that allows them to focus on developing their applications and not worry about the underlying infrastructure. Just like the SaaS model, users do not have control or access to the underlying infrastructure being used to host their applications at the PaaS level. Google App Engine5 and Microsoft Azure6 are popular PaaS examples[8].

Author affiliation must be in 10 pt Italic. Email address must be in 9 pt Courier Regular font.

C. Infrastructure as a Service (IaaS)

Cloud consumers directly use IT infrastructures (processing, storage, networks and other fundamental computing resources) provided in the IaaS cloud. Virtualization is extensively used in IaaS cloud in order to integrate/decompose physical resources in an ad-hoc manner to meet growing or shrinking resource demand from cloud consumers. The basic strategy of virtualization is to set up independent virtual machines (VM) that are isolated from both the underlying hardware and other VMs. Notice that this strategy is different from the multi-tenancy model, which aims to transform the application software architecture so that multiple instances (from multiple cloud consumers) can run on a single application (i.e. the same logic machine). An example of IaaS is Amazon's EC2.

IV. ARCHITECTURAL COMPONENTS OF CLOUD

There are some key security challenges which are:

Authentication: Throughout the internet data stored by cloud user is available to all unauthorized people. Henceforth the certified user and assistance cloud must have interchangeability administration entity.

Access Control: To check and promote only legalized users, cloud must have right access control policies. Such services must be adjustable, well planned, and their allocation is overseeing conveniently. The approach governor provision must be integrated on the basis of Service Level Agreement (SLA).

Policy Integration: There are many cloud providers such as Amazon, Google which are accessed by end users. Minimum number of conflicts between their

policies because they user their own policies and approaches.

Service Management: In this different cloud providers such as Amazon, Google, comprise together to build a new composed services to meet their customers need. At this stage there should be procure divider to get the easiest localized services.

Trust Management: The trust management approach must be developed as cloud environment is service provider and it should include trust negotiation factor between both parties such as user and provider. For example, to release their services provider must have little bit trust on user and users have same trust on provider[10].

V. SECURITY IN CLOUD

Based on the investigation security and privacy concerns provided by companies nowadays are not adequate, and consequently result in a big obstacle for users to adapt into the cloud computing systems. Hence, more concerns on security issues, such as availability, confidentiality, data integrity, control, audit and so on, should be taken into account.

Top seven security issues in cloud computing environment as discovered by "Cloud Security Alliance" CSA are:

- ✓ Misuse and reprehensible Use of Cloud Computing.
- ✓ Insecure API.
- ✓ Wicked Insiders.
- ✓ Shared Technology issues/multi-tenancy nature.
- ✓ Data Crash.
- ✓ Account, Service & Traffic Hijacking.
- ✓ Unidentified Risk report.

Misuse and reprehensible Use of Cloud Computing :Hackers, spammers and other criminals take advantage of the suitable registration, simple procedures and comparatively unspecified access to cloud services to launch various attacks like key cracking or password.

Insecure Application Programming Interfaces (API): Customers handle and interact with cloud services through interfaces or API's. Providers must ensure that security is integrated into their service models, while users must be aware of security risks.

Wicked Insiders: Malicious insiders create a larger threat in cloud computing environment, since consumers do not have a clear sight of provider policies and procedures. Malicious insiders can gain unauthorized access into organization and their assets.

Shared Technology issues/multi-tenancy nature: This is based on shared infrastructure, which is not designed to accommodate a multi-tenant architecture.

Data Crash: Comprised data may include; deleted or altered data without making a backup; unlinking a record from a larger environment; loss of an encoding key; and illegal access of sensitive data.

Account, Service & Traffic hijacking: Account or service hijacking is usually carried out with stolen credentials. Such attacks include phishing, fraud and exploitation of software vulnerabilities. Attackers can access critical areas of cloud computing services like confidentiality, integrity and availability of services [11].

VI. CONCLUSION

This paper discussed the deployment model and architectural component of cloud computing. It also addressed challenges and issues of cloud computing in detail. In spite of the several limitations and the need for better methodologies processes, cloud computing is becoming a hugely attractive paradigm, especially for large enterprises. Cloud Computing initiatives

could affect the enterprises within two to three years as it has the potential to significantly change IT.

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A Review on Security and Privacy in Application of IOT in Smart City

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ABSTRACT

From Stone Age to Bronze Age to 21[1st] century, mankind has made a remarkable development. Whether it is a field of science & technology or literature they have achieved excellence. Today we are living in a "computer dependent" world and are on our way to enter a new era of technology known as "Internet of Things" commonly known as IoT. IoT is a system of interconnected devices over network embedded with electronic device and, sensors which enables the exchange of data between the devices. Use of wireless sensors has led to the gather of large amount of data in Smart City infrastructure and IoT may come handy in managing these data easily. Till now we have mostly seen human to human type of communication or human-machine type of communication but IoT provides machine to machine type of communication.

Keywords: Internet of Things, Smart City, Security & Privacy.

I. INTRODUCTION

The Internet of Things (IoT) is a coming-of-age technology which will bind together everyday's physical objects embedded with microcontroller, transmitter, receiver, sensor, and protocols which will enable them to share data and communicate with each other over internet. Thus it will provide us an easy access and interaction with devices such as home appliances, surveillance cameras, sensors, vehicles etc which stores enormous amount of data. In this way enormous amount of data will be on our fingertips.

There has been an increasing trend of people moving toward urban areas in recent years because of employment opportunities, lifestyle and more. Thus challenging the existing system to manage the services for the increasing population and in this way forming what is so called "Smart City". There is no formal or widely accepted definition of smart city.

Wikipedia defines smart city as-
"A smart city is an urban development vision to integrate multiple information and communication technology (ICT) and Internet of things (IoT) solutions in a secure fashion to manage a city's assets – the city's assets include, but are not limited to, local departments' information systems, schools, libraries, transportation systems, hospitals, power plants, water supply networks, waste management, law enforcement, and other community services.".[4]

Smart city is, basically a concept in which cities makes the use of technologies connected over intelligent network to address challenges. These challenges may be related to parking, street light, transportation,

traffic, safety, waste management, service quality, security, water management, education system, healthcare system and more.

Thus the smart city concept aims to make the efficient use of public resources, improving and increasing the quality of services provided to the citizen and on the same time reducing the operational cost of these services.

Since Internet of Things connects devices, infrastructure, vehicles, appliances and more. Thus make it possible to make cities so called "smart" and more efficient by improving infrastructure, generating more cost effective municipal services, enhancing public transport by providing ways to reduce traffic and keeping citizens more engaged and productive.

The combination of technology with that of the physical world and communication between them can simplify the lives of citizens. Since according to a report from Cisco System, 60% of the world population will reside in cities by the year 2050, so transforming city into smart city should be our first preference. [5]

According to Forbes top 10 smart cities in the world are – New York, London, Paris, San Francisco, Boston, Amsterdam, Chicago, Seoul, Geneva and Sydney.
Some of the companies which provide smart cities solution worldwide are IBM, Cisco, Intel, and Silver Spring Network etc.

There are various terms related to the Internet of Things:[6]

Internet Protocol Version 6(IPv6) -
As IPv6's huge increase in address space, it is an important factor in the development of the Internet if Things. According to Steve Leibson(occasional docent at the Computer History Museum), the expansion of address space means that "after assigning an IPV6 address to every atom on earth, still we will have enough addresses left to do same for another 100+ earths." In simple words, we can easily assign IP address for every "thing" on the planet. An increase in the number of smart nodes, as well as the amount of upstream data the nodes generate, is expected to raise new concerns about data privacy and data security.

6LoWPAN -
6LoWPAN is a acronym that combines of the Internet Protocol (IPv6) and Low-power Wireless Personal Area Networks (Low PAN). This concept allows for the smallest devices with limited processing ability to transmit information with a battery life that lasts for years.

General Packet Radio Service (GPRS) -
A wireless communications process 2G, 3G and 4G cellular networks which supports a number of bandwidths and provides data rates of 56-114 kbps. As cellular companies need more advanced and effective network, GPRS network may be more cost-effective for IoT networks on basis of privacy and security purpose

Machine to Machine (M2M)-
It is a vast term that describes technology that permit one connected device to communicate for exchanging information with another connected device, without any human efforts.

II. APPLICATION

A.Traffic light Control

Traffic light control systems are used to monitor and control the flow of automobiles running on roads. They aim to make smooth motion of vehicles in the transportation routes. However, multiple traffic light systems' synchronization at adjacent intersections creates a complicated problem. However a system based on PIC microcontroller that evaluates the traffic density using IR sensors and accomplishes dynamic timing slots with different levels can be helpful. Moreover, a portable controller device is designed to solve the problem of emergency vehicles stuck in the overcrowded roads.

B. Smart Education

Albert Einstein said," Education is not the learning of facts, but the training of mind to think". So by making the education system smart, we can actually make the thinking process smart.

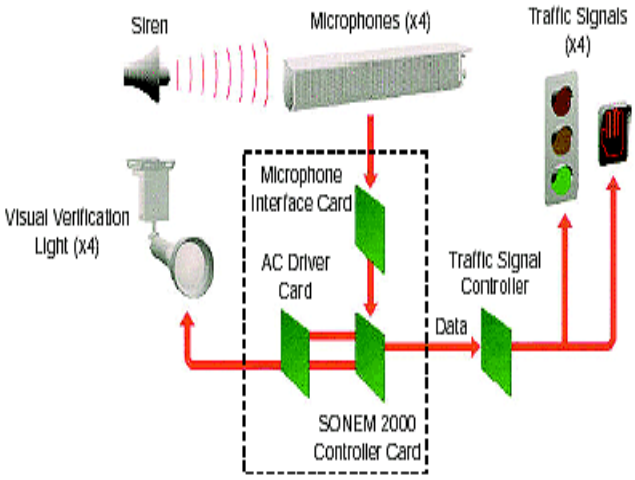

Figure 1. Traffic Light Control

Progress and enhancement of life and modern society demands the changes in today's educational infrastructure, which are traditionally very slow because of the existing education system.

Technology benefitted us in every way possible right form communication to education. Improving the quality and the enhancement of teaching and learning through the use and implementation of new trends of technology and IT enabled education is the primary target of higher education system.

Smart education, a concept that describes learning in digital age, has gained increased attention.

C. Intelligence Building

Building and home automation systems have usually been implemented only in high-level offices and buildings. The modern home entertainment systems could easily be combined with other sensors and actors within a building, thus forming a fully interconnected and smart environment. . Web- based smart energy metering and localization and mapping of energy consumption will be one of the IoT applications.

Figure 2. Intelligence Building

D. Waste Management

Municipal solid waste management (MSWM) is one of the major environmental problems in Indian. Improper management of municipal solid waste (MSW) causes hazards to inhabitants. Many studies have found that about 90% of MSW is not treated scientifically and then is dumped in open dumps and landfills, creating hazardous effects to public health and the environment. Various adopted treatment technologies for MSW are critically reviewed, along with their advantages and limitations. Recycling is a resource recovery practice that refers to the collection and reuse of waste materials such as empty beverage containers. Recycling is the process of making new objects from the material the item, which is being recycled, is made of. Kerbside collection process can be adopted to collect the material for recycling from general waste using dustbins and collection vehicles.

III. WORKING OF IoT [3]

The concept of Internet of Things lends to fabulous ideas. This concept provides internet based communication between physical objects, sensor and controllers. The connecting gadgets of the IoT such as computing hardware, including processors (with embedded programming telling what to do), sensors to gather various information (such as temperature, chemical levels, moisture, light, motion, heart rate and body movement) and communication hardware that can exchange signals.

Working of IoT mainly revolves around these components – sensors and devices, connectivity, data processing and user interface.

A. Sensors and devices

Devices with the help of sensors and other tech collect data from their environment. A device can be consists of one or more sensors to gather information. For example Phone is a device which is consists of many sensors like camera, GPS etc.

B. Connectivity

The data collected is then sent to cloud. A cloud is a data storage model in which data is maintained, managed and made available to the user. The sensors and devices can be connected to the cloud with the help of wifi, Bluetooth, satellite, internet.

C. Data processing

Now software performs some kind of operation on the data as per the requirement of the user, once data is uploaded on the cloud. It then resends the processed data to the devices or sensors at the user's end.

D. User interface

Here the processed data is made useful in some way to the user and may be communicated to the user through email, text, notification, alert etc. User can also proactively check the system for the result. User can also perform some action and affect the system. For example opening and closing the door, checking the temperature etc through an app or web browser.

User can also provide some predefined rule to automatically perform these actions.

IV. PRIVACY AND SECURITY [2]

a. Data Confidentiality

Confidentiality is somewhat equivalent to privacy. Confidentiality is done in order to prevent important and sensitive information from reaching the wrong

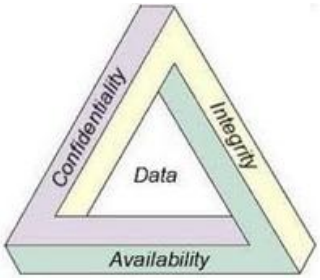

Figure 3. The CIA triad

people. On the same time making it sure that the right person gets the information thus restricting the access to the authorized person only. It is a process of providing confidence among the users about the privacy of their data. There are many methods to provide data confidentiality. Data encryption converts data into cipher text which makes it difficult to access for unauthorized persons. Two-step verification authenticates by testing two dependent component and allows the access only if both the components pass the authentication test. Biometric verification uniquely identifies each person.

b. Data Integrity

Data during its transition period may be changed by some unauthorized person, and the process is commonly referred as cybercrime, or it may get affected by some other factors such as crash of server or electromagnetic disturbance. Thus data integrity refers to the process of maintaining the accuracy of data and protecting it from being modified by some unauthorized person. Common method to provide data integrity is cryptography where hashing of received data is compared with the hashing of original data. Other methods includes user access control and file permission.

c. Data Availability

One of the main goal of IoT security is to make data available to the authorized persons whenever and wherever they need it. Any information has values if it can be accessed by authorized person at right time. To ensure availability there should be countermeasures for DoS attack which denies data availability to the users. Backup is the key to data availability.

A. Security And Privacy Concer And Their Measures [2]

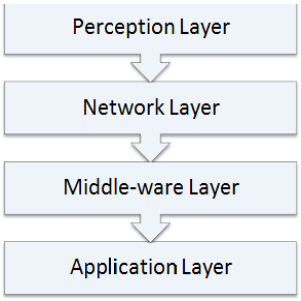

Figure 4. Generic architecture of IoT

Perception Layer

It consists of different types of sensors and other communication tools in order to communicate data between machines by uniquely identifying each object. Due to the lack of proper authentication mechanism in sensors data can be accessed by some unauthorized person and can be modified. Data cloning can also be easily done by any cybercriminal. System becomes vulnerable to spoofing in which attacker gain full control over system through broadcasting false information and making it appear as if it is coming from original source.

Security for this layer may include measures such as- authentication which means providing access only to the authorized person. Data privacy can be achieved through encryption, two step verification or biometric verification. Discovering new threats in advance can help in preventing security breaches. This process is called risk assessment.

Network Layer

This layer transmits the gathered information obtained from the previous layer to an information processing system over a connected network.

Challenges network layer faces are

Sybil attack: the attacker manipulates a node in a network such that that node acquires multiple identities.

Sinkhole attack: compromised node in a network attracts network traffic through its fake routing update. It can be used to launch DoS attack.

Sleep deprivation attack: maximizes the power consumption which eventually cause the node to shut down.

DoS: Network is flooded with useless of information and noises due to which network become unavailable to users.

Malicious code injection: attackers inject malicious code into the node which may cause complete shutdown of the network. Attacker may also get full control over network.

Measures that can be taken are-

Authentication: with a proper authentication process and proper encryption, unauthorized access to the sensor nodes can be prevented which in turn can prevent misuse of data.

Routing Security: routing algorithms can be implemented to ensure the privacy of data that is being exchanged between different devices connected over network.

Data privacy: encryption process, two step verification authentication, or biometric verification can be used to ensure data privacy.

C. Middle-ware Layer

This layer performs automated actions based on the results of the data processed and links the system with the database.

Challenges this layer faces are-

Unauthorized access: Middle-ware Layer provides different interfaces for the applications and data storage facilities. The attacker can easily damage the system by preventing the access to the related services of IoT or by deleting the existing data.

DoS Attack: This is similar to what we have discussed in the previous section.

Malicious Insider: This kind of attack occurs when someone from the inside tampers the data for personal benefits or the benefits of any 3rd party. The data can be easily extracted and then altered on purpose from the inside.

Measures that can be taken are-

Authentication: with a proper authentication process and proper encryption, unauthorized access to the sensor nodes can be prevented which in turn can prevent misuse of data.

Risk assessment: Discovering new threats in advance can help in preventing security breaches. This process is called risk assessment.

Data privacy: encryption process, two step verification authentication, or biometric verification can be used to ensure data privacy.

Intrusion Detection: it provides security solutions by generating alarm on generation of any suspicious

activity by continuously monitoring and keeping logs of intruder's activity which could help to trace the intruder.

D. Application Layer

This layer provides various application of IoT based on the needs of users. Some of the application includes smart city, smart home, smart hospitals, smart education etc.

Challenges this layer faces are-

Spear phishing attack: It is a type of email spoofing attack towards a specific individual, organization or business. The victim is attracted to open email through which the attacker may get control over the system and can also install malware on the targeted system.

DoS Attack: This is similar to what we have discussed in the previous section.

Malicious code injection: Some kind of malicious code is injected into the system in order to steal some kind of data from the user.

Sniffing attack: The attacker can introduce a sniffer application which can corrupt the entire system.

Measures that can be taken are-

Authentication: with a proper authentication process and proper encryption, unauthorized access to the sensor nodes can be prevented which in turn can prevent misuse of data.

Risk assessment: Discovering new threats in advance can help in preventing security breaches. This process is called risk assessment.

Data privacy: encryption process, two step verification authentication, or biometric verification can be used to ensure data privacy.

Intrusion Detection: it provides security solutions by generating alarm on generation of any suspicious activity by continuously monitoring and keeping logs of intruder's activity which could help to trace the intruder.

V. CONCLUSION

This review paer is significant in outlining general information about urban IoT, such as definition and status of IoT, which has become IT topic nowadays, and research institutes participating in related projects build a smart city as part of the future vision of local governments by reflecting the new information paradigm of IoT. A proof-of-concept implementation, deployed in the city of Padova, Italy, is a relevant example of application of the IoT paradigm to smart cities.

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IoT based security in Digital Door Lock

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ABSTRACT

Digital door locks have been widely used as part of the Internet of Things. However, there are reports that digital door locks being opened by invalid users to invade homes and offices. In this study, a digital door lock system that can work with the Internet of Things environment is proposed. It is designed and implemented to enhance security and convenience. In the overall system, there will be two different significant techniques to provide home security. One is to use video technology to see the front door in real time even if the home is empty and another is to provide communication between the door system and smart phone device. Connecting the smart door system with the smart phone through the cellular network, the house owner will have several opportunities such as controlling the house, getting instant video streaming, receiving and sending message, talking to the visitor and starting the alarm system. The experimental results indicate that the proposed system may provide a consistent support and assistance for safe and secure life.

Keywords: Digital Door, Internet of Things, Cellular network, security, smart phone.

I. INTRODUCTION

Over the world, Internet of Things and Machine Interpersonal Communication technologies which were developed for smart home system are becoming well known. The system is developed by using Supported Mobile Communication and Safety Powered Multifunctional Smart Door System. Home automation is one such application where Internet of Things oriented solutions is being implemented to make the secure and convenient living experience. Door lock system is an essential feature in this series of Home appliances which can be remotely controlled. In this work, intelligent door systems with confidential information contained in the digital code and the person's fingerprint is working, depending on the definition of identity.

[4]Recommended door lock system for detecting user ID RFID reader, LCD touch sensor module to determine the condition inside of house is used and finally includes communication module. In many cases, an intruder has tried to penetrate a private area by circumventing the lock. In this study, we will be designing and implement an IoT-based digital door lock to enhance the various security and monitoring functions using IoT technologies. The system is a three tier system based on IoT architecture using micro controller device, cloud and Android application. It aims to enhance several security and monitoring features based on IoT technologies [3].

II. IOT

The Internet of things is the internetworking of physical devices, vehicles, buildings, and other embedded with electronics, software, sensors, act-uators, 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 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 in addition to reduced human.

III. APPLICATIONS OF IOT

Internet of Things has a number of applications some of them are as follow:

Smart Home: Smart Home is one of the most popular IoT application at this moment because it is the one that is most affordable, efficient and easily available. From the Amazon Echo to the apple home automation, there are hundreds of products on the market.

Wearable: Watches are no longer just for telling time. The Apple Watch and other smart watches on the market have turned our wrists into Smartphone holsters by enabling text messaging, phone calls, and more.

IV. DESIGN OF SYSTEM

The main features of the proposed system are as follows. First, it has impact detection and alarm functions. This will help to detect an intruder who tries to open/break the door by applying physical force to the lock. Second, it has an image transfer function. Generally, an attacker who does not know the password will make a variety of attempts[3].

Therefore, when he enters the password the system clicks an image and sends it to the application on the user's phone. Fourth, the system can open the door lock automatically after recognizing a visitor's image. If a visitor does not know the code then he can enter a random code, the door lock system transmits his image to the admin. The user can remotely control the door lock through mobile app after reviewing the image. Fifth, the controller can detect a valid user if he is carrying the mobile device, and will open or close the door lock automatically.

