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Founder, IPEM Group of Institutions

Dr. B.S. Goel

(04.08.1937-10.01.2017)

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From the Editorial Board

We are glad to present the Second Edition of the IPEM Group of Institutions, Computer and IT Department Journal "IPEM JOURNAL OF COMPUTER APPLICATION & RESEARCH", December 2018. However, we braved all the odds, and published the issue as always, on time. We followed a rigorous method to select the papers. All the papers we have included in this issue of IPEM JOURNAL OF COMPUTER APPLICATION & RESEARCH are peer reviewed and only those papers which went through this rigor, have been given space in this Journal.

This Journal attempts to document and spark a debate on the research focused on technology in the context of emerging technologies. This is the special issue which covers area of Mobile Computing, Artificial Intelligence and Internet of Things. These technologies could be from very sophisticated to very elementary, but in term of impact they would be capable of being commercialized, scaled up and focused on real life challenges.

We sincerely hope that these in-depth research papers, focusing on different technologies, will further stimulate the academic research, and will help in developing an insight into the concerned areas. We are eagerly waiting for your critical response which we shall incorporate in the forthcoming issues. We are greatly indebted to the paper writers who took keen interest and submitted their research papers on time. It is because of the sincere efforts of these people that the IPEM JOURNAL OF COMPUTER APPLICATION & RESEARCH is in your hands today.

We are grateful to our Secretary - Mr. Anupam Goel who provided all the moral and financial support to publish the IPEM JOURNAL OF COMPUTER APPLICATION & RESEARCH.

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Functional Programming Languages and its Applications in Mathematics - A Survey

Shobhit Mani Tiwari*
Atul Kr Pal**

ABSTRACT

Functional programming languages were originally developed in late 1970's. With its root in Lambda calculus and combinatory calculus this proved to be the best choice for mathematicians. Its applications were visible in areas varying from differential calculus to rough set theory. The main aim was to provide compact notion for writing program mainly for symbolic computation and applications based on list-processing. The main concern lies in functionality and not storage and assignment sequences, it also provides features like lazy evaluation, higher order functions and pattern matching. This paper is a brief survey on the impact of functional programming on current research in the field of mathematics. We took many papers and analyzed the importance of these languages in shaping the modern mathematics.

Introduction

Programming languages were written keeping in mind the need for communication between machine and humans. From classical assembly languages to high level languages we had saw huge differences in the way we wrote their syntax. Earlier their used to be machine dependent syntax and operations which were replaced by architecture dependent syntax. Later we saw the languages which were platform and architecture independent as well. With the advent of C++ , i.e object oriented programming (OOP) we were able to write programs with lesser complicated and lesser confusing syntax.

Functional Programming have a well defined semantics , they are written clearly and have implicitly defined flow of control. It appears complicated to someone who is unaware of this concept but on the other hand it is concise and self explanatory for one who knows the ins and out of this model. The lazy evaluation techniques helps in describing mathematical objects which in turn helps in implementing things in quantum mechanics

so that scientists can use them. This model has helped mathematicians believe that computers were made out of mathematics and now they can help mathematics to solve the problems which were once unsolvable. With intensive exploitation of packages provided by these languages , the programmer can easily write semantics for formula processing and numerical evaluations. . There exist numerous such packages like Symbolic packages, algebra topology packages etc. Which proves the above fact. .

A. Structure of Functional Programming language

1) **Data Types:** In any language, variable(data) should be declared before it can be used in program. Data types are the keywords, which are used for assigning a type to a variable. .

Syntax for declaration of a variable: datatype variablename; Example: int a,b;

- **String:** A string is an data type utilized in programming, for example, a integer and floating point unit, yet is utilized to text to content instead of numbers. It is included a lot of characters that can likewise contain spaces and

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numbers. For example, the word "hamburger" and the phrase "I ate 3 hamburgers" are both strings. Even "12345" could be considered a string, if specified correctly. Typically, programmers must encase strings in quotes for the information to be perceived as a string and not a number or variable name.