V. OVERALL STRUCTURE OF THE SYSTEM

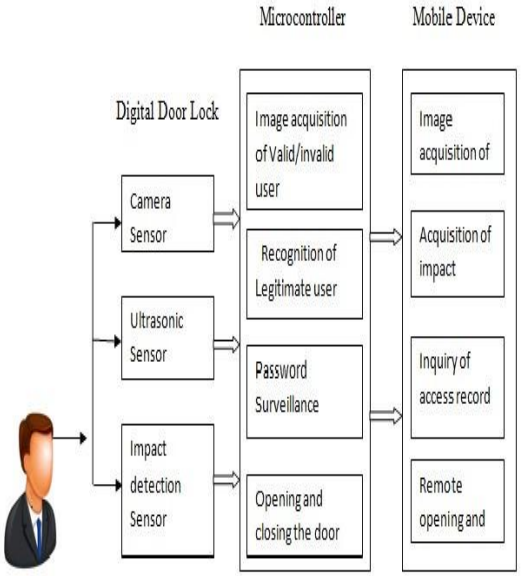

Figure 1. Structure of system

The controller detects physical impacts applied by a visitor, and notifies the user's mobile device. The controller detects that someone is entering the password it uses the camera to capture an image of the visitor. It transfers the image to the user's mobile device[2]. All of the access records are stored in the controller's database, which can be queried by the admin. If a person has lost his key, his image is captured and transferred to the admin by pressing a specific key, the user can then control the door lock remotely after verifying whether the visitor is valid or not. Another important function of the controller is automatically opening or closing the door when the mobile device user is near. When a valid user accesses the gate holding an object, as it is difficult to operate the door lock, the controller communicates with the user's mobile device via Bluetooth and opens the door automatically. The impact information and the invalid visitor image information is sent to the mobile user from the controller, and then the user can take

appropriate action. Further, if the user acquires image information for a valid visitor, it is possible to open or close the door lock remotely. It is also possible to query the incoming and outgoing records.

Pseudo Code

1. Foreach user
2. Input action
3. Switch action
4. Case “password”:
5. If (password is request number then take and send image)
6. Else if password is valid then open the door lock
7. Else if numer of mismatch >= 3 then take and send image
8. Else go to step 2
9. Case “impact”
10. Impact sensor operation
11. If impact value>= threshold value then camera sensor operation
12. Else go to step 2
13. Case “proximity”
14. If distance>=threshold value the mobile device synchronization
15. If valid user then send password, door oprn
16. Else go to step 2
17. Else go to step 2
18. End

VI. IMPLEMENTATION

A microcontroller is required to control the door lock and a Bluetooth module is used for communicating with the mobile device. An ultrasonic sensor is required to recognize a nearby user an impact vibration sensor is also required[2]. OpenWrt is used as the operating system of the system, the program to operate the controller can be written in C, PHP and MySQL are used for the database management, respectively, and UHTTP is used for the web server. Besides, various sensors for proximity and intrusion detection are connected to the system. A camera for capturing an image of users is installed, an impact sensor is attached for detecting an impact by an invalid user, and an ultrasonic sensor is attached to recognize the proximity of valid users[3].

VII. REMOTE CONTROL APPLICATION

The user can query all records of comings and goings from the Log menu. The Capture Log menu is for checking captured information, such as an invader’s image taken by the controller when an error occurs[2]. When an access request is generated by a valid visitor who does not possess the key, the Request menu allows the user to check the image of the requester and open the door. The Remote opening menu allows for remote door operation. The Option menu allows for password management and Bluetooth synchronization menu is a setting menu for automatic opening when approaching the door lock. The left side of the top of the figure is the main menu of the App, the right of the top shows the Bluetooth setup button for proximity open and a keypad for the remote open. The left of the bottom of the figure shows a list of the image information that has been captured by physical shock and the input mistake of password. And the right of the bottom shows an image of the item in the list.

VIII. CONCLUSION

In this paper, a digital door lock with enhanced security functions was designed to work with the Internet of Things. The designed digital door lock
Can sense the impact more than threshold by an invalid visitor and notifies the admin’s mobile device. If an incorrect password is repeated more than a certain number of times, the lock captures an image of the invalid user and transfers it to the mobile device, thus, strengthening the security function.

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A Comprehensive Study of Smart Farm

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ABSTRACT

Agriculture is the important factor development in rise of human civilization, and farming of domestic species which helped in creating food surpluses that nurtured the development of civilization. To produce output with high quality requires a good farm. In today's world, traditional farm alone cannot produce such results. It needs to get upgrade with technology thus enabling farmers to produce previously unseen results. With the advancement in the field of technology, the world around us is shifting towards automation. Automatic systems are being prioritized over manual systems, as they are energy efficient and minimize the need for tedious manual labour.

Keywords: Automation, Wireless Sensor Network, Zigbee, BeagleBone, Router, Access Point

I. INTRODUCTION

This paper aims to raise alternative ways to support farming. Modern farming techniques seek to diminish human involvement, escalate yield, and improve animal health. There are many actors which play a vital role in raising of animals in farm such as economics, quality and consumer safety. The paper attempts to extend automation to the farm level, by using complex and sophisticated home automation techniques, and adjusting them to suit a modern day farm.

Automation makes use of machines, control systems and information technologies to optimize productivity in the production of goods and delivery of services. The Indian farms are slowly beginning to feel the need of the technical advancement to be made in traditional farming methods. Automation in India is advancing at a fast pace, yet agriculture is one area that has seen less technological advancement as compare to the other countries despite having majority of population dependent in this sector. Use of sensor and other devices has made it possible to have technological advancement in almost all the areas. Sensor networks are compact wireless networks of small and low cost sensors, which gather and distributed environmental data. Wireless sensor networks helps in monitoring and controlling of corresponding physical environments from remote area with better efficiency and accuracy. It has applications in a range of fields such as environmental monitoring, climate control, surveillance and many more. Sensor nodes have various energy and computational restrictions because of their reasonable nature and ad-hoc method of implementation. In this paper we have proposed the Wireless sensor network to design the smart environment to monitor and control various climatic parameters contributing to smart farm. Data about livestock and farm can be remotely obtained by

farmer. Various operations such as automatic light control, automatic irrigation control can also be done with the help of system.

II. FEATURES

Features of Smart Farm are as follows

- Automatic lighting Control
- Climate Control System
- Humidity and Moisture Control
- Environment Monitoring System
- Tracking livestock
- Irrigation Control System

A. Automatic light switching system

Counters are used in both the directions to count the number of people entering a room in the farm house. The lights are turned off automatically on reading count zero. The system can also be modified to be timer dependent. In this case, lights will only be switched on when animals are awake and in their enclosures. In the farmhouse, lights will switch off at a preset time. An up-down counter that can change its state in either direction is used to count the number of people entering and exiting the farmhouse rooms. The up mode is counting the number of people entering while the down mode is used to count the number of people leaving the room by decrementing the value of counter. The IR sensor detects motion. When a person exits or enters it detects the interruption and runs the counter in either up or down mode based on selector setting. The count is displayed on a display(LCD). In this circuit, as showed in figure, a pair of infrared (IR) sensor modules is used, for both up and down counting. The pair of IR sensors are horizontally placed at a distance such that, whenever an interruption is observed by the first IR sensor, it increments the counter value. When the count value is more than zero, the lights are switched on. When the value becomes zero, the lights are automatically switched off, thus conserving energy.

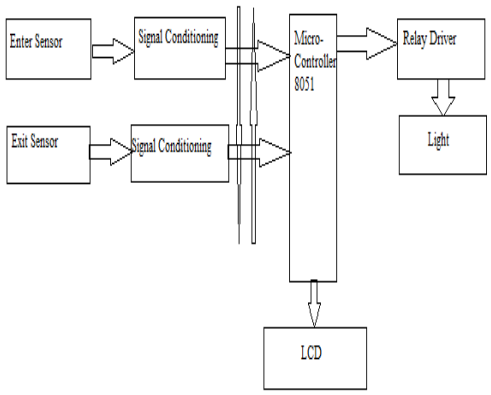

Figure 1. Automatic Light Control

B. Climate control system

An exhaust fan or a heater will get switched on automatically depending on real time readings from a temperature sensor. An 8-bit ADC is sufficient to provide required accuracy for in-house temperature readings. Depending on conditions requirements of cooling down or heating up inside the farm house, the microcontroller decides to switch on the exhaust fan or the heater respectively. It ensures comfortable conditions for livestock without tedious manual monitoring, along with energy conservation. The system can also be used for storage of farm products like milk and eggs, which require ambient temperature conditions to prevent spoilage. In addition, it can also be used in hatcheries to store eggs at required temperature for artificial hatching to ensure quality control. The temperature output can be preset with a keyboard interface to the microcontroller based system. The system has also a

humidity sensor to decide whether increase or decrease humidity.[5]

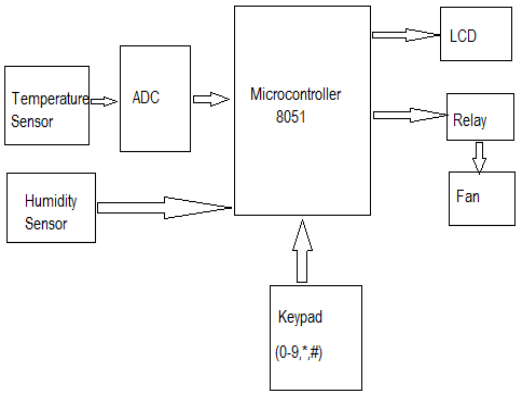

Figure 2. Climate Control System

C. Humidity and moisture control

A humidity sensor circuit is used to detect a change in humidity of the field surrounding and generate an interrupt signal to the microcontroller, which activates the sprinklers with the help of a digital solenoid valve. In the present scenario of water shortage, this system is an efficient and simple way of conserving water used in the farm. Humidity sensor is also used in many places such as hatcheries to maintain ambient temperature for artificial hatching. New born chicks require specific humidity and temperature conditions for their survival and healthier growth. The system has capability to measure different levels of temperature humidity and thus providing the necessary information to the farmers so that early precaution steps can be taken.[4]

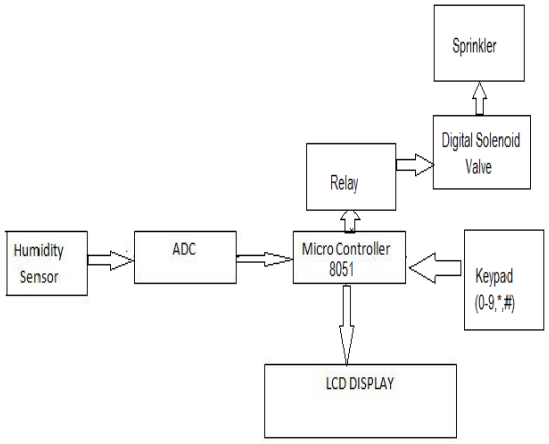

Figure 3. Humidity Control System

D. Environment Monitoring System

There are various problems in the traditional agriculture like weak real-time data acquisition, limitations in monitoring area, excessive manpower etc., The system collects various climatic parameters like temperature, humidity, illumination, voltage etc. from greenhouse and from there it transmits the data to nearest server via GPRS. The system includes a web application which is using Google Maps to show the greenhouse status and provide regular voice and SMS alarm service. Since, it requires lots of power so it is powered by solar and storage batteries. This results that low power system has better scalability and can provide better service.

E. Tracking livestock

The tracking collars are worn on the animal as a collar, and if or when the farmer wants to collect and review that recorded tracking data all they need to do is manually remove the collar and download the stored data, which will allow them to view in retrospect the movements of the livestock.

F. Irrigation Control System

The utilization of proper method for irrigation by drip is very proficient and reasonable. The approach reviews various monitoring system and also proposes an automatic monitoring system model which is using Wireless Sensor Network (WSN) which is useful for the farmers to improve the growth of crops. The system provides proper amount of irrigation to agricultural fields by observing the moisture content of soil. The system automates the process of manually irrigating the fields by switching the pump ON/OFF. It is implemented by using an 8051 series microcontroller, programmed such as to collect input signals that measures moisture content of soil through sensing arrangement.[3]

III. CONCLUSION

This project has proposed to introduce an efficient and advance smart farm system. It has make use of automation into various aspects of the farm. A new system for animal enclosures is put forward to improve the living conditions of livestock, as well as reduce manual labour. It includes an automated light, humidity and sprinkler system. The humidity and moisture control mechanisms make sure the animals are comfortable in the conditions they are kept in, by auto adjusting the settings as per requirement. The system is energy efficient as it helps conserve resources like energy, water and reduces manual labour to a great extent. A GSM module is used to connect all aspects of the modern automated farm. The farm owner has easy access to the system and can control it remotely through his mobile phone. This paper shows that with the use of advance technology to the farm, systems and appliances will be able to communicate in an integrated manner. This will result in convenience, energy efficiency, and quality and safety benefits.[2]

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Cyber Security for the Economy and Protecting Cyber Space Reliant Societies Again Cyber Threats

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ABSTRACT

Internet is essential for development for both social and economic sectors to form vital infrastructures. Due to the increased use of Internet Cyber Threats are evolving and increasing rapidly. Two interrelated objectives of Cyber Security aims for strengthening cyber Security for the economy and protecting cyber space reliant societies again cyber threats. But, to achieve these two objectives in parallel is complex, and probably the main challenge of Cyber Security policy. With this objective, this paper analyses the background, characteristics, current research work, counter measure techniques and future research perspectives of Cyber security. Initially, mobile cloud computing is highlighted and then features and recent survey issues has discussed. Finally future trends have been discussed [1].

Keywords:- Cyber Security, Cyber Crime, Cyber Space, Cloud Services, Ransom Ware

I.INTRODUCTION

In this interconnected world and increased in the use of Internet Cyber Security crimes up 19 times over 10 years.

Cyber Security is a claiming issues that not only affects individuals but Government organizations, big enterprises and armed forces too.

In this increasing interconnected world, every user does not possess knowledge about the technical solution to the problems related to security.

Right from the loss of customer data to the intellectual capital continues despite of the increasingly efforts of IT budgets and sophisticated security solutions.

II. WHAT IS CYBER SECURITY? STRIVING FOR DEFINITION

Cyber Security is the solution which deals with the germinating Cyber Criminals, it is the collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, best practices, assurance and technologies that can be used to protect the cyber environment and organization .The general objectives which Cyber Security comprises of:

- Confidentiality
- Availability
- Integrity

Creating an open, substantial, vital cyberspace which can be used by users safely and that supports open societies [3].

Table 1

	Today	2020
Estimated	7 billion	~8 billion

world population	people	people
Estimated Internet Population	2.5 billion people (35% of population is online)	~5 billion people (60% of population is online)
Total No. of devices	12.5 billion internet connected physical objects and devices (~6 devices per person)	50 billion internet connected physical objects and devices (~10 devices per person)
ICT Contribution to the Economy	~4% of GDP on average for G20 nations	10% of worldwide GDP

III. WHERE ARE WE ON CYBER SECURITY IN INDIA?

More than 50,300 cyber security incidents were faced by many Indian Organizations. There are many cyber security incidents including phishing, probing, website intrusions and defacements, virus/malicious code and denial of service attacks. "Around 10 million customer records were stolen from e-ticketing portal server of Indian Railway Catering and Tourism Corporation (IRCTC) website by Cyber Criminals". "Fraudsters spoofed the email account of Binny Bansal ,chief executive officer (CEO) of Flip kart, and sent two emails to the chief financial officer (CFO) demanding a transfer of $80,000". "A cyber Criminal known as Faisal breached the website of Canara Bank. The attacker defaced the site by inserting a malicious page and blocked some of its payment services". [10]

"RBI has registered a total of 9,500, 13,083, 16,468 and 8,689 cases of frauds involving credit cards, ATM/debit cards and internet banking during the year 2013-14, 2014-15, 2015-16 and 2016-17 (up to December 2016), respectively".[7]

There were 19 DoS attacks that exceeded 100Gbps during the first three month of year.

When referring to Cyber Security in India, we have to believe this that the security incident can happen to anyone at anytime; including us therefore we have to be prepared for our future. To detect malicious mechanism across an entire area, there are few organizations that have crossed maturity sufficient.

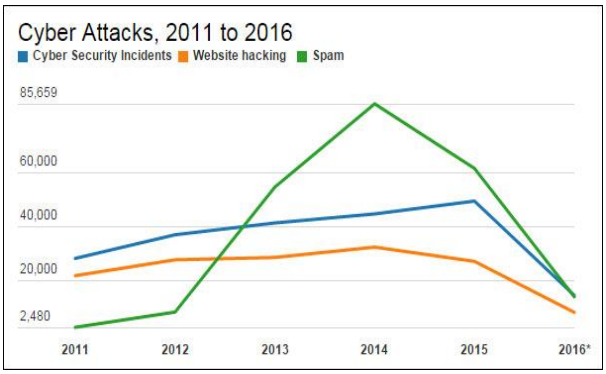

Figure 1. Year wise Cyber Attacks from 2011 to 2016[11]

IV. RECENT SURVEY ISSUES ON CYBER SECURITY TRENDS

“The development and adoption of new national cyber security strategies is an emerging trend characterised by its dynamism”.
Security will continue to escalate around not only securing networks but physical security too.

As per the recent Survey issues, there will be rapid increase in:

- Internal Threats.
- Spending on Business Security will increase.
- Industrial hacks will be increased.
- Increase in Cyber-Defence capacities.
- Ransom ware and extortion will increase [5].

V. PRACTICES AND CONCERN BY GOVERNMENT FOR CYBER SECURITY

"As per the information reported to and tracked by Indian Computer Emergency Response Team (CERT-In), a total number of 44,679, 49,455 and 50,362 cyber security incidents were observed during the year 2014, 2015 and 2016, respectively," Minister of State for Electronics and IT replied to Lok Sabha.

The efforts of Indian Government are also started for the recruitment of Cyber Security experts and partnership with top international Cyber Security Firms[2].

Standardization of Cloud Security:

Full capabilities and potential of cloud services are held by State government, their Cyber Security models will be rigorously transformed. Establishment of Focused Governance Structure: Full capabilities and potential of cloud services are held by State government, their Cyber Security models will be rigorously transformed. each agency should follow three steps namely develop, document, and implementation of its own information security plan should be carried out, which must be approved by the state CISO. Public comment should be made available for the information security plan.[8]

VI. CYBER SECURITY TECHNOLOGIES

Cybercriminal total annual revenue is higher than the drug trafficking.

The top innovative Cyber Security technologies of 2016 and till date are introduced as day by day hackers are getting smarter they are using many other techniques for the violation of data like Man-In-Middle Attack, Memory Scrapling Malware, Bespoke Attack, Spying Software and Google Glass.

Traditional and tool based approaches no longer cut all this threats. Some of the hot technologies are:

1) Context Aware-Behavioural Analytics: Organizations should be aware about the context and examine in which the data has been used i.e. unusual behaviour = nefarious doings.

2) Next Generation Breach Detection: It tells that what will happen if, once the attacker is inside the system instead of focusing on first line of defense. Machine learning and behavioural analytics are combine to detect breaches and trace them [4].

3) Virtual Dispersive Networking (VDN):

Traditional encrypting technologies are cracked by (MiM) attacks and ultimately target the intermediate code. In this message is split into multiple parts, each part is encrypted separately and routes them over servers.

4) Smart Grid Technology:

There are many smart devices which have left vulnerable infrastructure issues in the architecture. In order to avoid this new practical measure and ranges are been implemented.

5) SAML and Cloud:

Many applications are beyond the area of firewall and many other traditional techniques. In order to avoid

this SAML and Intrusion Detection Techniques are combined to control the traffic.

VII. POSSIBLE COUNTER MEASURE TECHNIQUES

Basic Cyber security measures to reduce the exploitable weaknesses and attacks:

Control System Devices should be accurately maintained and eliminate any exposure to external network: No machine or any other control network can communicate directly to other machine or on the Internet.

Implementation of Firewalls and Network Segmentation: With the rise of Internet Of Things many non-Internet connected device such as video camera have been linked to systems and web, so the importance of segmenting have been increased ever.

Security protocols are implemented and number of pathways is reduced then it is very difficult for a threat to enter in the system.

Implementation of System Logging and establishing Role Based Access Controls: By implementation of logging capability it allows for the monitoring of system activity. Establishment of Role-based access control grants limits the ability of users, attackers to the access prone areas.

Maintain Vulnerabilities and implementation of patches and updates:

System of monitoring for and applying system patches and updates should be implemented for the protection of one's organization from attacks and threats.

Developing and enforcing policies on Mobile Devices:

The spread of smart phones and smart devices in the workplace presents notable security challenges. In order to avoid threats and prevent devices from unauthorized access devices should be protected by the passwords .User should be cautious while using one's own device.

VIII. KEY CHALLENGES TO SOCIETY

Every Minute we are seeing about half a million attack attempts that are happening in Cyber Space.

Public and private institutions are the critical infrastructures of our Nation's in the sectors of Government, Defense, Energy, Transportation and finance. Full scale computerization has been opted by many banks for security purpose and due to this it has evolved the concept of e-commerce and e-banking [9].

IX. CONCLUSION AND FUTURE SCOPE

Inherent nature of information technology (IT), results in cyber security issues. Implementation of Cyber Security can be improved by calling two kinds of activities: What is known about improving Cyber Security, develop new knowledge about Cyber security. Focused attention and should be invested adequately for achieving the good degree of cyber security and to prevent one's data and information from the threats. Continuous evolving technology should be tracked globally, as it is a must requirement for Cyber Security. By growing interdependencies among infrastructures, global problems require global solutions, greater efficiency and faster results improves cost-effectiveness too.

It is crucial not only to our national sense of well-being, but also to our national security and economy. Considering the importance of Cyber Security challenges and counter measure techniques have been discussed in future, this will become the fifth utility because it plays major rule in smart city so the future work would focus to explore more control system devices to eliminate the exposure to external network. It will also focus to develop more policies for mobile devices to provide secure communication.

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Google Loons : Balloon Powered Internet Access via Stratosphere

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ABSTRACT

The service of Internet Service Providers (ISP) connect us to the global network via Internet services but is reachable to only one out of three in the world's population. The rest of the Population are not able to get internet access. It is not an easy task to lay the telecommunication lines all around the world to provide internet connection everywhere. As we area aware of that the developing nation cannot afford such a huge sum of money to lay fiber cables, this will not result to a productful solution. Google proposed the project Loon being developed for providing internet access to remote and rural areas. This project is a network of balloons floating in the stratosphere at an altitude of about 20-30 km to create an aerial wireless network with up to 3G-like speeds. In the Loon network, balloons travel around the earth bringing access points to the users. While energy on the balloons cannot be supplied by stable power source or by replacing batteries frequently, the balloons can harvest energy from natural energy sources, e.g. solar energy, or from radio frequency energy by equipping with appropriate circuits. This paper covers the working and designing of Loon balloons, the Loon's Technology, and its advantages in various fields.

Keywords: Stratosphere, user antenna, solar panel, Google Loon Project, wind data, etc.

I. INTRODUCTION

After more than 40 years of development Internet has created a revolution in communication for humans because it allows people to access and exchange information efficiently. Although Internet is highly accessible, approximately60-70%of people worldwide do not have the Internet reported by International Telecommunications Union in June2013.This stems from a fact that many areas such as Africa, Asia, and Pacific, cannot offer Internet connections due to geographical and infrastructure issues. Therefore, the idea of providing Internet connections via wireless networks has become more and more popular.

In wireless Internet, mobile users can connect to the Internet service provider (ISP) through base stations or access points. However, deployment of base stations for every location on the Earth seems to be impossible, e.g., oceans and mountains. Therefore, the idea of providing Internet from the sky was introduced. The early version is based on the satellites, which suffers from high cost and long transmission delay. As a result, the cheaper and faster alternative, i.e. Google Loon project, was proposed. In Loon project access points will be placed on balloons flying at an altitude of about 20km which is safe from bad weather and flights. The balloons will travel around the Earth and form a network of access points for Internet users in remote places. When receiving data from the user, the balloon will find the shortest route to transfer data to the nearest base station on the ground, which will be forwarded to an ISP.

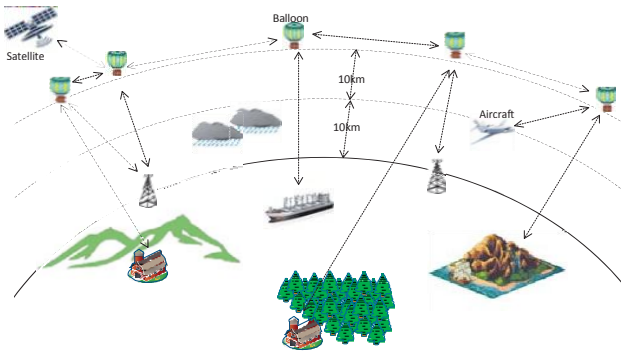

Figure 1. The model of wireless network in the sky

Since the balloons cannot acquire the energy from any stable supplied by stable power source or by replacing batteries frequently, the balloons can harvest energy from natural energy sources, e.g. solar energy, or from radio frequency energy by equipping with appropriate circuits. This seminar will cover the working and designing of Loon balloons, the Loon's Technology, and its advantages in various fields.

Google has taken an initiative and developed Project Loon which is a research and development project having the goal of providing Internet access to rural and remote areas. Google asserts that the stratosphere layer seems advantageous because of its relatively low wind speeds (likewise: wind speeds between 5 and 20 mph / 10 to 30 kmph) and minimum turbulence.

In this paper, we will cover working and designing of Loon balloons, the Loon's technology, its advantages and future scope of Google Loons.

II. THE TECHNOLOGY

In the stratosphere, there are many layers of wind, and each layer of wind varies in direction and speed. Loon balloons go where they're needed by rising or descending into a layer of wind blowing in the desired direction of travel.

Figure 2. Receiver antenna

By collaborating with Telecommunications companies to share cellular spectrum, Google has provided the facility which allow the people to connect to the balloon network directly from their cell phones and other LTE-enabled devices. The signal is then passes through the balloon network and back down to the global Internet on Earth.

Figure 3. Loons moving with wind

Project Loon balloons travel approximately 20 km above the Earth's surface in the stratosphere. Winds in the stratosphere are stratified, and each layer of wind varies in speed and direction. Project Loon uses certain software algorithms to decide where the balloons go and then moves each one into a layer of wind blowing in the required direction. By the process of moving along with the wind, the balloons can be arranged to form one large communications network.

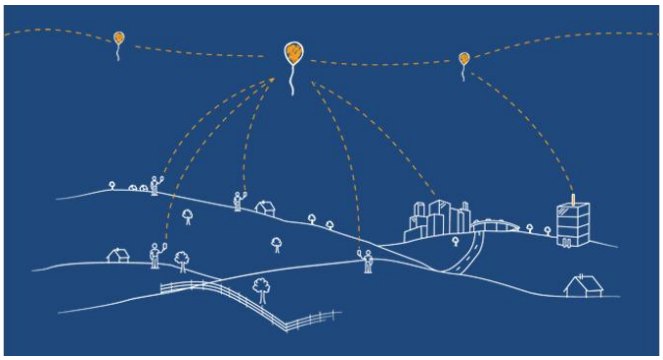

Figure 4. Communication network

III. Components Of Loon

ENVELOPE: The inflatable part of the balloon is called a balloon envelope. Loon's balloon envelopes are made from sheets of polyethylene plastic, and they measure fifteen meters wide by twelve meters tall when fully inflated. When a balloon is established well to be blown out of service, gas is released from the envelope to inflate the balloon down to Earth in a controlled manner. In case forbidden, the balloon drops too quickly. a parachute attached to the top of the envelope is deployed.

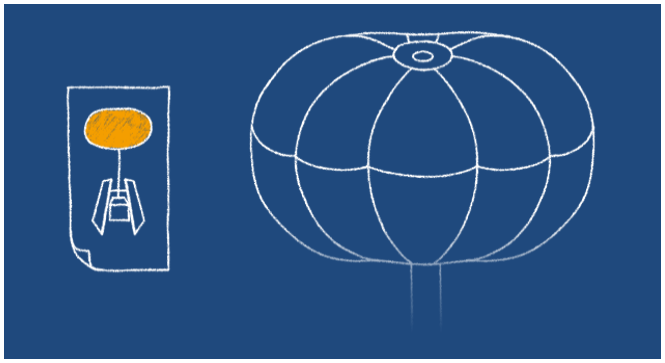

Figure 5. Envelope

SOLAR PANELS: Each balloon's electronics are powered by an array of solar panels. The solar array is mounted at a steep angle to effectively capture sunlight on short winter days at higher latitudes. The array is divided into two parts facing opposite directions to each other which allow us to capture energy in any orientation as the balloons spin slowly in the wind. The panels produce approximately 100 Watts of power in full sunrise, which is sufficient enough to keep Loon's electronics running along with this it also help in charging of the battery for effective use in the night hours. By moving along with the direction of the wind and getting charged in the sun, Project Loon is able to power itself using entirely renewable energy sources.

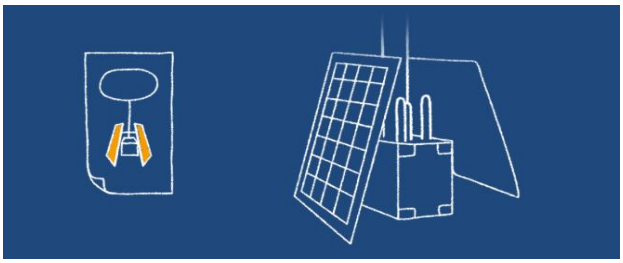

Figure 6. Solar Panels

ELECTRONICS: A small box containing the balloon's electronics hangs underneath the inflated envelope, like the basket carried by a hot air balloon. This box holds circuit boards that control the system, radio antennas to establish communication with other balloons and with Internet antennas on the ground, and lithium ion batteries to store solar power so the balloons can operate throughout the night.

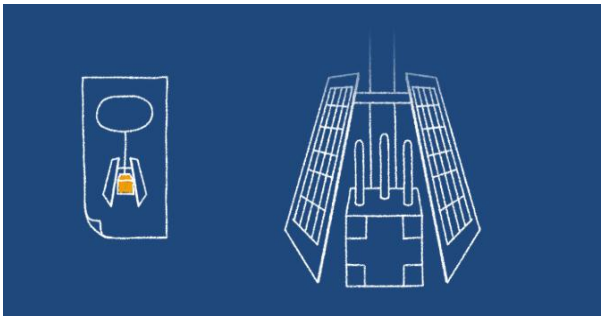

Figure 7. Electronics

IV. ADVANTAGES

Availability of Information: Assuming all the mechanisms of the project are functioning as planned, every single person who has access to some device that has Wi-Fi access would be able to search for almost any form of media online. Farmers in remote corners of third world countries would be able to research and analyze multiple techniques that could increase their yield, a father would be able to stay in touch with his daughter no matter which township either one of them lived in, villagers across an country would be able to transparently examine the country's political scenario and vote appropriately.

Education: With millions of uneducated children all across the world, this program might be able to successfully provide schooling through online classes on topics ranging anywhere from disaster management to literary analysis.

Health and Medicine: With globally available data on disease outbreaks and medical breakthrough, the entire population will be able to adjust to epidemics or adopt new drugs or medications.

Use of Renewable Energy: This will greatly influence and inspire future projects as well. Creating interplay between solar energy to keep proper functioning of the balloon while using wind energy to define its motor controls will help reduce the burden on coal, petroleum and other non-renewable energy sources.

Collaboration: Collaboration between people across the globe will become much easier with the constant connectivity to the each other through the internet, allowing newer more complicated projects to arise.

V. SUMMARY

After the detailed study on the topic, we can conclude that Google Loon's can be used for providing Internet access to remote and rural areas all over the world with up to 3G-like speeds. Given the relatively low winds and minimal turbulence, Google Loons can greatly increase the Internet usage in developing countries.

The planned deployment of Project Loon in Sri Lanka this year is a major step, following a successful trial in New Zealand launched in 2013. It's said that just three of the country's 20 million citizens have any sort of internet access, so even at 3G speeds Google's balloons will make a big difference. If Sri Lanka is a success, then Google's mission to deliver 'internet to everyone' has really just begun.

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Searching A Node In Linked List Using Divide And Conquer Approach

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ABSTRACT

The general idea of this paper is to implement binary search algorithm based on divide and conquer approach on the linked list. To implement the binary search algorithm the nodes of the linked list must be sorted in any order. In case of arrays it is very easy to find out the middle element because of the static and contiguous arrangement of its elements but because of the dynamic nature and random allocation of the nodes it is time consuming task to find out the middle node in sorted linked list. In this paper we have implemented two distinct pointers named, single Step pointer and double Step pointer to find out the middle node.

Keywords: Divide and conquer, Binary Search, middle element, single Step pointer, double Step pointer

I. INTRODUCTION

Binary search is a divide and conquer algorithm and is very widely used. It is specially used when the size of data is very large. If we have very large amount of data and we apply any linear searching algorithm on it, then the process will be everlasting, and as the complexity of linear search is O(n), so the complexity will be very high as the number of input data increases. So, we need to use divide and conquer approach, in which the whole work is divided and then conquered separately. Binary search does the same, it determines the middle element first and then compares it with the key element, and on the basis of that comparison the operation either stops or the algorithm operates on right half or the left half and this process is done recursively until the middle element matches with key. Implementation of this algorithm in arrays is quite easy. But if we talk about linked lists, it is not so straight forward. Determining the middle element is the first step, and in linked lists the nodes are at random locations in memory, so the middle node cannot be directly found. So, here we have used the special approach of dual pointers, in which we have used two pointers, a single Step pointer and a double Step pointer, to determine the middle node.

II. STEPS TO DETERMINE THE MIDDLE ELEMENT

1. First of all, we take two pointers, a singleStep pointer and a doubleStep pointer.
2. Then both the pointers are initialized with head of the linked list.
3. Then the linked list is traversed by both of these pointers.
4. For each step the doubleSteppointer will move twice the doubleStep pointer.
5. In this manner, when the doubleStep pointer will reach the end of list, the singleStep pointer will be pointing to the middle element of the list.
6. And we get the address of middle node through singleStep pointer.

III. ALGORITHM TO FIND OUT MIDDLE ELEMENT

MIDDLE_NODE(startNode, endNode)

1. IF startNode = NULL, THEN
2. RETURN NULL;

(END OF STEP 1 IF CLUASE)

3. singleStep = startNode
4. doubleStep = startNode
5. REPEAT STEPS 6 TO 9 WHILE singleStep != doubleStep,

6. singleStep = doubleStep -> NEXT
7. IF singleStep != endNode, THEN
8. singleStep = singleStep -> NEXT
9. doubleStep= doubleStep -> NEXT
   (END OF STEP 7 IF CLUASE)
   (END OF STEP 5 LOOP)
10. RETURN singleStep

IV. STEPS FOR IMPLEMENTING BINARY SEARCH ON LINKED LIST

1. Firstly, we take two pointers startNode and endNode, and initialize startNode with HEAD and then find last node of list and store that in endNode.
2. Then, we pass these startNode and endNode to the function MIDDLE_NODE and the return value is stored in middleNode.
3. If the info of middleNode matches with the key element, then the process is stopped, else proceed to step 4.
4. If info of middleNode> key, then we need to repeat the above steps for upper half, else proceed to step 5.
5. If info of middleNode< key, then we need to repeat the above steps for lower half.

If the key element is found then the loop will terminate, but if the key element does not exist in the list, then we will get into indefinite loop. If we are handling arrays, then we simply put the condition LOW <= HIGH, but in case of linked list the nodes exists at random locations in the memory unlike in arrays, so loop termination condition will be different. In this process, we continuously divide the array, goes onto the left or right side of middle element on the basis of comparison with key, so if during this process, we get onto a single node parition, whose info does not match with key, then we have to terminate. So, when we have a single node partition, the condition would be, startNode=endNode=middleNode.

V. ALGORITHM FOR IMPLEMENTING THE BINARY SEARCH

BINARY_SEARCH(HEAD, KEY)

1. startNode =HEAD
2. REPEAT STEP 3 WHILE endNode -> NEXT != NULL,
3. endNode = endNode -> NEXT
   (END OF STEP 2 LOOP)
4. REPEAT STEPS 5 TO 17,
5. middleNode = MIDDLE_NODE(startNode, endNode)
6. IF middleNode -> INFO = KEY, THEN
7. PRINT “KEY FOUND”
8. BREAK
9. ELSE IF middleNode -> INFO > KEY, THEN
10. endNode = startNode
11. REPEAT STEP 12 WHILE endNode -> NEXT != middleNode,
12. endNode = endNode -> NEXT
    (END OF STEP 11 LOOP)
13. ELSE
14. startNode = startNode -> NEXT
15. (END OF STEP 6 IF CLAUSE)
16. IF startNode == middleNode AND endNode == middleNode, THEN
17. BREAK;
    (END OF STEP 4 LOOP)
18. RETURN

VI. CONCLUSION

Binary search implementation on Arrays is more easy as compared to Linked List, due to following reasons:

a. The array elements are directly accessible by their locations or indices, while this is not the case in linked list (in which any node is referred by the next pointer of its previous node).
b. The array elements are stored at contiguous memory locations, while linked list elements are stored at random locations in memory.
c. The arrays are static in nature, as its size(elements holding capacity) has to be decided at the time of its definition, while linked list is dynamic, so the nodes can be added or deleted at run time.

Complexity of Binary Search algorithm in case of linked list is high as compared to arrays, as there is an additional algorithm to find out the middle node.

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Cross Platform Application Using Electron Js

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ABSTRACT

Electron is a framework for cross-platform desktop applications using Chromium and Node-Web kit. Electron is a JavaScript framework from GitHub, to build powerful cross platform desktop applications with HTML/JS/CSS. On top of electron, imagine applications developed with existing JavaScript ecosystem and building desktop apps - the outcome will be amazing. It's easy to build cross-platform apps using HTML, CSS, and JavaScript.

Keywords: framework; app; GitHub; ecosystem; Cross platform desktop; Imagine

I. INTRODUCTION

Electron is basically a runtime server base platform that allows you to develop desktop applications using HTML, CSS, and JavaScript.[2] It is an open source framework developed by GitHub. Electron is generally called atom cell. it built for atom editor to handle chromium to Node-Webkit event loop integration and developed native API. Electron js application is works with combining the chromium content framework and NW JS node together in a single processing framework. A variant of Node-Webkit runtime that is focused on desktop native application instead of web servers for different type of operating system. So using electron js we are able to create native desktop application. Electron js create a dynamic process for running the dynamic build application for native creation.

Electron really simple here by combining both frameworks together in a single shell. It's not a complex framework at all. You don't have to learn a lot of conventions in order to start application development with Electron. It's very easy to structure an application using Electron as there is no complex tooling required to set it up. Electron always keeps up to date with chromium and node versions. The chromium used inside Electron is always two weeks behind the latest stable chromium version. It typically includes the latest version of the node and v8 engine. Own strengths and disadvantages will be laid down in this paper.

II. PROBLEM STATEMENTS

A. Development of Application which is work as "cross-platform application"?

[1]"Native" cross-platform apps: Native cross-platform apps are created when you use APIs that are provided by the Apple or Android SDK, but implement them in other programming languages that aren't supported by the operating system vendor.

[2] Native HTML5 cross-platform apps have never gained wide of processing network and compiling because this approach to development results in performance issues when an app's UI is rich in components.

B. Why need to development of cross-platform apps for product owners and developers?

[1] Cost-efficient cross-platform apps are cheaper to build and maintain due to a number of factors. If cross-platform apps are properly developed, at least half of their code can be used across platforms.

[2] One team and one product for two platforms: - Product owners who want a cross-platform application need only one team of developers that are trained in one set of technologies.

C. How modern cross-platform apps good for the end user?

[1] Designing Uniqueness:- Feature of cross-platform development tools providing developers/ designers to create the unique user experience that app users appreciate.

[2] Best for Original: - Quicker development provides product owners with an opportunity to collect user feedback and to secure a patent and a spot in the market.

[3] Greater reach and easier marketing: - cross-platform apps are more useful for many business owners because they provide a wider reach: by creating one application you can use all platforms.

III. DETAILED CONTENT

A. HISTORY

Node-Webkit as a in history desktop applications starts in 2011 with Roger Wang, the developer of Node Webkit. Roger Wang started the node-webkit project naming a simple Node-Webkit module that can create a browser window using Web Kit - the browser engine used by Safari and chromium. Advantage of the node-webkit module is that we can use Node-Webkit APIs inside the webpage and create a native application which is use to renderer the process by child process of system.it is implemented in Node-webkit library which is show all browser data so in history it is not appropriate model for development. After some-time, Roger improved the node-weskit by replacing Web Kit with the chromium embedded framework (CEF).

B. DEVELOPMENT

- Title Development of a hello world application using Electron:- Node-Webkit is installed or not by cmd window and enter the command node -v // it is use to check node version in system
- Installing Node-Webkit :-The easy way to install Node-Webkit is using installer. Follow the instruction www.nodejs.org to download executable file for your operating system. There are a couple of other ways to install Node-Webkit.

Mac

brew install node

Linux

In linux base system the installation of nodejs is assential process of using terminal window so (http://nodesource.com)

curl -sL https://deb.nodesource.com/setup_6.x | sudo -E bash sudo apt-get install -y nodejs

- Installing Electron[1]

Electron is working by npm module so before installation of electron module to have to install the npm. To install npm electron use following command:

- npm install -g electron to install globally electron you can use the command with –g with electron: Globally process of system is include the programming to overall system. It is just system to include full processing system.: Locally - local modules can be installed with the same command, but without the -g flag. The modules will be installed into the current directory. Its scope is limited to the current directory.

C. INTERNAL WORKING OF ELECTRON

Electron is based on Google's chromium project. Electron working with chromium module that is internally working with render process of web page. Chromium can include modules are the core code in C++ needed to render a web page in multi process sandboxed browser process by multithreading.

Electron include the feature of node js, chromium and google V8 engine. Node Js is able to facility to development of web API and Google V8 engine is process the web API. For better understanding let is look into how the chrome browser works.[4]

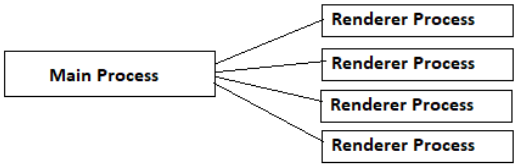

Figure 1. Process Handling by electron JS

- Architecture of Electron JS

Multi-process architecture of chromium because Electron uses a simplified version of chromium's multi process architecture. Modern operating systems are robust because they put an application into different processes that are separated by each other. [5]A crash in one application does not have any impact on another application and it will not affect the integrity of the operating system. In a similar way, Google Chrome uses separate process for each tab to protect overall bugs and glitches from the rendering engine. It also restricts access from each rendering process to others and to the rest of the system. So basically the Chrome browser runs two types of processes. The main process runs the UI and plugin process and tab specific processes which renders the web page. The following figure shows how the multi process architecture works in Electron. The main process can start multiple renderer processes with different URLs loaded into it.

Browser: This is responsible for business logic and data access. It works on its own process called main process. It creates the browser window and corresponding modules to render the web pages.

Renderer - This is responsible for rendering each web page. Each web page renders on its own thread.
Modules that bridge browser and renderer and control application life cycle

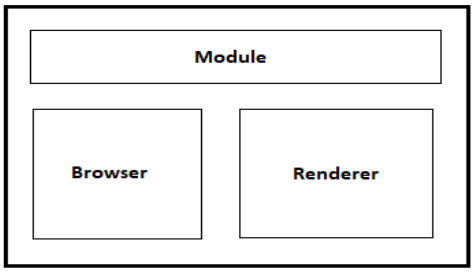

Figure 2. Internal Architecture of electron js

The Main process providing a web page by creating a Browser-Window object for compression of module. Each Browser-Window runs the web page in its own separate renderer process.

Main Process: The main process is responsible for responding to applications life cycle events, starting and quitting the application. it provides the Node-Webkit execution context inside the renderer process, which allows you the lower level operating system interactions from your web pages rendered in the Electron shell.

Renderer Process: The renderer process is responsible for loading the web pages to display the graphical user interface. Each process can load and execute additional JavaScript files in the same process. Each renderer process is isolated and each process cares only about the page running in it.