- **Character:** Utilize the Char information type when you have to hold just a single character and needn't bother with the overhead of String. In some cases you can utilize Char(), a variety of Char components, to hold numerous characters. The default value of Char is the character with a code point of 0. It holds unsigned 16-bit (2-byte) code points ranging in value from 0 through 65535. Each code point, or character code, represents a single Unicode character.
- **Float:** The Float information type is an alias for a Real or Precision information type, contingent upon the accuracy you indicate.
- **Integer:** Integer data type enables a variable to store numeric qualities. int keyword is utilized to refer to integer data type. The capacity size of int data type is 2 or 4 or 8 bytes. It varies depending upon the processor in the CPU that we use. If we are using a 16-bit processor, 2 bytes (16 bits) of memory will be allocated for int data type. Likewise, 4 bytes (32 bits) of memory for a 32-bit processor and 8 bytes (64 bits) of memory for a 64-bit processor is allocated for int datatype.

2) **Lists:** A list is a sequential data structure. It contrasts from the stack and queue data structures in that augmentations and removals can be made at any position in the list. The List operations are Add : adds a new node Set : update the contents of a node Remove: removes a node Is Empty : reports whether the list is empty Is Full : reports whether the list is full Initialize : creates / initializes the list Destroy : deletes the contents of the list (may be implemented by re-initializing the list)

3) **Classes :** When you characterize a class, you define a blueprint for an object. This doesn't really characterize any information, yet it defines what the class name implies, that is, the thing that an object of the class will comprise of and what tasks can be performed on such an object.

4) **Functions:** A function is a group of statements that together perform a task. Each C program has no

less than one function, which is main(), and all the most trivial programs can define additional functions.

You can divide up your code into separate functions. How you partition up your code among various functions is dependent upon you, however coherently the division more often than not is so each function performs a specific task.

The general form of a function definition in C programming language is as follows: return type function name (parameter list) {body of the function}

A function definition in C programming language consists of a function header and a function body. Here are all the parts of a function:

5) **The Lambda calculus and computation theory:** The Lambda-calculus is the computational model the functional languages are based on. It is a very simple mathematical formalism. In the theory of the lambda calculus one is enabled to formalize, study and investigate properties and notions common to all the functional languages, without being burdened by all the technicalities of actual languages, useless from a theoretical point of view.

In a sense, the lambda calculus is a paradigmatic and extremely simple functional language. The concepts the Lambda-calculus is based on are those that are fundamental in all functional programming languages : variable (formalisable by $x, y, z,$) abstraction (anonymous function) (formalisable by $\lambda x.M$ where M is a term and x a variable) application (formalizable by MN , where M and N are terms)

We have seen that these are indeed fundamental notions in functional programming. It seems, however, that there are other important notions: basic elements, basic operators and the possibility of giving names to expressions. Even if it could appear very strange, these notions actually are not really fundamental ones.

The formalization of the notion of computation in Lambda calculus: The Theory of Beta reduction In a functional language to compute means to evaluate expressions, making the meaning of a given

expression more and more explicit. Up to now we have formalized in the lambda-calculus the notions of programs and data (the terms in our case). Let us see now how to formalize the notion of computation. In particular, the notion of "basic computational step". We have noticed in the introduction that in the evaluation of a term, if there is a function applied to an argument, this application is replaced by the body of the function in which the formal parameter is replaced by the actual argument.

Functional Programming - Features

In an functional programming , a function is a mapping taking one or more arguments and producing a single result, and is characterized utilizing a condition that gives a name for the function, a name for every one of its arguments, and a body that specifies how the result can be calculated as far as the arguments. When a function is applied to actual arguments, the result is obtained by substituting these arguments into the body of the function in place of the argument names.

- 1) Concise program Syntax
- 2) Powerful type system
- 3) Polymorphism
- 4) List comprehensions
- 5) Recursive functions
- 6) Lazy evaluation
- 7) Overloading

Mathematics as Building Block for Functional Programming

Mathematics has always been considered as Queen of all sciences. In case of Functional programming this statements holds true. There are several features which were inherited by modern languages from Mathematics. Many of the calculation strategies which are present in functional programming comes from trivial concepts like recursion, algebra, double recursion, coalgebra etc.