Process Sharing between renderer and browser: Browser and renderer are separately running processes that communicate using special APIs called chromium inter process communication. IpcMain and ipcRenderer modules are basically event providing the handling the communication between main processes and the renders processes.

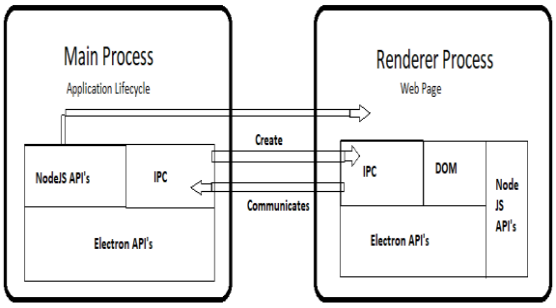

Figure 3. Interposes communication in electron js

D. DESCRIPTION

Process: -

Step 1: Create the basic file of electron

App

package.json

main.js

index.html

If package.json is according process of npm module so automatically the generation of system:

npm init

Package.json file is content the module of system that is used in program if we want to shift our project so no need to copy the npm module we just have to clone that module form GitHub. So [package.json file contain the dependencies.

package.json

```
{       "name"    : "your-app",
        "version": "0.1.0",
        "main"    : "main.js"
 }
```

Step 2: [3]Main.js page is controller the main process of application is file is running into the system and controlling the process of renderer process. Main process is able to create multiple renderer process itself.

```
const electron = require('electron')
// Module to control application life.
const app = electron.app
// Module to create native browser window.
const BrowserWindow = electron.BrowserWindow
// Keep a global reference of the window object, if you don't, the window will
// be closed automatically when the JavaScript object is garbage collected.
let mainWindow

function createWindow () {
  // Create the browser window.
  mainWindow = new BrowserWindow({width: 800, height: 600})
  // and load the index.html of the app.
mainWindow.loadURL(`file://${__dirname}/index.html`)
  // Open the DevTools.
  mainWindow.webContents.openDevTools()
  // Emitted when the window is closed.
  mainWindow.on('closed', function () {
    // Dereference the window object, usually you would store windows
    // in an array if your app supports multi windows, this is the time
    // when you should delete the corresponding element.
    mainWindow = null
  })
}
// This method will be called when Electron has finished
// initialization and is ready to create browser windows.
// Some APIs can only be used after this event occurs.
app.on('ready', createWindow)

// Quit when all windows are closed.
app.on('window-all-closed', function () {
  // On OS X it is common for applications and their menu bar
  // to stay active until the user quits explicitly with Cmd + Q
  if (process.platform !== 'darwin') {
    app.quit()
  }
```

```
})

app.on('activate', function () {
  // On OS X it's common to re-create a window in the app when the
  // dock icon is clicked and there are no other windows open.
  if (mainWindow === null) {
    createWindow()
  }
})

// In this file you can include the rest of your app's specific main process
// code. You can also put them in separate files and require them here. [6]
```

Step 3: Index.html

Index.html page is viewer page on that file we are design the webpage and making the system process to viewer itself. Html page itself is web technology like angular, css and JavaScript page application also collectively information setup.

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8">
    <title>Electron Hello World!</title>
  </head>
  <body>
    <h1>Electron Hello World!</h1>
    We are using node <script>document.write(process.versions.node)</script>,
    Chromium <script>document.write(process.versions.chrome)</script>,
    and Electron <script>document.write(process.versions.electron)</script>.
  </body>
</html>
```

Step 4: Execution of application in debugging mode is using command that is development process in which we can create new window to show the process. Electron.

IV. CONCLUSION

Although Electron is good new technology and a lot of improvements and infrastructural tools are still to come. It is allows building quite good desktop applications and community is doing great progress on providing setup and development in the best and easy and interesting. To build cross platform application electron help to providing capability to improving desktop application.

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Noise Pollution Reduction through Sensors and Digital Image Processing

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ABSTRACT

Noise pollution is one of the major concerns in today's scenario. And one of the major contributors in noise pollution is honking by vehicles. Therefore we are intended to use some sensors and some hardware to reduce the effect of vehicular horns. Here only the intended drivers will get alert while rest of the area will remain undisturbed. We will be using radio waves for transmitting signal and this signal will be send only to intended receiver, receiver will be identified by its unique number plate. To identify the number plate we will be using some digital image processing techniques. The signals will be send by the sender by radio frequency transmitter to the receiver having id same as the number plate. Once the receiver got the signal then two actions will be performed simultaneously. One is horn will be blown inside the car only and the other is the tail light will be blinked to alert the sender that the receiver has heard the horn. Otherwise the sender has the option to use the normal horn.

Keywords: radio frequency, transmitter, receiver, signals, noise.

I. INTRODUCTION

Over In recent year's horns is a major contributor to noise pollution in Indian cities. Experts have warned that chronic exposure to sound beyond 93dB for eight hours can cause irreversible hearing loss. The road transport and highway ministry is considering a proposal to reduce themaximum permissible decibel range of vehicle horns, a move aimed at curbing noise pollution from compulsive honking on Indian roads. [3]

Honking for no reason makes irritation and Researchers says that noise pollution may increase the risk of heart disease, such as coronary artery disease, hypertension and heart failure.

We are applying DIP because the vehicles which we are considering is a moving objects so while scanning the number plate there are chances that the image which we are getting might contain some noise so to remove those noise image processing algorithm are required.

Once we got a clear picture of the number plate we will be sending the signals to the vehicle of that number plate and when that vehicle will receive the signals the horn will be blown inside that vehicle only. And once the horn got blown we can blink the tail light of the vehicles so that sender will get alert that receiver has received the signals and if there is no signals of reception then the sender has the option of using secondary horn(usual horn) that will alert the whole region within the frequency range of the horn.

II. SURVEY

According to the Environment Protection Act, the noise limit prescribed for automobiles is 85dB (decibel).That means increase of 10dB will makes a sound that is perceived to be twice as loud.

According to a survey conducted by Awaaz Foundation in Mumbai, vehicles have been observed to honk at peak levels of up to 108.4dB.

"Honking is a major source of sound pollution and each year around 1.5 crore vehicles are added. If the standards for horns are fixed around 90dB and immediately implemented on new vehicles and in a time-bound manner on older vehicles, the noise pollution due to horns will reduced by 1/6th provided the much-needed relief to people," said Nevatia.

In its recommendations, Deole said, the MPCB suggested to restrict the sound levels for horns at 88dB, while the CPCB felt the sound level for horns should be 95dB. "We will wait for the CPCB to fix the standards and immediately work on0 fixing standards for the state as well," he added. [Indian express]..

III. LITERATURE SURVEY

There are several methods to control the honking such as:

A. Through VANET

The In VANET network each and every vehicle behave like node or a router so that they can communicate with each other. Instead of alerting the whole area in this network the vehicles can communicate with each other over the range of 100-200 m and only the intended vehicles will be alerted. But implementing such system in such a large country will be costly enough and also this method is not efficient for those areas in which this network is not available. [1]

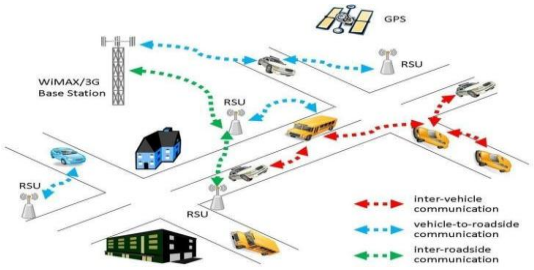

Figure 1. VANET

B. Using Infrared rays

Instead of using VANET if we use infrared waves then this method will be cheap to implement because for emitting infrared waves IR led can be used and for reception purpose IR receivers can be deployed the same transmitter and receiver which is generally found in TV and TV remotes. But if we use this method then the range of horn gets decreased and the sender will not be able to alert the person 50-60 m away from him/her. And the second disadvantage of using this method is infrared ray wave's works on line of sight which means the receiver has to be in straight line and should be sync with transmitter. [6]

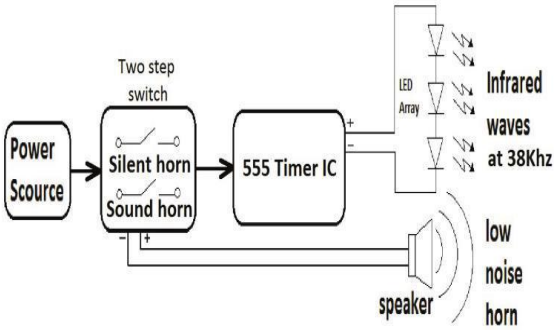

Figure 2. Transmitter block diagram

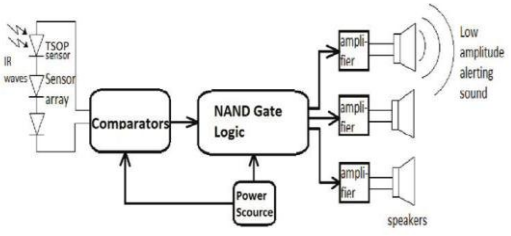

Figure 3. Receiver block diagram

C. Using Bluetooth

By using Bluetooth transmitter and receiver two vehicles can communicate with each other by sending the signal over Bluetooth. The advantage of

using this methodology is it is cheap to implement. But it has its limitation as well, the limited range of Bluetooth makes it useful over short distance but it will not be as useful over large distance such as on highways. [5]

D. Using GPS system

The other alternative is using GPS system to locate the vehicle and sending the signals to the receiver. The at receiver side intensity of the signal gets compared is it is greater than the threshold value then the receiver gets notified and it works accordingly. The main drawback of this system is that when it's come to practical implementation it is quite costly. [5]

IV. ROPOSED METHODOLOGY

Number plate identification and Storing

We will be using digital image processing techniques to identify the number plates uniquely. The number plate will be scanned by the camera installed in front part of the car and since the image acquired by the camera will have noise in it so it will be difficult to identify the numbers uniquely so to remove noise and to identify the numbers image processing is needed. This will include detecting the vehicle and in vehicle we have to identify the required area i.e., number plate after which noise from image acquired through camera will be removed and the numbers in number plate will be identified.

So in wholesome this process will include detecting the vehicle and then capturing the vehicle image. Vehicle number plate region will be extracted using the image segmentation in an image. After which the characters will be recognized by optical character recognition techniques. After reconditioning the numbers this number have to be stored temporary in some place from where retrieval is as fast as possible.

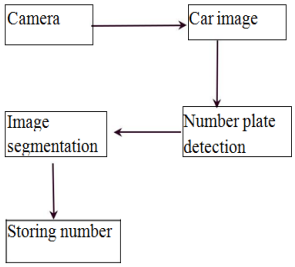

Fig.4 Number detection process

Transmitter Process

Once the transmitter got the numbers form the storage system it will treat that number as the pseudo code. Here the role of transmitter is to combine both the signal and the number and to send this combined code to receiver.

Transmitter contains three blocks

1) Encoder
2) Modulator
3) Storage system

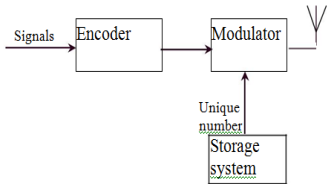

Fig.5 Transmitter Process

Receiver Process

Receiver storage system has predefined value which is same as the number on number plate. So whenever the receiver will receive the signal from the transmitter which contains the signal with pseudo code, then the first thing the receiver will do is to compare the pseudo code with its number and if matched then it will alert the driver about the signal.

Receiver process also include three blocks:

1. De-modulator
2. Decoder
3. Storage system

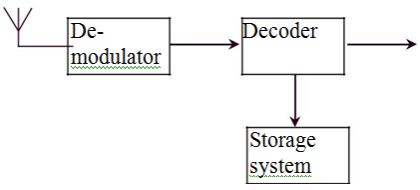

Fig.6 Receiver Process

Alert

When the match occurs the driver on receiver side should get alert of the vehicle behind him so that he/she can take appropriate actions. Not only the driver on receiver side will get alert but also the sender will get alert that the driver on receiver side has received the signal.

The sender can be alerted by blinking of tail light of the receiver side vehicle.

Alternative

If the sender does not get alert back by receiver then he/she has the option of using the secondary horn (usual horn).

ADVANTAGES

This method will be cheap to implement as well as the transmission range of the signal got improved to certain extent.

DISADVANTAGES

Vehicles should be in the range of the camera.
Costly as the processor with good computational speed is required.

V. CONCLUSION

We have successfully implemented this project and we found that the range of this method is better than the infrared rays but it has the limitation that vehicle should be in the range of the camera.

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Augmented Reality: Map with information using Unity-3D

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ABSTRACT

This paper explores the use of Unity3D Vuforia packages to make an application in Augmented Reality for any small area, buildings including colleges, monuments etc. It is described that how map is created in AR along with the information. Results shows that created application is accurate enough to show the information of target image and scanned text in real time environment also able to show the path between source to destination through camera in AR.

Keywords: Unity3D, Vuforia, Target Image, Augmented Reality, Navigation, Map, 3D, A* Algorithm, Mapbox

I. INTRODUCTION

Augmented reality is the integration of digital information with the user's environment in real time. Unlike virtual reality, which creates a totally artificial environment, augmented reality uses the existing environment and overlays new information on top of it[1]. Basically AR is a technology in which registration of 3D objects are done. With this technology user can use their personal mobile device, head mounted display to produce interesting AR environment in 3D around devise in real time. Otherwise AR technology has a broad range of applications including medical, creating 3D model, map navigation, showing information of 3D objects. there are several ways to implement AR applications. This paper uses Unity-3D and vuforia AR packages to establish 3D world, 2D image correspondences (for image target).

This paper describes the implementation of three different modules of an AR application. In which user will be able to use their personal mobile phones to see 3D objects in real world through camera also able to get the detailed information of that object, written text, image and move to destination according to path which is navigated by application in AR.

The rest of the paper is structured as follows: "Background" presents the use of vision-based methods for augmented reality and gives examples from the literature making use of Augmented Reality. "Methodology used" describes a method for creating complete application.

"Method to detect image target" detailed explanation of image target detection. "Method to scan text" describes a method of Text recognition, in this module we have to recognise written text (OCR). "Method to create navigation" describes for navigation use of unity Navigation and Path finding feature and A* algorithm, while "Results" assesses the effectiveness of the A* algorithm and presents the results of augmentation. Finally, conclusions are drawn in for the implemented work.

Figure 1 (a)Image target (b)3D View

II. BACKGROUND

"A Survey of Augmented Reality" by Ronald T. Azuma [8] -

In this paper, the author differentiates the two terms virtual environment [VE] and augmented reality [AR] in terms of real world. In VE, the user delves into

virtual environment and cannot feel real world as in AR, where he can interact with real world. AR bridges or glues virtual and real world. The paper is arranged surveying the combination of VE and AR, interaction of user in real time and registration of 3D space. The AR is widely applicable in many areas. Most useful application which he discusses is Medical (surgery and visualization aid), Machines (assembling, maintaining and repairing), robotics, entertainment etc. He had discussed about the characteristics of virtual environments and in comparison to AR stated rendering process for virtual objects is quiet easy in AR as compared to VE because in virtual environment all the objects need to be rendered virtually whereas in AR only few objects need to superimposed with real world. Example, AR for text, annotation applications etc. The hardware requirements of AR is low but more stringent in case of sensing or tracking applications. The reason for this is registration problem means, two objects must be properly aligned which is the serious need of few applications.

"Recent Advances in Augmented Reality [9]" -
The same author along with others, discussed in this paper about how recent advancements in technology demands AR to be deployable on mobiles and web technologies. As to make extensive use of AR possible to maximum users. He discussed the research contribution of Mohring and Wagner on usage of phones for computer vision in sensing and tracking. He studied about characteristics of web 2.0 and AR 2.0 and compared them. He concluded how AR can be deployed with handheld devices, to generate and share information or user content with others users. But till 2001, the problem of registration was an issue.

The main problem in already existing 2D navigational system that you have to check screen simultaneously with real world so there is a big problem, many time accident happens due to this, and 2nd problem is that you don't have gps system for small colleges and building and you required a guide if you want any information about anything, many time there is language barrier, understanding problem.

So to resolve all these problems we can use Augmented reality. We will use two type of augmented reality, marker less augmented reality and marker based augmented reality, for showing information's we use Marker based augmented reality, which is basically having following characteristics:
1. Combination virtual environment and real world.
2. Real time interaction.
3. Register in 3 Dimension [2]

A. Combination of real and virtual environment

After image detection we have to show outputs, to show output we used 3D object to show any information on image or text also. So for this we have to combine real and virtual environment, which is the main feature of augmented reality.

B. Real time interaction

In this we gather all information of real world using mobile camera or head mounted device using our application in android / iOS, this is cross platform application so we can use any mobile device. We designed gui to interact in real time we have used virtual button which is use gesture detection to interact with application and give input to application.

C. Register in 3 Dimension

In this step we detect our targeted object which are already stored in our database and we have already stored corresponding 3d object for each object target.
In navigational part we will use markerless augmented reality in this we don't require any marker (marker is basically a target which is scanned and play any object) we just have to select our desired location and our app will show navigation to that position for that we will take all gps coordinates and if user will open app then we record his/ her current gps coordinates and show a path. Arrow to destination location gps coordinates it

will check coordinates and compares both coordinates and then show navigation.

III. METHODOLOGY USED

We have used augmented reality with unity 3d (to design gui and use package) and Vuforia AR package to use Augmented reality prefabs and objects. Here are our all module of project:

A. Method to detect image target

Our first module is image target detection, in this module we have to detect our target image, for this we have to enter image in vuforia database then vuforia will change image in black and white image and set marker for image and make a database package and we will use that package as a database and then we design environment for image target detection for that we have to import ar camera, and image target and then we have to set desire output on each image detection. To use this module user have to select image target option and then he have to point his camera to object/ image , then app will convert that image and set marker then compare those marker to all image in database and then load object according to that image.

B. Method to scan text

Our second module is Text recognition, in this module

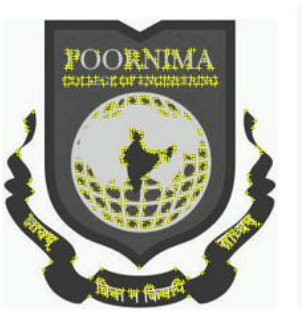

Figure 2. Target image in Vuforia database

we have to recognise written text (OCR). For this we are using text recognition engine of vuforia package. The Vuforia text recognition engine will acknowledge text that's written or rendered in most of the unremarkably occurring line and fount fonts. The supported text designs embody designs that square measure plain, bold, and italic.

We use a glossary, Word lists can even be filtered victimization filter lists to exclude sure words from being detected (using black-list filters), or to permit solely specific words to be detected (using whitelist filters). A set of words is outlined by filter, that the filter is longing for, whereas the filter mode tells Vuforia the way to use those outlined words for filtering. More specifically, two filter modes defines by Vuforia:

A. Black-list mode: If this mode is about, Vuforia can notice all the words within the current thesaurus except those per the filter list.

B. White-list mode: If this mode is about, Vuforia detects solely those words that area unit enclosed at constant time within the current glossary and within the filter list.

Once we recognise text then we can set any output on word found. So if user want to recognize text then he have to point the camera to text and then app will recognize text and check in database for corresponding output. And show it in 3d on screen.

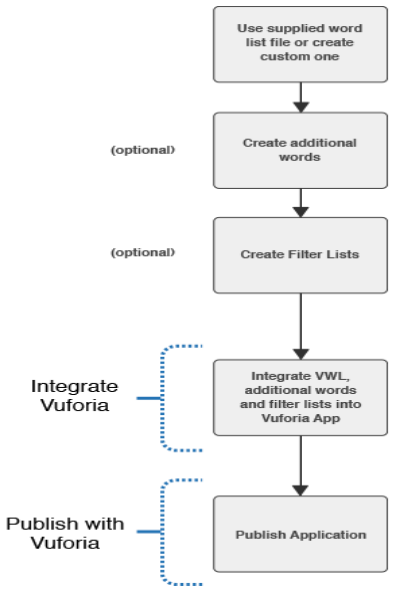

Figure 3. The process for creating an app with text recognition

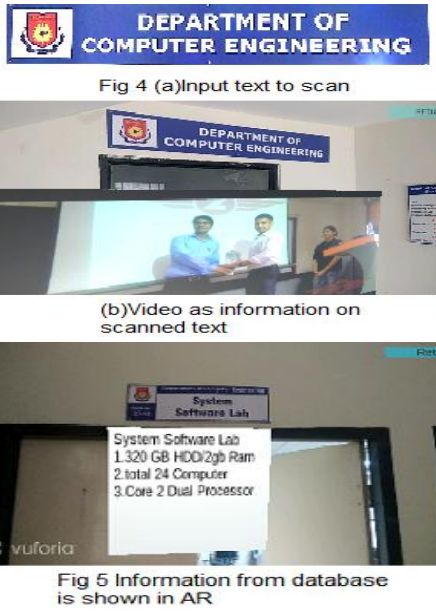

Figure 4 and 5. Showing database in AR

C. Method to create navigation

Our third module is navigation, so for navigation we are using unity Navigation and Pathfinding feature and A* algorithm along with mapbox. For destination and source we are using gps coordinates and to find best , shortest route we are using A* algorithm.

Mapbox

Mapbox is the area information stage for versatile and web applications. We give building pieces to include area highlights like maps, inquiry, and route into any experience you make[5].Mapbox project offered a way to get a reliable facing direction relative to true north so all that was left was to just place the objects in the world[6]. In the case of Mapbox, we do the following [7]:

1) **Geospatial data:** Mapbox utilizes tilesets as a geospatial information arrange while showing maps. Tilesets are a lightweight stockpiling group for both raster and vector information. When you transfer information to Mapbox, it is put away as a tileset.
2) **Styling rules:** When you characterize how your information ought to be styled in the Mapbox Studio style editorial manager, this data is put away in a JSON report that fits in with the Mapbox Style Specification.
3) **Display:** Whether you utilize the Mapbox Maps SDK for iOS or Android on versatile or Mapbox GL JS on the web, we utilize a device assembled Mapbox GL to put the style JSON and the tilesets utilized as a part of the style and draw your guide.

D. A* algorithm

A* Search algorithm is one of the best and most popular technique to find path between two nodes and for graph traversal. It is mostly used to approximate the shortest path between nodes in real-life situations, like- in google maps, games where there can be many hindrances. To better understand this method we can assume a 2D Grid having several obstacles in the path and want to move from a source cell (coloured red below) to destination cell (coloured green below)

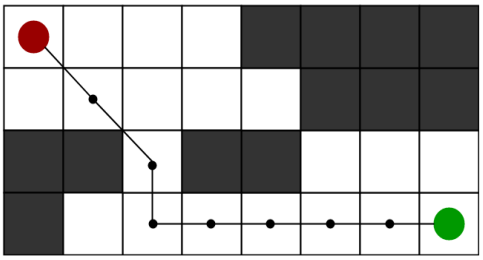

Figure 6. A* Algorithm

In A* Search rule at every step it picks the node per a value-'a' that may be a parameter adequate to the add of 2 alternative parameters – 'b' and 'c'. At every step it picks the node/cell having the bottom 'a', and method that node/cell.

We merely outline 'b' and 'c' as below b = the movement value to maneuver from the supply purpose to a given sq. on the grid, following the trail generated to urge there.

c = the calculable movement value to maneuver from that given sq. on the grid to the ultimate destination.

Algorithm: [4]

Step1. Perform open list initialization

Step2. Perform closed list initialization on the open list,put the starting node

(you can leave its **a** at zero)

Step3. whereas the open list isn't empty

a) notice the node with the smallest amount a on the open list, decision it "q"

b) pop letter of the alphabet off the open list

c) generate q's eight successors and set their folks to letter of the alphabet

d) for every successor

i) if successor is that the goal, stop search

successor.b = q.b + distance between

successor and letter of the alphabet

successor.c = distance from goal to

successor (This is done mistreatment several ways, we'll discuss 3 heuristics-

Manhattan, Diagonal and euclidean Heuristics)

successor.a = successor.b + successor.c

ii) if a node with an equivalent position as successor is within the OPEN list that incorporates a lower a than successor, skip this successor

iii) if a node with an equivalent position as successor is within the CLOSED list that has a lower a than successor, skip this successor otherwise, add the node to the open list finish (for loop)

e) on the closed list, push q finish (while loop)

And for destination and source we are using gps coordinates and to find best, shortest route we are using.

IV. RESULT

Successful creation of an application can be seen in this paper through which the user will be able to view the information of any 2-D image in AR environment. An individual will be able to scan any text or word and then will fetch the detailed information of the same along with 3-D objects if required. The only condition with is application is that the text should be written in plain, bold, and italic.

V. CONCLUSION

It is clear that the Unity3D has great potential in AR applications for creating 3D environment and mapbox to create AR map with its API's. It can also be used in creating an interaction device tracking the path. In this paper, we displayed an application to demonstrate 3D data or principally proposed an approach to consolidate join every one of the scenes utilizing scene administration. This application will be useful to demonstrate route progressively, which can be utilized on huge scale in future. AR guide can converge with google delineate better utilize.

Limitations

- Required a device to use this
- Only able to show details about data which is stored in database

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Ant Colony Optimization Algorithms: Introduction & its Recent Trends

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ABSTRACT

Ant Colony Optimization (ACO) algorithms be-long to the class of meta-heuristic approach to solve hard combinational optimization problems and were introduced in the 1990's. The exhilarating source of ant colony optimization is the foraging demeanor of the real ant colonies. This demeanor of ants is exploited in artificial ant colonies for the search of comparative solutions to discrete optimization problems. ACO algorithms were given by DiCaro & M.Dorigo, in the year 1996. This paper is a review of Ant Colony Optimization with its algorithms in horological order with its recent trends.

Keywords: Shortest Path Algorithms, Meta-heuristics, Ant Colony Optimization, Combinatorial Hard Problems

I. INTRODUCTION

Advancement issues are of prime significance in the mechanical world and in the logical world. Some working cases of advancement issues are in prepare booking, timetabling, shape streamlining, and media transmission organize design[3]. Combinatorial enhancement issues are captivating in light of the fact that they are very simple to state yet are frequently troublesome to understand. A considerable lot of the issues stemming in applications have a place with NP - hard class, that is, it is staunchly trusted that they can't be comprehended to optimality inside polynomials limited calculation time. Therefore, to reasonably take care of extensive occasions of such issues one needs to utilize similar techniques which returns close ideal arrangements in a generally brief time. Calculations of this sort are approximately named heuristics. They primarily utilize some issue particular information to either assemble or to enhance existing arrangements. A meta-heuristic is a collection of algorithmic ideas that can be utilized to constrain heuristic techniques pertinent to various problems[2]. The utilization of meta-heuristics has essentially enhanced the capacity to discover quite brilliant answers for burdensome combinatorial improvement issues in a sensible time. Subterranean insect settlement improvement (ACO) is one of the freshest procedure for estimated enhancement. The rousing wellspring of ACO calculations is genuine subterranean insect states. ACO is enlivened by the ants' searching propensities. At the core of this conduct is the suggested correspondence between the ants by methods for concoction pheromone trails, which empowers them to discover most limited ways between their settlement and nourishment sources. This element of genuine subterranean insect states is misused in ACO calculations for comprehending discrete enhancement problems[4]. This survey is sorted out in an accompanying way. In Section 2 we diagram the inceptions of ACO calculations. In Section 3 we provide a description of various variants

of ACO meta-heuristic in rather general terms, outline some of the most successful ACO variants. In Section 4, we unravel many recent applications of ACO. In Section 5, we call upon the various advantages and disadvantages of ACO algorithms. Finally, in Section 7 we offer conclusions and an outlook to the future of ACO.

II. LITERATURE SURVEY

For the review of ACO algorithms and its recent trends, we have done a brief study of the previous work in the field. In this section, we discuss the various previous accomplishments in this field.

A. Ant colony optimization: Introduction and recent trends[3]

In this research paper, the author first gives a brief description of the origins and the basics of ACO algorithms. The author also provides a detailed insight of various variants of ACO. Finally, the author provides a review of various interesting recent search directions.

B. Ant colony optimization: Introduction and recent trends[3]

In this paper, the author outlines the utilization of Artificial Intelligence techniques to solve problems unsolvable for many years. The author discusses the recently proposed meta-heuristic approach for solving hard combinatorial optimization problems.

C. Review Of Ant Colony Optimization Algorithms On Vehicle Routing Problems[4]

This paper presents the strategy to various versions of ACO algorithm. The author also evaluates the solution cost in bounded time for various estimation-based problems.

D. Review: Applications of Ant Colony Optimization[5]

The author discusses that the relatively new meta-heuristic approach like ACO is great for solving hard combinatorial optimization problems. ACO shows great prominence in "ill-structured" problems like routing.

E. A Review of Ant Colony System Algorithm and its Models[2]

The author reviewed the ant colony for the optimization problems. ACO can be observed as the very first study to showcase the viability of ACO algorithms to attack NP-hard problems.

III. ALGORITHMS

As viewed from various classes of algorithms, ACO algorithms can be classified into diverse classes of approximate algorithms. From artificial intelligence (AI) perspective, ACO algorithms are one of the most successful strands of swarm intelligence. From the operations research (OR) perspective, ACO algorithms belong to the class of meta-heuristics.

A.Ant Colony System

The Ant Colony System (ACS) was the principal change in the first subterranean ant framework to be proposed, presented by Dorigo and Gambardella (1997)[4]. Ants in ACS utilize the pseudo-irregular relative govern: the likelihood for an ant to move from node I to node j relies upon an arbitrary variable q consistently dispersed over [0,1], and a choice parameter; q, at that point, choice of most attainable parts is done that boosts the item is picked. This avaricious lead, of pheromone data which favors abuse, is counteracted the presentation of a differentiating part: the nearby pheromone refresh. Every ant at that point plays out the nearby