- I. Recursion and Algebra Recursion holds a great importance in modern programming languages. Data structures like lists, and trees can be best implemented using this concept. If we consider mathematical operations , recursion is very useful. Several algorithms pertaining to mathematical foundations can be

easily dealt with recursion. A concept called corecursion (dual recursion) is also useful in programming. Algebra and coalgebra is used to describe the behavior of structures like automata.

- II. Category Another such feature is category . A category c is defined as a mathematical structure containing of objects. Here we our concern lies both on objects and morphism. Objects are mapped and they are composable as well. These categories follow rules like transitivity and associativity. These categories are very useful in defining structures in a Functional Programming languages.

Milonga- A Modular Functional Language

MILONGA stands for modular implementation language oriented to nonlinear geometry applications. This was designed specifically for geometrical interpretation and applications. The concept says that a line or a curve can be easily represented by using an equation, we have to use function instead of symbolic expressions. It was clearly observed that Functional programming paradigm would be useful in such scenario. Solving a polynomial equation or a curve becomes easy by MILONGA by taking polynomials and integers as basic data structure , the MILONGA language also allows the implementation of most fundamental algorithms commonly used for polynomial equation solving. In particular, This language is expensive but still useful and expressive. It is also capable of solving elimination based algorithms. For its execution, a given MILONGA program is mapped into C++. The compiler for this was written in HASKELL which is a non structured programming language. Other non strict programming languages can also be used for creating such compilers. Thanks to this tool, namely Haskell s monads, it took only one man-month to develop the whole MILONGA compiler. MILONGA is based on abstract machine, which was basically an inspiration from G machine pf Johnsson. These kinds of languages allows the applications to be very specific , optimized and performant. The compiler transforms the code into a highly optimized C++ code.

Concurrency and Parallelism

When multiple execution threads operate on same data it is known as concurrency while parallelism is the case where a computational task or tasks are divided into more than one communicating processes or processors. This concept is rapidly gaining importance in current computing scenario. There are several occasions where the need of such computations can be observed. The main reason is that rate of speed or performance gain in single-processor is not improving at the pace it used to. There is always a need for efficient programming language which can understand and utilize the architecture for gaining performance using multiple cores and multiple cpus. Most of the languages which are used for parallel and concurrent programming are error-prone and inefficient.

Functional programming can be thought of as a great alternative for these languages, the semantics that we write using concept of algebra and functions can be mathematically remodeled to implement concurrency so that parts of program executed by one thread can be executed simultaneously with parts executed with other threads. It must be impossible for one execution thread to modify data that another one is reading or writing at the same time. So, if several threads need to modify a data item, they must do so in a coordinated way and such coordination can be easily modeled by using functional programming strategies.

Functional Programming in Soft Computing

Soft computing is a collection of techniques in computation which comprises of artificial intelligence, machine learning, fuzzy logic and traditional mathematics as well. Its an attempt to study and analyze very complex phenomena which were either left unsolved or were inefficiently solved by conventional methods. In the fields like rough sets, fuzzy sets or fuzzy rough sets, we need to derive functions for modeling data models based on which further data predictions can be made. In such situations functional programming is very useful. There are several packages which were specially designed for such purpose. Languages like Java or C were unable to work efficiently when data size were

high. In case of machine learning the learning models can also be created and understood easily using functional programming. Functional programming provides simple, powerful, concise and persistent way to write code for such paradigms. In case of rough sets when the attributes are high in number we require storage structures to be efficient and conventional languages were unable to do that. With packages provided by functional languages one can operate on them easily.

Data Management and FP

During design or production usually a large amount of data is generated, by large industrial projects. For instance if we consider a non linear model being converted into a linear model with several operating points will have its own analysis data. These data have complex interrelationships and they evolve dynamically and needs to be kept in a consistent state as changes are made to data. Managing this kind of data unaided is difficult and error-prone. These data are usually statistically very important. Other fields like stock market also produces large amount of data that should be managed in order to predict or analyze the situations. Databases and programming languages have evolved along different lines, mainly because they were developed for different purposes. Recent attempts have been made to integrate databases and programming languages in one uniform environment, Functional Programming has also given significant contribution to enhance the way huge databases are used, let us take an example PolyEX, this language supports semantic data modeling features and have powerful structuring facilities. It also have options to define new data types and storage structure for databases.