pheromone refresh after every development step. For enhancing the hunt performed by resulting ants amid one emphasis, neighbourhood updation is performed. Truth be told, diminishing the pheromone focus on the edges as they are navigated amid one cycle urges ensuing ants to pick different edges and subsequently to create diverse arrangements. Also, due to the neighborhood pheromone refresh in ACS, the base estimations of the pheromone are limited [5].

B. MIN-MAX ant system

MAX-MIN subterranean ant framework (MMAS) is another change, proposed by Sttzle and Hoos (2000), over the first subterranean ant framework thought. The fundamental focuses that recognize MMAS from ant framework are:

1. only the best ant adds pheromone trails
2. the minimum and maximum values of the pheromone are explicitly limited

Note that the pheromone refresh of MMAS is identical, as it is the situation for AS, to every one of the edges while in ACS it is connected just to the edges went to by the best ants. The base esteem is regularly tentatively picked. The most extreme esteem might be figured logically given that the ideal subterranean insect visit length is known[6].

IV. APPLICATIONS OF ACO & CURRENT TRENDS

In the division of NP-hard combinatorial streamlining issues there exists numerous applications. Various applications that were viewed as ahead of schedule in the historical backdrop of ACO is steering in media transmission systems. The early advancement of hypothetical establishment was begun by Gutjahr, who was the first to exhibit merging in likelihood of an ACO calculation. Concerning applications, the utilization of ACO for the arrangement of dynamic, multi-objective, stochastic, consistent and blended variable enhancement issues is a well-known talk topic. Typical applications are the phone, Internet and any issue that can be depicted as traveling salesman problem.

A.Travelling Salesman Problem

The traveling salesman problem is a problem in diagram hypothesis requiring the most proficient hamiltonian cycle a salesman can take through every one of urban communities. No broad strategy for arrangement is known, and the problem lies in NP-hard [4]. The main ACO calculation was known as the Ant framework and it was planned to take care of the traveling salesman

problem, in which the objective is to locate the briefest round-outing to connect a progression of urban areas. The general calculation is moderately reasonable and in light of a set of ants, each making one of the conceivable round-trips along the urban areas. At each stage, the insect moves from one city to another as indicated by a few tenets:

1. It must visit each city exactly once;
2. A distant city has less chance of being chosen (the visibility);
3. The more intense the pheromone trail laid out on an edge between two cities, the greater the probability that that edge will be chosen;
4. Having completed its journey, the ant deposits more pheromones on all edges it traversed, if the journey is short;
5. After each iteration, trails of pheromones evaporate.

To apply ACO to the TSP, we consider the graph characterized by partner the arrangement of urban areas with the arrangement of vertices of the graph.

This graph is called development graph. Since in the TSP it is conceivable to move from any offered city to some other city, the development graph is completely associated and the quantity of vertices is equivalent to the quantity of urban areas. We set the lengths of the edges between the vertices to be corresponding to the removes between the urban communities spoke to by these vertices and we relate pheromone esteems and heuristic esteems with the edges of the graph. Pheromone esteems are changed at runtime what's more, speak to the cumulated involvement of the insect state, while heuristic esteems are issue subordinate esteems that, for the situation of the TSP, are set to be the reverse of the lengths of the edges.[8]

B.Vehicle Routing

The vehicle routing problem (VRP) is a combinatorial optimization and integer programming problem which asks "What is the optimal set of routes for a fleet of vehicles to traverse in order to deliver to a given set of customers". It generalizes the well-known Travelling Salesman Problem (TSP). Ant colony algorithms are known to have a significant ability of finding high-quality solutions in a reasonable time [9]. Often, the context is that of delivering goods located at a central depot to customers who have placed orders for such goods. The objective of the VRP is to minimize the total route cost. In 1964, Clarke and Wright improved on Dantzig and Ramser's approach using an effective greedy approach called the savings algorithm.

V. ADVANTAGES & DISADVANTAGES

Advantages

1. When the graph may change dynamically, ACO has an advantage over simulated annealing and various genetic algorithms
2. ACO is adaptable to real-time changes and can run for a long time
3. Algorithms can be used to find the solution to small problems optimally in bounded time
4. ACO has been applied to a wide variety of real-world applications

Disadvantages

1. If the routing is static in nature such as in case of TSP, ACO still lacks in terms of runtime optimization
2. If there is a node failure and shortest route is restricted, dynamic routing can't be performed

VI. CONCLUSION

We have successfully reviewed the ant colony for the optimization problems. It is neatly understood from the paper about the origin of the ant colony, its basic concepts and its working in the field of computer science. When large-scale problem instance is considered, ACO is a huge success. In this paper, various variations of ACO has been discussed with its working applications. In the opinion of the authors, there exist many possibilities for the valuable future research.

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A Review on Various Techniques of Smart shopping

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ABSTRACT

This paper targeted to reduce the Queue at a billing counter in a shopping complex. The system does the same by displaying the total price of the product kept inside the cart. In this way the customer can directly pay the amount at the billing counter and leave with the commodities he/she has bought. It eliminates the traditional scanning of products at the counter and in turn speeds up the entire process of shopping, also with this system the customer shall know the total amount to be paid and hence can accordingly plan his shopping only buying the essential commodities resulting in enhanced savings. Since the entire process of billing is automated it reduces the possibility of human error substantially. Also the system has a feature to delete the scanned products to further optimize the shopping experience of the customer. The hardware for the test run is based on the Arduino platform and Xbee modules, as both are very popular in small-scale research and wireless automation solution.

Keywords: RFID, Smart shopping, Retail, POS

I. INTRODUCTION

This paper proposes a solid and savvy shrewd shopping basket (SSC) with a brilliant client intuitive interfacing plan. The SSC means to decrease the labor and advance the shopping knowledge for its clients, and in this way it is reasonable for utilize and coordinated into the IoT system of the brilliant shopping center. In the accompanying, the execution of the SSC will be portrayed in detail with the help of vision and remote innovation to give the strength also, usability from the perspective of the client. At last, the trials in a standard shopping center will be led to display the empowering brings about certifiable organization to alarming him to rebates or reminding him about perishables acquired a month prior Despite the fact that enthusiasm for keen shopping baskets is expanding, retailers and shopper bunches have worries about how constant spending criticism will impact shopping conduct. Constant spending criticism animates spending customers to spend more. Interestingly, this criticism drives high spending customers to spend less. Besides, shrewd shopping baskets increment aims for spending customers while keeping them stable for high spending customers. These discoveries underscore central unexplored contrasts amongst spending plan and high spending customers. Also, they have key ramifications for both infra and on the web retailers and in addition application engineers The conventional shopping baskets which are accessible in shopping markets are only trucks with a steel outline proceeding onward wheels. Till now there has been no consolidation of hardware with a specific end goal to help the clients and improve their shopping experience. Though there have been considerable measures of endeavors to modernize the shopping baskets these endeavors are gone for finding the items in the shopping market in lesser time utilizing web servers and different utilities.

The most widely recognized issues confronted sitting idle in the lines for charging as opposed to not being ready to discover their preferred result. Subsequently there is a need to address the most widely recognized issues previously drawing nearer the more unpredictable ones.

II. TECHNOLOGY

Radio Frequency Identification (RFID) is getting the opportunity to be perfect development as another choice to institutionalized label systems. RFID structures give a modified ID system, contingent upon securing and remotely recuperating data using RFID marks or transponders. A RFID tag is a dissent that can be joined to or melded into a thing, animal, or individual with the ultimate objective of unmistakable evidence using radio waves. Chip-based RFID names contain silicon chips moreover, getting wires. In this paper, we have developed a sharp shopping container system that empowers customers to manage their shopping list while shopping and in a manner of speaking pay the bill at the checkout counter The shopping crate can figure normally and demonstrate the total expenses of the considerable number of things inside it. This makes it straightforward for the customer to know the sum he or she needs to pay while shopping and not at the checkout counter.Along these lines the customer can get faster organization at the checkout. The favored angle for the shop proprietors is that they would require a less assistants, which would happen in an immense cut in their costs.

III. METHODOLOGY

The shopping helped handiness is completed in the embedded PC and the tablet PC. The system convenience is for the most part executed in C-based tongue what's more, LabVIEW, to execute the sharp customer instinctive organization additionally, to finish the relationship between the embedded PC and the embellishments, RFID development is among the most dynamic progressions that will shape tomorrow's unavoidable retail bargains. This development offers a fundamental plan of chances which upgrade the shopping knowledge of customers while passing by any self-benefit store. No ifs ands or buts, this advancement is dynamically Promising to the level of a potential substitution the scanner label system as new negligible exertion RFID tag delivering methodologies have created.

A. Smart User Interactive Interface Design

The UI of SSC gives the customer a couple of decisions, for instance, thing looking, diagram, likewise, motorized charging. To encourage the versatile arrangement in the UI, the upheld state machine in light of a lined message handler (QMH) is grasped. Each section of the line or FIFO is considered as an event and is in a manner of speaking set one up time. With the guide of created guide and dead reprisal, the repression of SSC can be invigorated in an iterative way to deal with make customer more viably investigate to another zone. Additionally, the SSC can limit itself against a guide using the RFID readings on the thing marks.

Figure 1. Developed user interface for the SSC, the right picture indicates the map information while clicking Map option.

B. Automatic Billing for Smart Shopping Cart

The splendid shopping structures normally require other Aide remote correspondence structures (especially Insignificant exertion) to perform indoor arranging and thing information broadcasting. Thusly, the twofold gathering mechanical assembly RFID peruser is gotten in the made SSC to recognize the things in the truck (inside getting wire) and out of the truck (external radio wire). The directional accepting wires are used and the yield control from each radio wire is moved up to diminish the disclosure goofs and block between them. The yield control levels are 27dBm and 10dBm from the external gathering mechanical assembly and within radio wire, independently, achieving a correspondence division of around 4m and 30cm. In addition, the external gathering mechanical assembly is in like manner used for indoor arranging, recognizing the territory in help of proposing the shopping plans. The distinguished thing IDs are associated with the database of the merchants, and each the thing information is appeared on the UI of the SSC. The total of procuring can be robotized figured and by then send to the charginggame plan of mall.

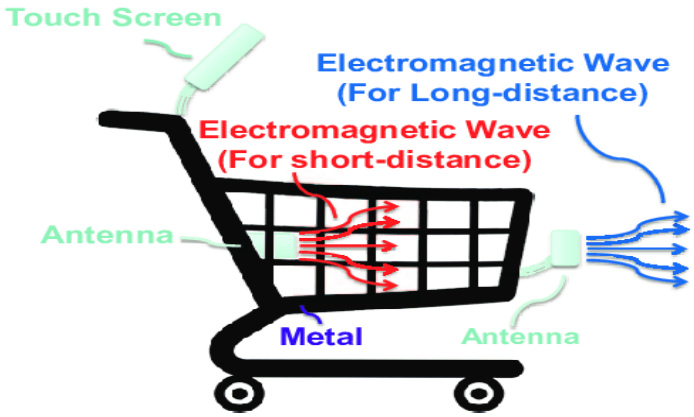

Figure 2. RFID module installed on the SSC

C. Improving Store Management

Utilizing radio-recurrence distinguishing proof RFID information, which demonstrate the situation of a shopping basket through a RFID label connected to the shopping basket. The RFID information contain important data for showcasing, such as shopping time and separation and in addition the number of rack visits. The creators examine clients' obtaining conduct and in-store development data utilizing POS information joined with RFID information. The reason for this examination is to find a promising shopping way that can recognize clients' in store developments by consecutive example examination utilizing RFID information. These shopping ways are extricated utilizing an example mining technique. At long last, shopping ways are utilized as a part of the choice tree examination to create the guidelines that communicated clients' in store developments and buying qualities

D. Improving Commodity Allocation

To have the ability to pass on things accessible to be bought in assorted resigns in a general store remembering the ultimate objective to show signs of improvement advantage for merchants with

considering convenience for buyers is an imperative subject in the retail area. Another technique for allotting product resigns in supermarket in perspective of customers' shopping ways and trades data mining is being used by researchers. Here customers' shopping ways data can be gotten by shopping bin which has RFID marks embedded and shopping trade data can be procured from POS advancement. Through planning what's all the more, mining the nonstop ways data and trades data, the See-Buy Rate - an expected probability to purchase this product when they see the item, can be registered. In light of See Buy Rate, we build advantage progression model to get the perfect distributing plan with thinking about the advantage, bargains volume, and purchase probability of the item.

E. Developed Model

We discuss a creative thought of RFID Based Smart Shopping and Billing. The key idea here is to help a man in customary shopping regarding lessened time spent while acquiring a thing. The standard goal is to give a development Situated, negligible exertion, easily flexible, and harsh structure for supporting shopping vis-à-vis. The made system includes Cart territory revelation unit (CLDU) Server Communication unit (SCU), User Interface what's more, demonstrate unit (UIDU) and Billing and Inventory organization unit (BIMU). CLDU is used to adroitly discover the circumstance of shopping crate inside the shopping business segment to help in obtaining material thing information. SCU will help in setting up and keeping up the relationship of the shopping bushel with the essential server. UIDU will give the customer with UI and BIMU deals with the charging likewise, stock organization as a group with the SCU. These units are fused into an insightful encased. Structure and are attempted to satisfy the value. The splendid shopping bushel will help shorten the checkout lines in this way helping the customers at retail stores.The customers will have the ability to channel the things themselves and the LCD screen on the shopping crate will keep reviving the total. This will wind up being incredibly beneficial for the retail stores as more people will welcome the shopping foundation and come all the more as often as possible to shop. In the headway and discussion of the as these shopping container, we acknowledge that the shopping field is formed in ways/inlets, and each walkway is enough adequately wide for customers with shopping crate to move.

The segment/leave status of the truck and the sound recognizing evidence. Greater the detachment between the walkways/bays, we will require more grounded IR trans collectors. What's more the arranging of these IR trans collectors on the shopping bushel and on the ways will be noteworthy to the most ideal working of shopping crate. Further, as IR advancement manages noticeable pathway.

F. Security Analysis

1. Classification: The imperative charging data exchanged between the keen truck and the server is scrambled utilizing the server or the customer's open key. We additionally demand that the correspondence between the checkout point and the server is secured by unbalanced encryption. Hence, to get the first information in the rush hour gridlock, any outside enemy must have the capacity to break the awry encryption framework, which should not be possible with a non-immaterial likelihood

2. Integrity: In the proposed protocol, the messages sent between the clients, server and the checkout point are all signed with its private key. To break the integrity,

an adversary must be able to forge the private keys of the other entities, which can not be done with a non-negligible probability. Therefore, the integrity of the messages is well protected.

3. Replay Attack Resistance: Since we demand all correspondence messages incorporate a period stamp T, it is hard for an aggressor to play out a replay assailant. On the off chance that a noxious client might want to replay a message from a server that contains a thing's value lower than current value, the brilliant truck can identify that the message is replayed promptly by checking the time stamp. Along these lines, replay assault isn't down to earth.

4. Tag Security: In view of our outline, the security of the RFID labels are all around ensured. Right off the bat, physically pulverizing the labels or obstructing the RFID motion from the tag can be recognized by the scales on the brilliant truck. A minor camera can be introduced on the savvy truck to coordinate with the scale for this capacity: If the keen truck neglects to peruse a tag while the scale or camera recognizes that another thing is put into the truck, it will send a caution. Besides, any revising to the RFID labels will make the mark on the label invalid and will be recognized by the keen truck. Moreover, a substitution of the labels with a phony one doesn't work in light of the fact that the mark of a phony tag isn't substantial. At last, exchanging the labels on diverse things does not work in light of the fact that any physical harm on the carefully designed labels, (for example, peeling off the labels) will break the labels.

IV. SMART SHOPPING SYSTEM

A. Design Goals

Our proposed savvy shopping framework ought to accomplish the accompanying objectives:

1. Navigation for clients: The server ought to have the capacity to find the situation of each shopping basket and guide the client to the thing that he is occupied with. To deal with this, we use the zig-honey bee doors to decide the area of a shopping basket through triangulation system.

2. Items tracking for the store: The server should remain mindful of the status of the things in the store. We propose. Introducing RFID perusers on the racks so that the racks can screen the things and report the tally of the items to the server.

3. Payment check for the store: The clients are not permitted to leave the store until the installment of all things in the shopping basket has been made. To do this, we set a checkout point furnished with UHF RFID peruser at each exit of the store. The checkout point permits just a single shopping basket going through. The checkout point speaks with the server to confirm if the every one of the things in the truck are paid.

B. Challenges

1. Tag Tamper-Proofing (Tag Security): The label configuration must meet the accompanying necessities.

a) Distinguish if a noxious client reworks the labels keeping in mind the end goal to pay less.

b) Distinguish if a noxious client hinders the labels on things and utilizations counterfeit ones.

c) Identify if a pernicious client switches the labels on various things.

d) Distinguish if a malignant client breaks the labels to abstain from paying the cost.

In the segment V, we give a standard of how the labels can be intended for security utilize.

2. Reading Range: To guarantee that a brilliant truck can just read the things that are in it, the energy of the peruser must. be deliberately changed in accordance with avoid things read by another truck adjacent by botch. This should be possible by changing the control on the RFID peruser. The material utilized as a part of the truck likewise matters as metal can piece signals.

3. Communication Security: Prevent the assailants from spying the information or modifying the information sent between the trucks and the server. This is to ensure the privacy and uprightness property of an exchange. An open key crypto framework can be used to tackle this issue.

C. Components

Our proposed smart shopping system consists of the following components:

1. Server: Every one of the things are enlisted to the server before moved to the offering racks. The server store every one of the things data, for example, area and cost, in the database. The server speaks with the various elements in the brilliant shopping framework through Zig-Bee.

2. Smart Cart: As shown in the following components are equipped on the smart cart.

a) Microcontroller: Organizing with RFID peruser, Zig-Bee connector, weight scanner, and LCD touchscreen to play out some basic figuring.

b) Zig-Bee Adapter: Zig-Bee is a minimal effort and low-control convention which costs significantly less vitality than Wi-Fi.

c) Weight Scanner: The weight scanner can quantify the things that are put in the truck to ensure the label analyzes to the best thing.

d) RFID peruser: We use a ultra-high repeat (UHF) RFID peruser which will allow an examining range that is up to 10 meters. By tuning the transmission vitality of the peruser, we can control the examining extent of the peruser.

e) User interface (LCD show): Shows thing information, possible course, charging information, and coupons et cetera.

3. Smart Shelves: The racks are introduced with RFID perusers that screen the status of the things.

4. Smart Checkout Point: The checkout point is presented with a Point of Sale (POS) for the customer to make a purchase. In the wake of making the portion, a customer needs to encounter a gateway presented with a RFID peruser which talks with the server to twofold check if the things are out and out paid. Any overpay or miss the mark on will trigger a caution.

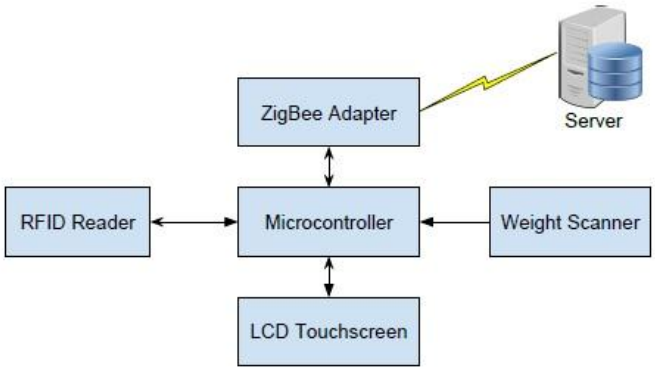

Figure 3. Cart components

V. CONCLUSION

This examination builds up a keen shopping basket which can be connected for general stores and shopping centers. The UI gives the facial acknowledgment work and assistive data to advance

the shopping administration for clients. In expansion, the programmed charging office can keep away from line in the registration process with the goal that the better shopping background for clients can be made. At long last, through the recorded information which interfaces amongst clients and shopping conduct, the proposed SSC shows the exceptionally potential ability to be incorporated into the IoT in general stores and shopping centers. There are a hardly any perspectives that can be incorporated to make the brilliant shopping basket more strong. In the first place, in this venture the dormancy time of the remote correspondence with the server may should be considered. Furthermore, the correspondence isn't exceptionally secure. Another ZigBee module working at the same recurrence can without much of a stretch capture the transmitted information. This issue should be settled particularly with regard to charging to advance shopper certainty. Further, a more refined miniaturized scale controller and bigger show framework can be utilized to give better shopper encounter.

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Blue Eyes Technology with Electric Imp Explorer Kit

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ABSTRACT

The world of technology cannot be always constant. It shows how far the human mind thinks beyond edge of the earth. Every time human mind created something new so, in terms of technology we called it as Research Based Technology. Now the time has to be come where we deploy The Blue Eyes Technology on to the IOT device (Electric Imp Explorer Kit). The main aim of this Research Paper is how to reduce the manpower and improve the efficiency of computer or Smartphone. The Blue Eyes Technology was conceived by the research team of IBM in California since 1997. The Technology have ability to sense and control human emotions through gadgets like Laptop, Smart Television, Smartphone's etc. It give power to computer so, machine start interacting with human beings as an intimate partner and identify their emotions Sad, Happy, Angry, Surprise. The sensors were embedded onto the Emotion Mouse or Expression Glasses which understand the emotions or feelings of human through facial expressions of muscles movement. When the blue eyes technology will extend with "Electric imp Explorer Kit" then the system will able to check the current temperature or humidity of electronic devices like Refrigerator, Television, Laptop as well as current temperature and humidity of the room. The concept of Explorer kit or EyeTribe is the implementation part of this Research Paper.

Keywords: Emotion Mouse, Expression Glass, IBM Almaden Eye Tracker, EyeTribe Tracker, Electric Imp Explorer Kit with imp card 001.

I. INTRODUCTION

The term blue eyes is made from the two words "Blue + Eyes". Blue is basically used for Bluetooth, which enables wireless Communication where as Eye means to obtain the psychological data. It give power to computer so, machine start interacting with human beings as an intimate partner and identify their emotions (Sad, Happy, Angry, Surprise) using Pressure sensor, Temperature sensor and Galvanic Skin Response sensor etc. The sensors were embedded onto the Emotion Mouse or Expression Glasses which understand the emotions or feelings of human through facial expressions of muscles movement. The main aim of this technology is reduce the manpower or balance the coordination between machine and human beings.

Imagine the world when you go to home and see on power button then your laptop will open, the necessary mail will screening automatically all the documents were arranged according to your virtual mind through eyes, machine feels your presence; verifies your identity and starts interacting with you and even it will dial and call to your home in a urgent situations. All the above things will be possible when we were using Eye Tribe Tracker in the blue eyes technology. The blue eyes technology work on the

two hardware portable device that is (a)Data Acquisition Board (b)Central System Unit. The traditional system is working upon the sensors which were embedded into Emotion Mouse or Expression Glasses. It detects the emotion when anyone touch the magical mouse then the psychological data of human is fetched by data acquisition board and transferred to central system unit using Bluetooth connection which show the result of human moods. The same things were happen in Expression Glasses. It detects the emotions with the help of facial movements.

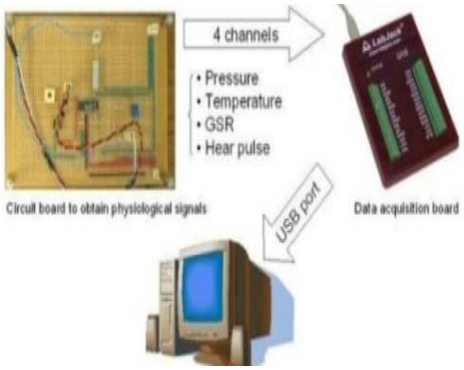

Figure 1. working of overall System

The blue eye technology has ability to read the emotion of human beings with the help of Emotion mouse and Expression Glasses which consists the variety of sensors. In natural world there are some unique identities of every humans like eyes, fingers, speech which help to sense the emotions. It can even understand your emotions at the single touch of the mouse. The blue eyes technology check your presence and starts interacting like a another human beings. For example, It realizes the urgency and dial your emergency contacts, and establishes a connection. The system can understand the feeling of human beings and acquire the knowledge from users mind that what a user wants. The emotion level can be measured by anyone on any system but the problem is that the result is not always accurate because the sensor fetch the psychological data on the basis of surrounding. This was the great challenge since 1995 so, to remove the drawback the IBM introduce the new concept that is called as to be "IBM Almaden Eye Tracker". It was introduce by the IBM Company since 1997. Almaden Eye Tracker capture the ray of eye, for every intensity there is predefined expression for example the intensity between 10-20 is predefined for sad, 60 -70 is predefined for angry. The result of Almaden Eye Tracker is detected easily in a nanosecond and the result is always 100% accurate.[5] www.ibm.almaden.com.

The limitations of IBM Almaden Eye Tracker are:-

- The connectivity of structure is so complex, huge kit are require for connection so it take lot of time for establishing the initial connection.
- The biggest challenge of IBM Almaden Eye Tracker is, only experienced person or specialists with Ph.D.'s can used so it was expensive technology in those time.

Figure 2. IBM Almaden Eye Tracker

II. CHALLENGES IN BLUE EYES TECHNOLOGY

The following are the challenges of Blue Eyes Technology:-

1. After the limitation of IBM Almaden Eye Tracker the blue eyes technologywas no longer to used. No solution was implemented to track the correct way, in 2005 the technology almost gone to extinct.