Functional Programming in Embedded Systems

Embedded Systems development is slow and costly because it is low level nature. The programming is close to machine. We need tools which can provide abstraction to those details and let the programmer write a high level program to work on those systems. The systems on the other hand should be reliable and fast. In some situations sensors are used and those sensors analyze the data using mathematical functions. Because of these

requirements the complexity of these systems makes it even harder to develop them. We have seen a rapid increase in the number of devices using Linux environment. Development is no longer tied to hardware. Embedded applications should also use the operating system as their interface to the hardware. Those operating systems are usually real time OS and require mathematical libraries. Packages provided by functional languages lets the developer write codes for performing such mathematical calculations . There are several examples of functional programming languages , one such language is OCaml which is a general-purpose programming language that supports functional programming keeping in mind safety and reliability as well. Due to its high- performance nature this is widely used in current times. Other advatages of this language is that it supports object oriented and portability also. It consists of a huge mathematical library which allows user to write programs with less LOC.

Conclusion

We have seen the huge and promising possibility of the use of functional programming in various domains which are dominated by imperative and data driven approaches which were implemented

in low level languages. We then pre-sented the examples demonstrating the areas where functional programming found its application which is not limited to mathematics and computer sciences. We also demonstrated its use in soft computing and saw how it helps when the data is big and important. Another thing that was discussed is that we can write scripts based on functional languages by converting the syntax into XML type semantics.

References

- 1) *Peter Aczel and Non-Well-Founded Sets Number 14 in CSLI Lecture Notes. Stanford University, 1988*
- 2) *Florent Balestrieri, The undecidability of pure stream equations. Draft paper, 2011.*
- 3) *Coalgebras in functional programming and type theory. Venanzio Capretta . Theoretical Computer Science 412 (2011)*
- 4) *M. Frigo and S. G. Johnson "The Design and Implementation of FFTW3", Proc. IEEE, vol. 93, no. 2, pp.216-231 2005.*
- 5) *J. Karczmarczuk "Scientific Computation and Functional Programming", Computing in Science and Eng., vol. 1, no. 3, pp.64-72 1999.*
- 6) *Bird R, Introduction to functional programming Prentice Hall 2000.*
- 7) <http://www.haskell.org>

A Review on Democratization of Machine Learning in Cloud

Ms. Shalini Pathak*
Mrs Rama Bhardwaj**

ABSTRACT

This paper gives you detailed information about the use of autonomous policy in machine learning so that the use of democratization may easily direct to "Cloud based open-source machine learning APIs". By going through this paper you'll able to learn how we can use "Democratization of Machine Learning in Cloud" for the development of benefit of Women.

Keywords: Machine Learning, APIs, Cloud, Democratization

Introduction

The name Machine Learning came into subsistence by Arthur Samuel in 1959. According to him, "Machine learning is the ground of study that gives computers the capability to learn without being unambiguous programmed."

By Tom Mitchell, "The field of Machine Learning is apprehensive with the question of how to construct computer programs that automatically progress with experience."

Machine Learning was once something that only large companies or organizations could invest because these organisations can afford programmers and data scientists for construction complex machine learning frameworks. Companies like Google, Amazon and Netflix were among the few who had used their assets to take advantage of machine learning. But this is no longer the case.

New tools and technologies are enabling the regular companies or organizations to take the benefit of machine learning. The idea of making amazing easy to get to to everyone is called Democratization.

Google, Apple, Facebook, Microsoft and other tech giants are on the forefront and are vigorously investing in democratization of machine learning. In the modern years, these companies have open sourced many AI/ML libraries, tools.

Machine Learning

Machine learning is a acquaintance that is used so that the intricate task performed by the human can be easily performed at a much superior speed and with more effectiveness .Machine learning is sub-categorized to three types: Supervised Learning – Guide Me! Unsupervised Learning – Learn from the surrounding Reinforcement Learning – My life My rules! (Hit & Trial)

Supervised learning is a learning in which a machine learns from the instruction data set. It can't take resolve on its own .It will equivalent every decision with the predefined set that has already been cache in it. In the case of unsupervised learning ,machine grasp from the environment Assume we made a Robot to perform the convinced task, say, to put the books from one table to a different but we have not distinct the scope of the room or the distance between the two tables. In this case The Robot will

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itself find the best promising path after deteriorating for a number of times and will primarily complete the definite task. Reinforcement learning works on either 0(failure) or 1(success). If the machine chooses a exact option it will be measured as success or vice versa.

Democratization of machine learning means giving gain of machine learning to regular people also .As Democracy merely means for the people, to the people and by the people.

This means they will bring assistance in favor of themselves. Democratization of machine learning in Cloud will give them adequate storage to bring their thoughts into action as most of the people can't afford it. APIs (Application Programming Interface)-It is a software that allows communication between two applications. It serves as the interface or medium between the applications to exchange the useful information. In technical terms, It is a set of function definitions, protocols and various tools that are needed to build a software

In this paper we are going to explain few machine learning tools that have been recently released for AI start-ups, developers, and researchers.

These are as follows:

- I. Tensor Flow Object Detection API- Machine Learning systems for computer vision has been developed by Google for improving their products and services and for research community.

It is a very powerful tool that enable everyone (even those who do not belong to machine learning background) to build and deploy powerful image recognition software. The functionality of Object Detection API comes with the Mobile Nets single shot detector optimized to run on mobile devices. It has been designed for the limited computational and power resources of smart phones.

Mobile Nets makes it easier for mobile developers to integrate the machine learning functionality into their mobile applications .Anyone who wants to use AI/ML functionality in their desktop, Object Detection API provides a heavy duty inception based CNN (convolution Neural Network) that is optimized for heavy data processing. In both cases Object Detection API makes it easier to integrate image recognition functionality into their software.



Fig 1. Illustration of Tensor Flow Detection API

Google's Cloud Video Intelligence API

The video Intelligence API allows developers to figure out what videos are about and detecting objects within them. Many similar image recognition APIs are available focusing only on images. But with the help of this API, developers can search and discover information in videos. This means we can search for "apple" or "cat" or "flower" or anything in the video. Besides this, the API helps us to tag scene changes in a video but those videos have to be stored in Google's cloud storage service. Cloud Video Intelligence has been improving over the time as new concepts are introducing and accuracy has been improving. We can search our video catalog in the same way as we search for the text document. Cloud Video Intelligence extracts metadata that can be used index the content of our

video. We can identify the signal mixed with noise, by using shot detection to distinguish scene changes within a video and discern only relevant entities at the video, shot or frame level. Since Video Intelligence API is provided as a REST service, there is no need to download any library or software. We just only need to do registration on the Google Cloud Platform and begin using Video Intelligence API via the standard cloud pay-as-you-go scheme. This API is majorly used in the videos of large duration. For example (fig 2), Now-a-days people uses CCTVs to protect themselves and/or to see what was happening in their absence. So if they want to search a man having a black cap, they can simply search this with the use of this API that will help in saving their time.

Intelligence and Accuracy have been improving.



Fig 2. Depicting Video Intelligence API

Apple's Core Machine Learning

In June 2017, Apple released its Core Machine Learning API that has come with ios11 designed to make AI faster on its iPhones, iPad, and Apple Watch products. This API includes most of the machine learning operations such as

image and face recognition, object detection, natural language processing (NLP).It supports a variety of machine learning models including neural (deep,

convolution recurrent),linear models and decision trees . Core machine learning model format (models with all model file extension). The Core Machine learning model has been used to integrate machine learning models into the app. A trained model is the combination of machine learning algorithm and set of training data. This model makes predictions based on the input data. For example when the number of bedrooms and bathrooms are provided as the input, this model predicts the house prices.