2. There are so many new technology was implemented like Magic Pointing, Gaze Tracker but all have certain limitation that's was the main cause so, the technology was no longer to used.
3. There are so many Eye Tracker was implemented after the Almaden Eye tracker but no one can fulfill the market strategy.

III. FACTORS WHICH CREATED THE CHALLENGES

I think that poor results aren't the fault of the technology its totally depends upon the researcher mind that how far human work and think.

There are three major factor which created the challenges:-

A. Poor Communication between IT sector and market Poor communication between Information Technology Research Department's which is productivity which create the issue between Research Departments and IT sector. Before launching the products in market it is necessary to check the customer satisfaction, if the technology were not working according to users choice then they not reached up to a final edge and these things are created due to the poor communication in between users and IT sectors.

B. Lack of IT governance- Like the newest or most popular technology may be appealing, so the system be not care about the running technology implementation they switch on to the new technology.

C. Alignment issues- Technology needs to do work properly but due to inappropriate relations among the industry caused the problem of alignment.

IV. SOLUTION TO IMPROVE THE BLUE EYES TECHNOLOGY

The Eye Tribe Tracker eliminates all the challenges of by delivering a platform for self-service that puts the value of "Blue Eyes Technology".

The benefits of Eye Tribe Tracker are:-

- It give response in nanoseconds.
- The result will always accurate.
- Eye Tribe Tracker is a portable device so, there is no need to establish connection.
- No any specialist is required, there is few line of code after that anyone can used.

Eye Tribe is one of the fortune 8 favorite gadgets. The starting price of tracker is 5,000$ and it support c-sharp, java, c++. The tracker enables eye control on display screen allowing eye navigation and control cloud-based data analytics. It was started seven years ago by the four students of IT University at Copenhagen. Sun Alstrup Johansen is the CEO of EyeTribe company. The technology was launched on 10th August 2017 by the Eye Tribe Company. All the impossible things is came to be true after the implementation of EyeTribe Tracker like machine sense your work with the help of eye and start doing work according to that.

Figure 3. Eye Tribe Tracker

Eye tracking is a technology which calculate the eye gaze point of a user as he or she looks around.[4] www.eyetribe.com

Eye tracker is externally equipped on to the gadgets which enables the users to use their eye gaze as an input modality that can be combined with other input devices like mouse, keyboard, touch and gestures.

The eye gaze coordinates are calculated with respect to a screen the person is looking at, and are represented by a pair of (x, y) coordinates.

Figure 4. Fighter Tie Game

In this paper there are two implementation part the first one is EyeTribe Tracker and the second is Explorer Kit. The Electric Imp Explorer kit is basically a IOT(Internet of Thing) device which work on the Bluetooth or Ethernet that's why it is called to be as **Portable Explorer Kit.** It is used to measure the current temperature or humidity of electronic equipment with help of server or Cloud based application. we can measure the readings using electric imp app in smart phone or laptop. It work on Saas (Software as a Service) platform so it can easily accessible from anywhere at any time. If you connect your devices through Explorer kit then you can manage your home automation work from anywhere so, it can reduce the gap between Electronic and Physical world. The Electric Imp Explorer Kit consist the two hardware device for running the application from anywhere.

The hardware devices are:-

1. Explorer Kit:- It is a self-contained connected device. It uses the blink-up process to establish the connection and act as a interface between connected device.

2. Imp card:- It is the sensor which is used to check the current temperature or humidity with the help of approval or alerts which is generated by the Electric Imp application. Imp card have certain extension like(001-010). For every extension there is predefined work. In this paper I am using imp card 001 which is a temperature or humidity sensor.

V. WORKING AND SETUP OF EXPLORER KIT

The smartphone is connected with Explorer kit using blinkup process once the connection is complete the electric imp application start working. The information or data will send in Imp Cloud then it will

trap the receiver and give the result of running process.

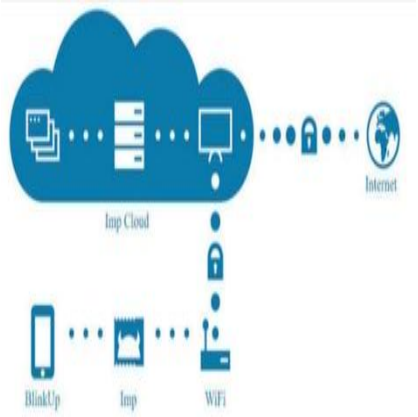

Figure 5. Working module of Explorer Kit

The following are setup of Electric Imp Explorer Kit-

1. Download the electric imp application from playstore- When the app has been downloaded then sign in and login into your account using username and password.

2. Select your Wi-Fi network- After the login in account there are two choice of connection first is from Bluetooth and second is Ethernet then the will send into the imp cloud.

3.Perform a Blink-Up- It tells you to power up your impExplorer Developer Kit with the mini USB cable (connected to either a USB AC adapter or a USB port on your computer). The on-board imp001's status LED will now begin blinking orange if you have a brand new impExplorer Developer Kit, or red if it has been used before for perfect connection it should be stable green.

VI. APPLICATION OF OVERALL SYSTEM

- Now a days games which require co-ordination and Fast reaction like (fruit & Ninja, Fighter Tie).
- Automobile industry for manufacturing the parts.
- Perpetrators were easily caught.
- It reduces the gap between electronic and physical world.
- It manage the "Traffic Collision Avoidance System"(TCAS).
- Used in ship navigation.

VI. FUTURE ASPECTS

The blue eyes technology reduce the gap between electronic & physical world in near future. The aim of this technology is to deploy the human skills on machine so, our work is automatically done. In future it interact with all system and start talking with humans and maintain the coordination between human and machine.

VII. CONCLUSION

The Blue Eyes Technology have certain limitation which was overcame by IBM Almaden Eye Tracker, but the structure of Almaden was giant and complex. So, the concept of Eye tribe Tracker was introduced by Eye Tribe company in 2017. It capture the emotion as well as behavior of humans in just a nanosecond and manage the co-ordination or response. Instead of that it manipulate the work of human like screening of email etc when the Electric imp (IOT) concept added with this technology then it will totally reduce the man power. A kind of sense automation will generated if the Blue Eyes Technology will extend through Electric Imp ExplorerKit.Imagine the world

when you go to home and see on power button then your laptop will open, the necessary mail will screening automatically all the documents were arranged according to your virtual mind through eyes.

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Virtual Keyboard

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ABSTRACT

Nowadays People uses Standard computing devices like Desktop Computers and Laptops to cut back their everyday work, in addition more advanced gadgets like mobiles and PCs. To enhance the mobility and quality individual wants to cut back the dimensions of the devices. Thus most of the mobile devices and hand-held devices contain really small keypads. Individuals who use such a tool find it tough to see the letters on the keypads. With a mobile device, a full size physical keyboard is not compatible. However all of traditional keyboard deficit the accuracy and convenience of a full size keyboard [1].

This paper confers an innovative approach for virtual keyboard to hammer the above mentioned issues, which might be a feasible replacement for fold-up keyboards. The keyboard primarily based on the vision based human-computer interaction concept, image capturing and image processing technique that contains virtual keys adequate to the dimensions of traditional keys within the normal QWERTY keyboard. The final result of the virtual keyboard project was a economical, user friendly and movable virtual keyboard, that sends typed characters to any laptop. This virtual keyboard provides the short touch-typing feedback to the uses[1].

Keywords: Virtual Keyboard, The sensor Module, The IR Light Source, The pattern projector, image processing, camera

I. INTRODUCTION

Machine writing was invented for mechanical typewriters which had the current QWERTY key layout since 1874.This QWERTY interface survived because of its many positive outlooks. QWERTY is widely used keyboard layout on English-language computer and typewriter keyboards. It takes its name from the first six characters present in the far left of the keyboard's top first row of letters.

However, this is not achievable for text entry in smaller computing devices such as PDA's and mobile devices and input to the small devices is becoming an increasingly important factor in development for even more powerful embedded market. Touch typing is an initial method that deploys discrete sensors, or sensed area, or buttons for one or a set of atomic symbols (characters, digits, letters) of a natural language. E.g. common keyboard, the keypad of a mobile phone, on-screen keyboards on PDAs. This definition explicitly consist virtual keypad buttons that only differ from the surrounding physique in that their extent is sensed by some ways for touch by a finger or pointer[2].

A virtual keyboard can be defined as a key-in touch typing device that does not have a physical appearance of the sensing areas that is the sensing area which acts as a button. But not per use but is

programmed to act as one. Therefore, sensing area can be realized with image sensors, finger tracing methods, or a touch pad. The latter is different from a keypad as it does not have a prior designated area for buttons.

Virtual keyboards that employ different sensing areas for each symbol inherently pass the realization of soft keyboard. The basic idea behind creating virtual keyboard is it is confined in space , well designed, handy and really easy to operate too, which results in the perfect solution for cross multilingual text input.

II. SYSTEM ARCHITECTURE

The 3-D range camera is placed several cm over the input surface, with a well-defined angle facing the working place. The suggested system consists of three main hardware modules. The sensor module is mounted on the camera, facing the same area, which would generate the observable feedback for the keyboard and input info [3].

A. Sensor module:-

The sensor module serves as an eye of keyboard perception technology. The sensor module operates but locating users fingers in 3-D space and tracking the deliberated key strokes. Key stroke information is processed and can then be output to host device via a Bluetooth or USB[3].

Figure 1. Sensor Module

B. IR Source (illumination module):-

The IR light source emits a beam of infrared light. This IR light beam is designed to overlie the area on which the keyboard pattern projector is mounted. This is done so as emblaze the users fingers by infra-red light beam. This helps to identifying the hand movements and pressing of keys. The light beam ease in scanning the image. Accordingly information is passed on sensor module which decodes that information[3].

Figure 2. IR Light Source

C. Pattern projector

It presents the image of keyboard. This forecasted image is of standard QWERTY keyboard, with all the keys and control functions as in the keyboard. The projector features a wide-angle lens so that large pattern can be calculated from relatively low heights. In some type of virtual keyboard, a second infra-red beam is not compulsory. A sensor or camera in projector takes up finger movements, and passes the information on sensor modules[3].

Figure 3. Pattern Projector

III. WORKING OF VIRTUAL KEYBOARD

A. Template projection

A template produced by a highly designed and highly efficient projection element with a red diode laser is projected onto the nearby interface surface. The template is not however intricate in the detection process and it is only used as a reference for the user. In an environment, the template can just as easily be printed onto the surface [4]. It shows projection of template (keyboard).Various types of projection elements are obtainable in market.

B. Reference plane illuminations

An IR plane of light is generated on the interface surface. The plane is however located just above and parallel to the surface. The light can't be visible to the user and hovers a few mm above the surface. When a key position is forced on the surface, the light is reflected back from the IR plane in the surrounding of the key and directed towards the sensor module.

C. Map reflection coordinates

The reflected light user correlation with the interface surface is directed through an infra-red filter and imaged on to an image sensor in the sensor module. The sensor chip is made up of a custom hardware which is embedded such as the VIP (Virtual Interface Processing) Core and it is capable of generating a real time determination of the location from where the light was reflected.

Figure 4. Virtual Keyboard

D. Image Processing with MATLAB

Images are worldwide, from every devices like cameras and smart phones to specialized devices for medical imaging, industrial automation, automotive safety and more. Each of these uses for image processing has specific challenges. MATLAB and Image Processing Toolbox provide a flexible

surroundings to explore design ideas and create distinctive solutions for imaging systems.

MATLAB toolbox used in this project is as follows :-

1. Image acquisition Toolbox.
2. Image processing toolbox
3. GUI builds.

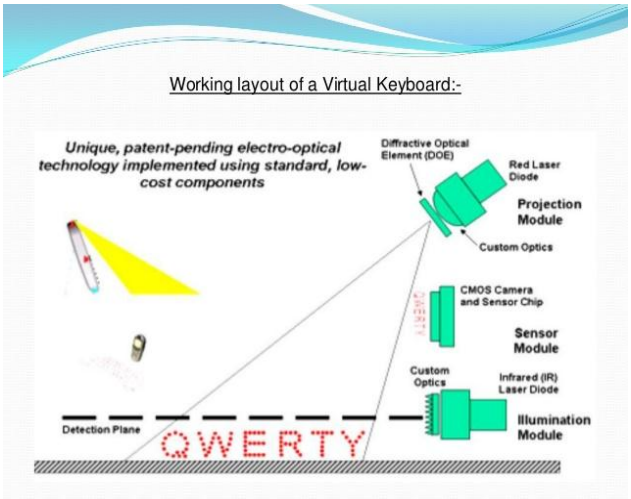

Figure 5. Working Layout

IV. ALGORITHM

1. ycbcr2rgb - to change ycbcr image to rgb.
2. Color based thresholding.
3. Find the logarithmic values of color.
4. Blob detection algorithm - to detect rgb color blob (stickers)[7].
5. Divide keyboard image into a sector.
6. Positioning the stickers with sectors.
7. Find the word of sector.
8. Show the output on command window.

V. ADVANTAGES

1. Highly Portability, accuracy, flexibility.
2. Speed of text entry.
3. Noise less than conventional keyboards.
4. The typing does not require a lot of force. So easing the strain on wrists and digits.
5. They are also made to be water proof and hence less prone to damage when spills occur
6. Maintenance of the laser keyboards is much easier.

VI. DISADVANTAGES

1. Tactile feel is not possible.
2. Dirty screens.
3. Virtual keyboards are hard to get used to. Since it combines of typing in thin air, hence it requires a little practice. Only people who are good at typing can use it efficiently [5].
4. It is very costly ranging from 150-200 dollars.

VII. FUTURE ASPECTS

1. Laser keyboards can be embedded into ATM's.
2. Laser keyboards can be used into space craft's as they are very lighter and smaller.
3. It can be embedded into digital lockers into banks, hostels for entering passwords and digital door lockers based on passwords.

VIII. CONCLUSION

1. A virtual keyboard system based on a true-3d optical range camera is presented.
2. No training is required by the system that automatically adapts itself to the background conditions when turned on.
3. The feedback text and graphics can be integrated with such projector, thus enabling virtual working areas.

4. It is also used in 6th sense technology device in which it is not depends on surface.

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Video De-noising by Different filters for different Noise

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ABSTRACT

In this paper we have adopted various filter technique for removing noise from video. The existence of noise in video gives blurred, snowy appearance. Video contain noise that comes from different electronic sources. Noise reduction is a useful tool to: enhance perceptual quality, increase compression effectiveness, in addition to pattern recognition processes. The quality of video is measured using Mean Square Error, Root Mean Square Error, Peak-to-Signal Noise Ratio and Average Difference. The results were compared to identify the significant filtering technique for de-noising in video applications.

Keywords: Video processing, noise, filtering, MSE, RMSE, AD

I. INTRODUCTION

Noise removal is the challenging task in video processing. The aim of filtering is to remove noise from the video in such a way the "original" video is visible. Image noise is an irregular, undesirable, variance of pixel esteems in picture. Any certifiable sensor is influenced by a specific level of noise, regardless of whether it is thermal or electrical. Thus the measurement of the signal will be corrupt, such that the output data is mixture of signal and noise. There are various filters technique for the removal of Gaussian noise (white noise), Salt & Pepper noise and Speckle Noise. Filtering technique is use to enhance the quality of the picture [1]. Video de-noising is the way toward expelling noise from a Video signal. Video de-noising strategies can be isolated into spatial video de-noising, temporal video de-noising and Spatial-temporal video de-noising. Noise reduction is applied to each individual outline in spatial video de-noising. In temporal video de-noising techniques, noise between outline are minimize. Spatial-Worldly video de-noising strategies utilize a mixture of spatial and temporal de-noising [1].

Noise removal is the difficult task in digital image processing.

The various evaluation parameter on which the quality of video measures are MSE, RMSE, and AD. If the value of MSE, RMSE, AD is low then the value of PSNR is larger and better the enhancement approach [1].

Firstly, the noise detect according to human visual characteristic and then for removing salt and pepper noise, median filter is used and for removing Gaussian noise, spatial-temporal adaptive filter. Experiment shows that it remove mixed noise from image [2]

This paper describe depth about various types of noise model which are helpful in selection of proper noise in image de-noising system [2] .

II. TYPRS OF NOISE

A. Gaussian Noise

It is moreover called as electronic clamor since it rises in intensifiers or locators. Gaussian clamor caused by basic sources, for instance, warm vibration of particles

and discrete nature of radiation of warm inquiries. Gaussian clamor by and extensive irritates the dull regards in mechanized pictures. That is the reason Gaussian commotion show fundamentally made and characteristics by its PDF or institutionalizes histogram as for dark esteem.

B. White Noise

Gaussian property does not implies in white sense. The recurrence space of background noise in the range - _ to +_. It demonstrates that noise control is vast in perfect background noise. In repetitive sound pixel esteem is not quite the same as their neighbour so relationship isn't conceivable.

C. Brownian Noise (Fractal Noise)

Due to Brownian movement Brownian noise is caused. Brownian commotion caused by Brownian movement. Brownian movement seen because of the irregular development of suspended particles in liquid. Brownian noise can likewise be created from repetitive sound.

D. Impulse Valued Noise (Salt and Pepper Noise)

The impulse noise is also called as Salt and pepper noise. Salt and Pepper noise is caused when dust particles is present in the camera. Picture pixel esteems are supplanted by tainted pixel esteems either most extreme 'or' least pixel esteem i.e., 255 'or' 0 individually, if number of bits are 8 for transmission.+

E. Periodic Noise

This commotion is delivered from devices checks, especially in charge movement in the midst of picture acquisition. This commotion has exceptional properties like spatially dependent and sinusoidal in nature at results of specific repeat. It's appears in kind of conjugate spots in repeat space. It can be beneficially removed by using a tight band expel channel or step channel.

F. Speckle Noise

This clamour is delivered from devices impedances, especially in charge movement in the midst of picture securing. This clamour has remarkable characteristics like spatially dependent and sinusoidal in nature at results of specific repeat. It's appears in kind of conjugate spots in repeat space. It can be beneficially cleared by using a restricted band expel channel or step channel.

G. Photon Noise (Poisson Noise)

The presence of this noise is seen because of the measurable idea of electromagnetic waves, for example, x-beams, obvious lights and gamma beams. The x-beam and gamma beam sources transmitted number of photons per unit time. These beams are infused in patient's body from its source, in restorative x beams also, gamma beams imaging frameworks. These sources are having irregular vacillation of photons. Result accumulated picture has spatial and transient arbitrariness.

H. Structured Noise

The presence of this noise is seen because of the measurable idea of electromagnetic waves, for example, x-beams, obvious lights and gamma beams. The x-shaft and gamma pillar sources transmitted number of photons per unit time. These shafts are injected in patient's body from its source, in remedial x bars likewise, gamma pillars imaging structures. These sources are having subjective difference in photons. Result amassed disturbance are irregular, stationary or non stationary and an intermittent in nature. If this commotion is stationary, it has settled sufficiency, repeat and stage. Sorted out commotion caused by blocks among electronic parts. Commotion presents in correspondence redirect are in two segments, unstructured clamour (u) and sorted out commotion (s). Sorted out uproar is furthermore called low rank fuss. In a banner setting it up, is more advantagable (more reasonable) to considering uproar exhibit in a lower dimensionality space.ge has spatial and transitory abnormality.

III. PROPOSED SYSTEM

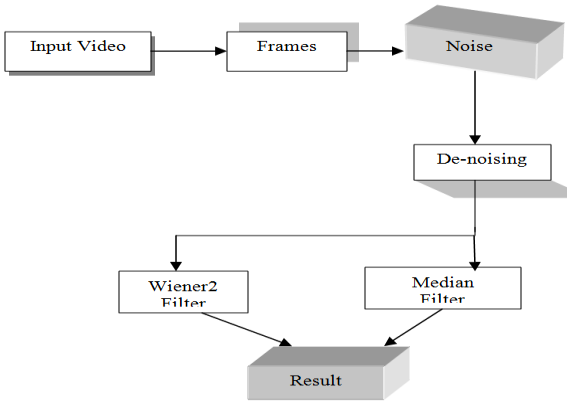


Figure2: Proposed System

In this system, firstly the video is converted into frames. The various noise as Gaussian noise, salt and pepper noise are added on frames. Wiener2 filter and Median filter2 is used to remove noise from that frame. The filtered video is free from noise.

IV. FILTERING TECHNIQUES

A. Wiener2 filter

It performs two-dimensional versatile noise evacuation sifting. Wiener2 low pass channels a force picture that has been corrupted by steady power added substance commotion. Wiener2 employments a pixel-wise versatile Wiener strategy in view of measurements evaluated from a nearby neighbourhood of every pixel. It employments neighbourhoods of size m-by-n to appraise the mean and standard deviation of a picture. Wiener2 gauges the neighbourhood mean and fluctuation around every pixel. This channel is utilized to evacuate the Gaussian commotion. The wiener channel is a picture rebuilding arrangement that can be connected to pictures that have a corruption work and furthermore commotion. The debasement work is given by G(u, v).

B. Median Filter2

Middle Channel stick the photo without getting darkened. Middle Channel is done on a photo grid by finding the centre of the territory pixels by using a window that slides pixel by pixel.

It performs middle separating of the grid An of each two estimations. Each yield pixel contains the centre an impetus in the m-by-n neighbourhood around the relating pixel in the information picture. Medfilt2 pads the photo with zeros on the edges, so the centre regards for the concentrations inside [m n]/2 of the edges may appear to be bent. This channel is used to remove the salt and pepper commotion.

V. EXPERIMENTAL RESULTS

The proposed estimations have been executed utilizing MATLAB. The execution of various commotion evacuation approaches using wiener2, median2 and filter2 channels are analysed and talked about. MSE, RMSE, Promotion are used to analysed the upgrade execution. . The outcome is taken by looking at the execution of Wiener2 Channel, Middle Channel based on PSNR and MSE esteem.

Original Frame (a)

Gaussian noise (b)

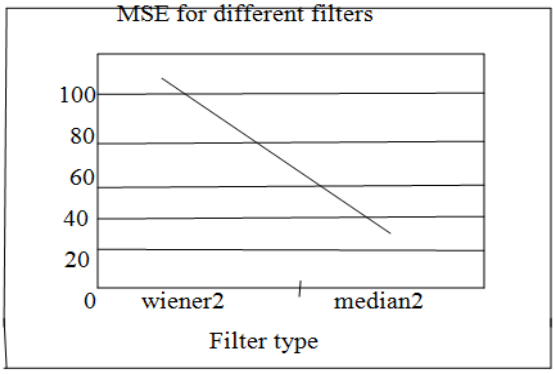
Salt and Pepper Noise (c)

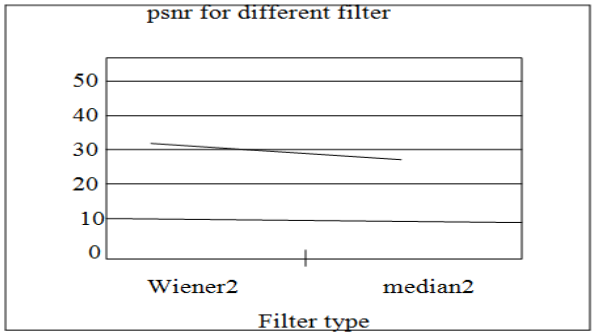
Median2 Filter (d)

Wiemer2 Filter (e)

TABLE 1

S.No	Filter	MSE	PSNR
1.	Wiener2	80.61	30.22
2.	Median2	30.92	29.18





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Search Engine Optimization Techniques

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ABSTRACT

Most Search Engine Optimization is nothing but a practice to attract traffic on the website. SEO makes the website SEO friendly and visible within the top results of the search. It increases the quality of traffic on the website and also the results achieved by the SEO are permanent or long lasting. 70% of SEO is in the hands of developer while designing a website i.e. ON PAGE SEO and the rest 30% is done by applying other strategies i.e. OFF PAGE SEO. This paper comprises the study of techniques which makes the website appear in top 10 results of the searches.

Keywords: traffic; seo technics; seo friendly; on page seo; off page seo

I. INTRODUCTION

Noise Search engine optimisation (SEO for short) is just the method of getting web site guests (or traffic) from “free” or “organic” search leads to search engines like Google or Bing. All major programmes have primary search results that area unit hierarchical supported what the search engine considers most relevant to users. we have a tendency to decision these organic results, as a result of they are free and not driven by paid advertisements. Programme optimisation helps maximize the quantity of holiday makers to a selected web site or page by making certain that the positioning seems high on the list of organic results came by a given programme. [18] [19] Methodology of SEO: Start with pages: The page is that the next level of graininess up from the keyword that may be simply measured.

Pair pages to keywords: Catchphrases square measure still the essential motor of the Website design enhancement strategy, since it's however clients see your pages. and furthermore the positioning of your pages on those watchwords is a crucial metric for connecting execution of the page.

Plan , Execute and Track: Page that is the new focus of the Web optimization Universe. Page-driven planning, execution, and measure implies page changes (not watchword transformations) are the metric of progress. the plan of objectives and furthermore the execution of errands can progress in the direction of that wrap up.

Wire the powerful knowledge sources: All information has importance and associated. Incorporated and revise learning from sources tantamount to Google Website admin Devices and apparatuses like Lofty Web optimization square measure fundamental in an exceedingly Secure Pursuit surroundings. Google Website admin Devices' catchphrase snap and impression knowledge provides halfway perceivability into your prosperity inside the substance of "Watchword (Not Gave)." Back link information offers you a picture of what the web crawlers see concerning not exclusively your site however conjointly your rivals' locales.

Utilize technology to manage information at scale: The right innovation stage licenses you to incorporate data from site examination, back link trackers, social

stages and Google Website admin Instruments. After you will see your rank, catchphrase, social and substance data in far reaching dashboard reports, you'll get laser-sharp perceivability into the achievement of your pages and can be prepared to make determinations on an approach to organize future exercises easily. the right innovation accomplices have profound associations with the web crawlers and make visit item improvements, serving to you keep educated the advancing pursuit scene II.

II. PRINCIPLE OF SEO

SEO could be a promoting discipline centered on growing visibility in organic (non-paid) computer programme results. SEO encompasses each the technical and artistic components needed to boost rankings, drive traffic, and increase awareness in search engines. There ar several aspects to SEO, from the words on your page to the means alternative sites link to you on the online. Generally SEO is solely a matter of creating certain your web site is structured during a means that search engines perceive. SEO is not just concerning building search engine-friendly websites. It's concerning creating your web site higher for individuals too.

[11] Principles of SEO:

A. Keywords:

When you accept making content, grasp the words that individual's square measure victimization to look. Each page ought to be engineered around keywords that square measure most vital to you and your company. Do your school assignment. after you square measure manufacturing pages for your web site, use the simplest keywords on each post. Google helps you together with your keywords. after you start to kind into the search bar on Google, it provides you suggestions of common words or phrases that individuals use in an exceedingly search. If you would like to require it one step additional, you'll use a tool referred to as Google Keyword Planner that may tell you common keywords. it'll tell you true numbers of what percentage average monthly searches square measure occurring with those keywords.

B. Image tags:

folks have pictures everywhere their websites, and that i am perpetually shocked once bloggers do not establish the photographs. Google compartmentalisation sites got to perceive what the image is and once it ought to be served up. You need to tag your pictures. If there area unit none, Google doesn't acumen to spot the image.

C. Meta Description:

Right below your computer address on the search page could be a sentence that is the meta description. this can be a very important outline that tells folks what they'll learn on the page. you would like it to be participating and truthful and prompt folks to click and learn additional. Use call-to-action words similar to "learn" and "visit" to interactfolks and encourage them to search out out why the data on your page is vital to them.

D. Backlinks:

One of the matters that are incredibly valued in website positioning is back links. Back links are incoming hyperlinks from one webpage to any other -- in other words, people linking to your internet site they determine the price in what you are saying. In addition, you will choose to include hyperlinks to supply your readers more useful information and to help build relationships with different bloggers.

SEO techniques

[12] [13] [14] The tactics and methods used for Search Engine Optimization are as follows:

On page SEO is the technique in which the content on the website is modified in order to make it Search

Engine friendly. It includes modifying the text, XML Sitemap, HTML, CSS, Graphics etc.

III. COMPONENTS OF ON PAGE SEO

Following are the components of on page SEO:-

1. Page Title:-

The two web page titles are one of the most necessary search engine marketing factors on the site. Each of your pages & posts have to have its very own special title, which consists of the primary key phrases for that page.

2. Use the key-word phase in URL:

Using the key-word phrase in the URL of your page or put up is convenient to do in Word Press as lengthy as permalinks are enabled. Word Press robotically generates publish slugs from a post's title, and you can edit the slug to contain your exact key-word phrase.

3. The Meta Description:

The META description is generally the short "snippet" paragraph displayed below a link in a Search Results Page. However, relying on the search term, Google will now and again show something different than the META description, highlighting words used in the content that are applicable to the user's search terms.

4.Avoid Keyword stuffing:

Keyword stuffing is repeating the same phrases or phrases so frequently that it sounds unnatural.

5. Internal Linking:

After the web page is optimized, be certain to create hyperlinks lower back to the page from other content material on your website. Look for locations where you point out the keyword phrase on other posts and pages and take that chance to link returned to the web page your are optimizing for that phrase.

IV. Off Page SEO

Off page SEO refers to techniques that may be wont to improve the position of an internet site within the programme results page (SERPs). Many of us associate off-page SEO with link building however it's not solely that. In general, off Page SEO must do with promotion ways – on the far side web site style –for the aim of ranking a web site higher within the search results.

1. Social Media Involvement:

A major Off-page SEO technique is social media engagement. If you would like to create yourbusiness, website or diary common, interact with folks on multiple social media platforms. Social media presence can facilitate grow your business and additionally assist you get additional back links.

2. Social Bookmarking Sites:-

Social bookmarking websites are one of the quality systems to promote your website. When you bookmark your webpage or blog publish on famous social bookmarking websites, you obtain high traffic to your webpage or blog.3.Submissions:- This includes submitting different documents which include:

- ✓ Forum Submissions.
- ✓ Video Submissions.
- ✓ Image Submissions.
- ✓ PDF Submissions.
- ✓ Articles Submissions.
- ✓ Document Sharing.

V. OFF PAGE SEOBLACK HAT SEO TECHNIQUES

Black Hat SEO is most ordinarily outlined as a disapproved follow that yet may increase a page's ranking in a very computer programme result page (SERP). These practices ar against the computer programme's terms of service and might end in the positioning being illegal from the search engine and affiliate sites. a listing of ways and techniques utilized by black hat SEO practitioners are overtly denounced on Google's Webmaster tips and Bing's Webmaster tips.

Components:-

Content Automation

Doorway Pages

Keyword Stuffing

Sneaky Redirects

Link Manipulation

Creating pages, subdomains, or domains with duplicate content

Pages with malicious behavior, such as phishing, viruses, trojans, and other malware

VI. GRAY HAT SEO TECHNIQUES

It is what its title suggests. It's somewhere in the center of white and black and if used by using a professional, can nonetheless be effective. However, it's secure to say that taking a gray hat method is playing with hearth if you're notone hundred percent sure of what you're doing. Components:-.

- ✓ Cloaking
- ✓ Purchasing old domains
- ✓ Duplicate content
- ✓ Link buying

Social media automation and purchasing followers

VII. WHITE HAT SEO TECHNIQUES

White hat SEO is that the opposite of Black Hat SEO. Generally, white hat SEO refers to any apply that improves your search rankings on a look engine results page (SERP) whereas maintaining the integrity of your web site and staying at intervals the search engines' terms of service. These ways keep at intervals the bounds as outlined by Google. samples of white hat SEO include:

Offering quality content and services

Fast site loading times and mobile-friendliness

Using descriptive, keyword-rich meta tags

Making your site easy to navigate

Components:-

Focus on User Experience (UX).

Keyword Research.

Rich and Attractive Content.

Link Building

V. CONCLUSION

This paper shows the study of various Search Engine Optimization methods on various experimental results in order to depict and formulate the best technique and the most efficient one that needs to be undertaken by a person for getting the most proficient outcomes. According to the researches, it can be concluded that for having the website to be in top ten results of the search , one has to follow the best suitable techniques such as the ones enlisted above and the results will be more than satisfactory in terms of increase in traffic, business development, page ranking, web ranking and to be more specific the results will be long lasting or permanent.

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A Comparative Study of Image Compression Techniques

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ABSTRACT

The increase in the amount of images captured per day and uploaded over cloud nowadays requires much more bandwidth then previous few years. The high end enhanced image quality requires more number of bits per pixel which increase the overall size of a single image. We generally need to compress the image before storing and transmitting over the channel. In this paper we shall discuss three algorithms for image compression such as: - Block Truncation Coding (BTC), Discrete Cosine Transform (DCT) and Singular Value Decomposition (SVD). We shall compare the results by using MATLAB as tool by calculating Mean Square Error (MSE), Peak Signal to Noise Ratio (PSNR) and Compression Ratio (CR).

Keywords: Image compression, BTC, DCT, SVD, MSE, PSNR and CR.

I. INTRODUCTION

In this super fast world people do not wish to wait for a second. Similarly in case of image transmission and uploading of image over internet where people are more obsessed about taking pictures from a DSLR whose average size of image ranges from 4-12 Megabytes (MB). A picture of such size needs a higher bandwidth of channel to transmit from one place to another instead it will have higher transmission time. Although it can be possible to transfer such size of file in just blink of eye by applying different compression algorithms to the image.

There is two type of image compression technique such as lossy image compression and lossless image compression.

The loss in term of information required to represent an image comes under lossy image compression where the compressed image losses some of the information as the bits are reduced per pixel in compression.

In lossless image compression the original image is regenerated by the compressed representation of image where there is no loss in the information is seen. Both the techniques applied depending on the requirement of the scenario.

In case of social sites and messaging application lossy image compression can be applied where as in case of official documents and banking details we require lossless image compression.

II. LITERATURE SURVEY

A compression algorithm is one which reduces the size of image in context to bit representation. Compression is none other than encoding of an image

in some other representation and to get it back decoding the compressed image. In the field of digital image processing, a large variety of image compression algorithms have been introduced. Some of them are efficient and being used in different field depending on their requirements. Below is the literature survey on different proposed algorithms for image compression by authors.

In [1], the author uses the adaptive interpolation for image compression and decompression which is computationally inexpensive and reduces the size of image effectively. The author also provided different compression ratios that can be applied based on original image.

In [2], the author performed a new compression technique by combining two algorithms in two step sequence where in first step he used Lempel-Ziv-Welch (LZW) algorithm and in second step the output of first step is input to the second algorithm that is Bose, Chaudhuri and Hoc-quenghem (BCH). The compression ratio was higher than other algorithms.

In [3], the author introduced two new algorithms based on Run length encoding (RLE). He proposed RLE-1 and RLE-2 which gave better result by saving bytes and increasing the compression ratio. Almost 17.88% and 17.75% better CR respectively.

In [4], the author compared five algorithms and their advantages and disadvantages among other algorithms. It was a survey paper on image compression. The compression techniques are wavelet compression, JPEG/DCT, vector quantization, fractal and genetic algorithm.

III. ALGORITHMS

In this paper we shall be working on three algorithms to find out which one is giving better result based on the parameters as compression ratio, MSE and PSNR.

The objective is to reduce the redundant bits by eliminating them from repeating in the image. The algorithms we are working on is lossy compression algorithms.

A. Block Truncation Coding

It is a lossy image compression type of technique for greyscale and also used for colour image compression. The original image is being divided into blocks and after that quantises to reduce the gray levels by keeping the mean and standard deviation similar.

For a two level quantization the formula is given by:

$$y(i,j) = \begin{cases} 1, & x(i,j) > \bar{x} \\ 0, & x(i,j) \leq \bar{x} \end{cases} \quad (1)$$

Here x is the original image where as y is the compressed image block which is calculated based on the mean value.

The compressed image is then transmitted along with the mean and standard deviation to retrieve back the original values. The value of a and b is calculated as such by formula:

$$a = \bar{x} - \sigma\sqrt{\frac{q}{m-q}}$$

$$b = \bar{x} + \sigma\sqrt{\frac{m-q}{q}} \quad (2)$$

Where sigma is standard deviation, m is total frequency of pixel and q is the frequency of pixels greater than mean.

$$x(i,j) = \begin{cases} a, & y(i,j) = 0 \\ b, & y(i,j) = 1 \end{cases}$$

(3)

To reconstruct the image 0's are replaced with a and 1's are replaced with b.

B. Discrete Cosine Transform

In DCT the image is processed in blocks of size 8x8 of different frequencies. DCT is generally used for the process of JPEG images. It is again a lossy image compression technique where compressed block is stored in reduced space. These blocks of image are processed from left to right and top to bottom.

Steps:-

1) First, the image is split into blocks of 8x8 to process quantization.
2) Second, DCT is calculated for each block applying from left to right and top to bottom along the image.

$$D(i,j) = \frac{1}{\sqrt{2N}} C(i)C(j) \sum_{x=0}^{N-1} \sum_{y=0}^{N-1} p(x,y) \cos\left[\frac{(2x+1)i\pi}{2N}\right] \cos\left[\frac{(2y+1)j\pi}{2N}\right]$$

(4)

$$C(u) = \begin{cases} \frac{1}{\sqrt{2}} & \text{if } u = 0 \\ 1 & \text{if } u > 0 \end{cases}$$

(5)

Where p(x,y) is the pixel value of the image represented by matrix p along x and y coordinate and N is the size of the block of DCT.

3) Third, quantization is performed on each 8x8 block of image which in result compresses the size of each block.
4) Fourth, reduced image formed by these blocks are then stored in memory.
5) Fifth, decompression can be done on the compressed image to retrieve back the original image by applying inverse discrete cosine transform (IDCT).

C. Singular Value Decomposition

Image processing and signal processing is being the main field of singular value decomposition as in image processing it works as to reduce noise and image compression and in signal processing to least square fitting. The working of SVD is to decompose the maximum signal energy into few coefficients as per need.

The singular value decomposition takes a matrix A of dimension m*n and decomposes by

$$A = U \sum V^T$$

(6)

Where $\sum$ hold the singular values of A along diagonally, U and V are matrices having dimension m*m and n*n respectively and are orthogonal matrices.

It calculates eigenvalues and eigenvector by A^TA for computing SVD where eigenvector is used to structure the matrix U and singular values are calculated by taking square root of the eigenvalues.

The generated matrix is now a reduced matrix which is decomposed based on the singular values that used to distribute the all values present in matrix A.

IV. METHODOLOGY

The algorithms of BTC, DCT and SVD are being used in MATLAB tool to compare the results of the compression techniques. Matlab is a matrix laboratory tool which is uniquely built for performing operations on matrixes.

The inbuilt libraries are very easy to use and provide a diverse range of functionality to be used by the user. An image is a 2-D matrix which holds the pixel value for each RGB for a color image where as a single value for a gray image.

A graphical user interface (GUI) is being build to visually show how the algorithms showing results by providing a 2-D image. The GUI have 3 section for each algorithm where each section hold the before and after size of original image and compressed image along with the MSE, PSNR and CR.

The traditional image of Lena is used for comparison between all the three algorithms. Also we have performed comparison of 10-15 images to find out which algorithm efficiently gives better result.

A. Block Truncation Coding

The BTC algorithm showed a compression ratio of 1.72 on the image of Lena along with the mean square error of 3.05 and peak signal to noise ratio of 43.32602 dB. The template is shown below.

Figure 1. Compressed result using BTC

We can see that the image is compressed from the size 592.93 KB is reduced by the block truncation coding to 345.08 KB.

B. Discrete Cosine Transform

The DCT algorithm showed a compression ratio of 1.56 on the image of Lena along with the mean square error of 4.26 and peak signal to noise ratio of 41.86888 dB. The template is shown below.

Figure 2. Compressed result using DCT

We can see that the image is compressed from the size 592.93 KB is reduced by the DCT to 379.57 KB.

C. Singular Value Decomposition

The SVD algorithm showed a compression ratio of 1.33 on the image of Lena along with the mean square error of 0.39 and peak signal to noise ratio of 52.26027 dB. The template is shown below.

Figure 3. Compressed result using SVD

We can see that the image is compressed from the size 592.93 KB is reduced by the SVD to 446.20 KB.

V. RESULT ANALYSIS

As the result generated it is quite obvious to analyze and predict that which algorithm performs efficiently and provide good result while compressing an image during storage and transmission.

The factors by which we can define that which algorithm can be used while transmission and which algorithm can be used for storage purpose.

We can say that an image needs to be highly compressed for transmission purpose and for storage purpose we can say that an image needs to be error free such that its mean square error should be minimum so that the compressed image holds the maximum original data.

Below is the table having data of nine images which are mostly used as sample images for image compression and analysis of image compression algorithms. The table has MSE, PSNR and CR for each algorithm BTC, DCT and SVD for each particular image.

The compression ratio (CR) of block truncation coding (BTC) is higher in all the nine images among other algorithms except the image Barbara which have the same compression ratio 2.28 with discrete cosine transform (DCT).

The image compressed by BTC is higher among other two algorithms.

Table 1. Data Obtained By Matlab

Image	Algorithm	MSE	PSNR	CR
	BTC	3.82	42.34378 dB	2.13
Airplane	DCT	6.49	40.04101 dB	1.72
	SVD	0.36	52.65154 dB	1.57
	BTC	12.02	37.36460 dB	1.45
Baboon	DCT	20.33	35.08343 dB	1.18
	SVD	6.15	40.27670 dB	1.04
	BTC	6.09	40.31910 dB	2.28
Barbara	DCT	10.46	37.96867 dB	2.28
	SVD	0.61	50.30531 dB	2.25
	BTC	10.13	38.11078 dB	1.81
Cameraman	DCT	14.06	36.68417 dB	1.29
	SVD	0.04	62.46416 dB	1.4
	BTC	3.05	43.32602 dB	1.72

Lena	DCT	4.26	41.86888 dB	1.56
	SVD	0.39	52.26027 dB	1.33
	BTC	3.45	42.78617 dB	2.11
Pepper	DCT	6.16	40.27114 dB	1.77
	SVD	1.25	47.20961 dB	1.64
	BTC	1.38	46.76361 dB	2.22
Pepper2	DCT	2.48	44.21708 dB	1.24
	SVD	0.17	55.82348 dB	1.15
	BTC	5.13	41.06360 dB	1.98
Sail Boat	DCT	8.85	38.69512 dB	1.61
	SVD	1.63	46.05110 dB	1.48
	BTC	1.69	45.89778 dB	2.11
Tiffany	DCT	3.95	42.20010 dB	1.92
	SVD	0.57	50.63899 dB	1.54

The compression ratio of BTC is higher than DCT and compression ratio of DCT is higher than SVD which is very clear from table 1.

If we talk about mean square error that is the error due to reduction in the information lost while compressing an image. The MSE for algorithm SVD is lesser than other two algorithms that show that this algorithm can compress an image efficiently along with lesser amount of information loss. The least value of MSE is for the image Cameraman with value 0.04 having a compression ratio of 1.4 which is not too bad.

The mean square error for SVD is least than other two and then comes the BTC algorithm which has less error than DCT.

VI. CONCLUSION

In this modern world where people are being more smart and intelligent along with smart gadgets the data transmission really require quick actions so to provide a better experience to the user. In this paper, it is concluded that block truncation coding algorithm is efficient in term of higher compression ratio where as in term of MSE the singular value decomposition have an upper hand.

BTC can be used where there is more focus on transmission rather than what information is present in the image where as SVD can be used for the credentials, banking details and confidential documents where data loss is not tolerated.

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An Experimental Study on Clustering Techniques in Data Mining

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ABSTRACT

Clustering is important in data analysis and data mining applications. Cluster can mean as a conglomerate of data sets which can be seen similar to other data set in the same cluster and also are not similar to the different objects in same clusters.[1]The objective of data mining process is to come out with output of useful and relevant information from a large data set and convert it into an understandable form so that it can be used in future. The Aim of this paper is to identify the high-profit, low error, high efficiency and high-value by one of the data mining technique.

Keywords: Data mining, Simple K means, hierarchical clustering, farthest first

I. INTRODUCTION

Data mining is the phenomenon to analyze the data from different data sources for different perspectives and making the summary of the one into an understandable and meaningful information through various decision producing algorithms. Data mining consists of many functions which have to be performing like it extracts the data and then transform the data, and load transaction data onto the data warehouse system. It store and manage the data in a multi-dimensional database system and present the data in a useful manner and format like a graph or table. It provides the satisfactory data access to business analysts and analyzes the specified data by the application software. Data mining involves the association rule learning, anomaly detection and classification, clustering, summarization and regression. In this paper, we have to do simple clustering analysis by the help of different clustering algorithms [2].Cluster Analysis is a fundamental operation in data and it is an automatic process to find the similar objects from the database. It's important features is that it discovers the patterns in large datasets. To extract the data patterns it used the intelligent methods. Basically in data mining process there are six classes which is anomaly detection, association rule learning, clustering, classification, regression and summarization. There are three stages of clustering in which first raw data is come then clustering algorithm is come after the last stage of clustering is cluster of data.

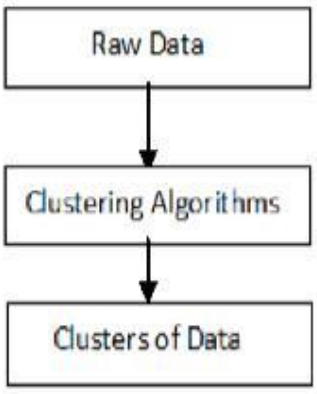

Figure 1. Stages of Clustering

II. LITERATURE SURVEY

Table 1

S. no.	Title of paper	Year of publication	Author's Name	Identified Problem	Methodology
1	Customer Data Clustering	2011	Dr. Sankar Rajagopal	In the real world there are many number of company which having large number of database but it can't manage these dataset.	We apply three algorithm in this paper and purpose of these algorithm is to provide low risk, high value and high profit.
2	Survey paper on Clustering Techniques	2013	Amandeep Kaur Mann and Navneet Kaur	The main problem in the hierarchical clustering algorithm that it don't visit the cluster again after once the visit.	In this survey paper, we have to understand the simply clustering algorithm and analyze the predict results which they produced.
3	Performance Analysis Of Clustering Techniques	2013	Kyle DeFreitas and Margaret Bernard	The main problem in the K Means Algorithm is number of cluster that means we have to define the values of k cluster in starting.	In this paper, we analyze the clustering algorithm and according to that we predict the case based results.
4	Clustering Algorithms in Educational Data Mining	2015	Ashish Dutt, Saeed, and Hamidreza Mahroeian	The main problem is that how the algorithm applied in the education field and produce the result.	The main aim behind in this paper is that to produce the low risk and high profit when we apply the clustering algorithm.
5	Lung Cancer Data Analysis by K-means and Farthest first clustering algorithms	2015	A. Dharmarajan and T. Velmurugan	The main problem of this paper is to identify the how the clustering algorithm apply in the medical field and to identify the yield of the field.	The final outcome of this paper is to analyze the high profit and low risk in the medical field.

III. CLUSTERING ALGORITHM

This Cluster can mean as a conglomerate of data sets which can be seen similar to other data set in the same cluster and also are not similar to the different objects in same clusters. That means the similar data set belong to the same class.To make the clusters for any data set there are so many algorithm which is like hierarchical, K-Means, Farthest First and the Partion Based Clustering Algorithm. These algorithms are mainly used for data mining.

A) Hierarchical Clustering Algorithm-

Hierarchical clustering is one of the method of clustering Algorithm which is used to build a hierarchy of clusters of a particular dataset. The hierarchical algorithms is the connectivity based algorithms of clustering and it mainly build the

clusters gradually of a dataset. Hierarchical clustering Algorithm having two types: First is agglomerative methods, which is the bottom up approach that means all the work has to be done the bottom to top fashion and the second is the divisive methods which is the top down approach that means all the work has to be done in the top to down fashion. The Agglomerative hierarchical clustering algorithm is a bottom up approach and the pairs of clusters are club together and become as one and then moves up the hierarchy and here each observation starts in its own cluster. The Divisive hierarchical clustering splits in the recursive manner and the move down the hierarchy.

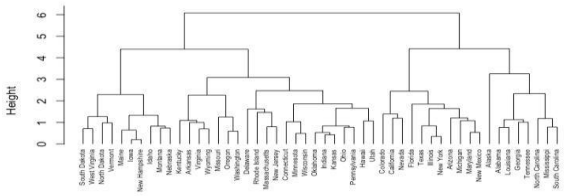

Figure 2. Hierarchical Clustering Algorithm

Advantages of hierarchical clustering

1. It is easy to implement and gives the best result in some cases.
2. Regarding the level of granularity it gives the embedded flexibility.
3. There is no need to require the predefined number of clusters.
4. It accepts any distance which is valid measure.

Disadvantages of hierarchical clustering

1. It is high in the time complexity.
2. It gives error rate high that is efficiency of correctness is low.
3. The main problem in the hierarchical clustering algorithm that it don't visit the cluster again after once the visit.

B) K Means Clustering Algorithm-

K-Means clustering Algorithm divides the n objects of a dataset into the k clusters and the main work in this k mean clustering algorithm is that here each object which having its mean value belongs to the cluster according to the nearest property of value. This Clustering Algorithm will produces the k different clusters which having the good quality. In this algorithm we simply make the two clusters and determine the mean value of each cluster. And analyze the mean value of these cluster set and now we take this mean value and find the new cluster set making this current value of mean value as a reference. and this process has to be continue until the we get two cluster set similar of last two process. That means when we find cluster set of continuously two process is same then our k means algorithm process is completed.

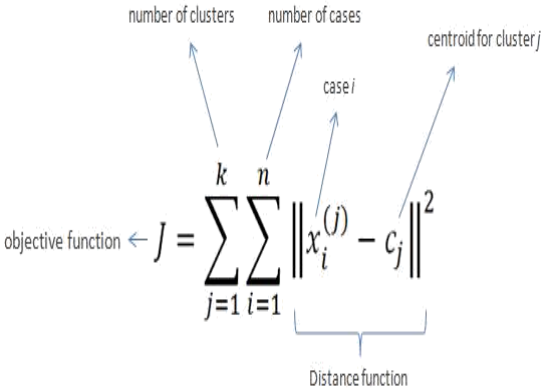

Figure 3

Procedure -

1. Firstly we have to make the k groups of the dataset and here k is the predefined. That mean we make the clusters initially.
2. After that we have to take the k value in the random fashion for making the center of the cluster.
3. And then we assigned the objects according to it's distance that mean which having minimum value from centre having one cluster and which having large value having other cluster. In this we use the Euclidean distance function.
4. Now we calculate the mean value of each cluster for next step.

We have to repeat the steps 2, 3 and 4 until we get same cluster set in consecutive rounds

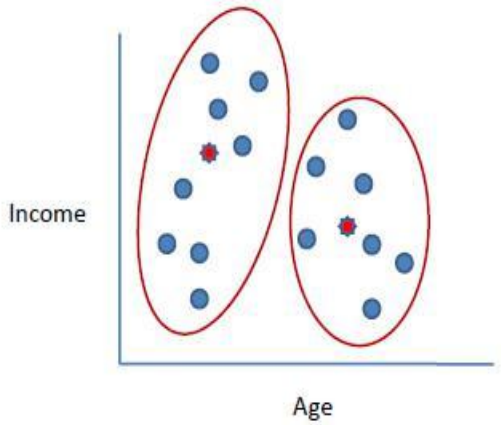

Figure 4

IV. METHODOLOGY

In this paper we have to do a review of clustering and its different Algorithms in data mining. here we used three clustering algorithm in data mining and according to that we analyze the result of these algorithms. The Algorithm which we used in this paper are HIERARCHICAL, K-Means and Farthest First Clustering Algorithm. For determining The Characteristics of these algorithm WEKA tool is used. Weka is a tool which is used for finding the properties and functionality of the algorithms. According to the WEKA tool we analyze the algorithm in terms of time, cluster instance and the efficiency factor. We have to predict the result by taking these factors of the algorithm which we get from the weka tool. Here we take the three different dataset and apply the clustering algorithm and then analyze the result and predict own results of the algorithm according to that factors which we have to take in this paper

IV. RESULT ANALYSIS

Table 2

dataset	Hierarchical Algo			K-Means Algo			Farthest-First Algo		
	Time (sec)	Cluster instanc	efficiency	Time(sec)	Cluster	efficiency	Time(	Cluster	efficiency
Dataset1	0.03	50% & 50%	good	0.02	50% & 50%	best	0.01	68% & 32%	better
Dataset2	6.49	100% & 0%	Not good	0.06	61% & 39%	good	0.05	89% & 11%	better

From Above result analysis table we can see that from all datasets the efficiency of Hierarchical clustering algorithm is not so good and it takes more time to predict the result.[3]And the K-Means clustering algorithm efficiency is good and it gives result in less time as compared to the hierarchical clustering algorithm but the farthest first clustering algorithm gives the result in very less time as compared to all the algorithm and it's efficiency is better. All the algorithm will produce the two cluster instance with different cluster percentages according to its dataset. And the error percentage rate is high in the Hierarchical approach but the correct result with in the short period of time is produced in the Farthest First Clustering algorithm

V. FUTURE SCOPE OF WORK

The main aim of this data mining procedure is to extract information from a large datasets and convert it into an understandable form so that it can be used in future. Clustering algorithm is useful not only for data analysis but for major data mining applications. It is one of the most prominent process of grouping a set of data objects so that the objects, which are similar to each other are usually come in one group and the dissimilar objects are present in other group. Clustering can be performed and executed not only by

a particular and specific methodology but also by the different number of algorithms likewise hierarchical, K-Means and Farthest First Clustering Algorithm. Hierarchical clustering is one of the connectivity based clustering approach and Algorithm hence it takes too long time to predict the result of any datasets. And the K Means clustering algorithm is good and it take less time to produce the result But The Farthest First Clustering algorithm takes lesser time as compared to all the other algorithm to produce the results and the efficiency of this algorithm is quite better in terms of the output generation and the correctness of the result is good.

VI. ACKNOWLEDGEMENT

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