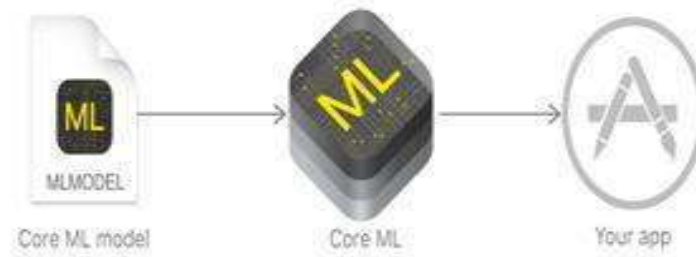


Fig 3. Apple's Core Machine Learning

It is a service released in November 2016 as a part of AWS (Amazon Web Services) artificial intelligence suite to convert text into speech. It uses deep learning technology that allow applications to speak with a human like voice. This system supports 24 languages and multiple voices. We just only need to upload the text into the AWS console, select one of 24 languages (of our choice) and customize pronunciation and download audio files from the cloud to our local machine.

Amazon Polly has many applications. It is used by Go Animate users to immediately give voice to the characters they animate using this platform. It has also been used by a website named duo lingo where

accurate pronunciation is more important than when we're learning a new language.

Microsoft Emotion API

This API has been provided as a part of Microsoft Azure Cloud Services. This API recognizes human emotions in images and videos. This API recognizes human expressions in an image and returns a face identification boundary box. It detects happiness, sadness, surprise, anger, fear, contempt, and disgust. It returns emotions of a number of faces in a video over a period of time. The Emotion API uses JSON for data exchange and API keys for authentication.

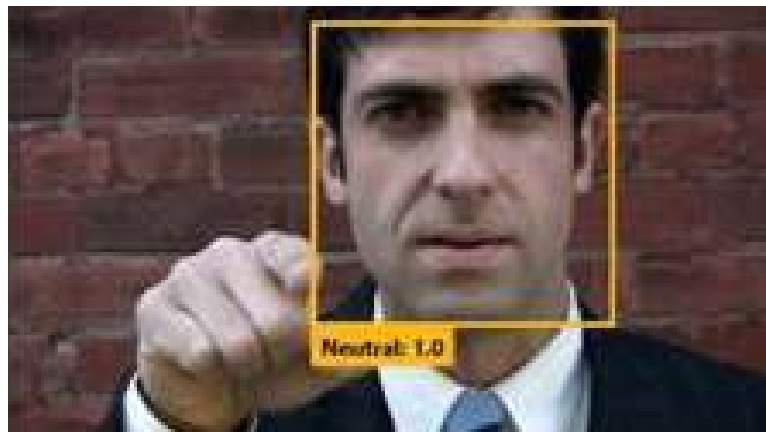


Fig 5 .Detecting Emotion via Azure

To start using Microsoft's tool, we need to send a POST or GET request to specified URLs and a detailed description in JSON as a result in response. Microsoft offers an

SDK (Software development kit) which is integrated with our application. The API can do 30,000 transactions with the images and 300 operations with the videos per month.

Apache Spark

It is a powerful open source processing engine which is easy to use with various APIs written in java, python, R, Scala and Sql. E-commerce companies like Alibaba, Social Networking companies like Tencent and Chinese search engine Baidu, all runs on apache spark engine.

Spark is a general purpose computing engine that allows you to run batch interactive and streaming jobs on the cluster using same unified frame.

To understand the working of spark you have to understand three big concepts:

First is RDD (Resilient Distributed Data Sets)- It is the representation of data that coming into your system in an object form and allow you to do computations on it .RDD are resilient because they rely on lineage whenever there is failure in the system they can recompute themselves using the prior Information using lineage .

Second concept is transformation-It is what you do to RDD to get other resultant RDD .Example of transformation is opening file and creating RDD or doing function like filter that would then create other resultant RDD. Third concept is actions. It is when you are asking for an answer that system needs to provide you.

The interesting thing about spark is that it does lazy evaluation means RDD are not loaded or pushed into system when the system encounter RDD they are only done when the action to be performed.

Benefits

- a) Fault Recovery
- b) Optimized
- c) Easy Programming
- d) Rich Library Support (ML, Graphics)

Conclusion

Life style of people are changing and not only the life style their attribute towards the lifestyle is also changing which encourage Women for their further education using latest technologies. To understand the ability and use of technology can have positive

impact on Women's freedom, education and employment. There is large population so that they want to invest less time and get maximum returns. Artificial intelligence, Machine learning or Neural Network is a technique to make things smart.

Reference

- [1] Manuel Fernandez-Delgado, Eva Cernadas, Senen Barro, and Dinani Amorim. *Do we need hundreds of classifiers to solve real world classification problems* *Journal of Machine Learning Research*, 2009
- [2] Elliot Turner-*Enhancing your cloud applications with artificial intelligence*
- [3] Anand Avati, Kenneth Jung, Stephanie Harman, Lance Downing, Andrew Ng, and Nigam H Shah. *Improving palliative care with deep learning*. *arXiv preprint arXiv:1711.06402*, 2017.
- [4] Sushmito Ghosh and Douglas L Reilly. *Credit card fraud detection with a neural-network*. *In System Sciences, 1994. Proceedings of the Twenty-Seventh Hawaii International Conference on*, volume 3, pages 621–630. IEEE, 1994.
- [5] Sherif Halawa, Daniel Greene, and John Mitchell. *Dropout prediction in moocs using learner activity features*. *Experiences and best practices in and around MOOCs*, 7:3–12, 2014.
- [6] Jiazhen He, James Bailey, Benjamin IP Rubinstein, and Rui Zhang. *Identifying at-risk students in massive open online courses*. *In AAAI*, pages 1749–1755, 2015.
- [7] James Max Kanter and Kalyan Veeramachaneni. *Deep feature synthesis: Towards automating data science endeavors*. *In Data Science and Advanced Analytics (DSAA), 2015*. 36678 2015. *IEEE International Conference on*, pages 1–10. IEEE, 2015.
- [8] James Max Kanter, Owen Gillespie, and Kalyan Veeramachaneni. *Label, segment, featurize: a cross domain framework for prediction engineering*. *In Data Science and Advanced Analytics (DSAA), 2016 IEEE International Conference on*, pages 430–439. IEEE, 2016.
- [9] Arti Ramesh, Dan Goldwasser, Bert Huang, Hal Daumé III, and Lise Getoor. *Modeling learner engagement in moocs using probabilistic soft logic*. *In NIPS Workshop on Data Driven Education*, volume 21, page 62, 2013.
- [10] D Sculley, Todd Phillips, Dietmar Ebner, Vinay Chaudhary, and Michael Young. *Machine learning: The high-interest credit card of technical debt*. 2014.

- [11] Haoran Shi, Pengtao Xie, Zhiting Hu, Ming Zhang, and Eric P Xing. *Towards automated icd coding using deep learning*. arXiv preprint arXiv:1711.04075, 2017.
- [12] Artur Kiulian Partner at Colab, helping startups build tech products. Author of "Robot Is The Boss: How To Do Business with Artificial Intelligence."
- [13] Burstein J., Leacock C., Chodorow M. (forthcoming) *Criterion On-line Essay Evaluation: An Application for Automated Evaluation of Student Essays*. To appear in *Proceedings of the Fifteenth Annual Conference on Innovative Applications of Artificial Intelligence, Acapulco, Mexico, August, 2003*.
- [14] Achindra Bhatnagar-Azure Cognitive Service Emotion API
- [15] Baldi, P. and Brunak, S. (2002). *Bioinformatics: A Machine Learning Approach*. Cambridge, MA: MIT Press
- [16] Baldi, P., Frasconi, P., Smyth, P. (2003). *Modeling the Internet and the Web - Probabilistic Methods and Algorithms*. New York: Wiley.
- [17] Bishop, C. M. *Neural Networks for Pattern Recognition*. New York: Oxford University Press (1995)

Automatic Service Provider

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ABSTRACT

The Internet of Things (IoT) is a system of interrelated electronic devices that are capable of transferring information with the help of internet without any human interaction, but it does not provide any information related to the working of devices to users via the internet. By taking the benefit of the high-speed internet, a technology called AUTOMATIC SERVICE PROVIDER (ASP) is proposed in this paper. ASP is based on the HOST-NODE architecture in which different NODES are connected to a single HOST so that HOST can collect information of devices connect to different NODES and send it to the server via the internet.

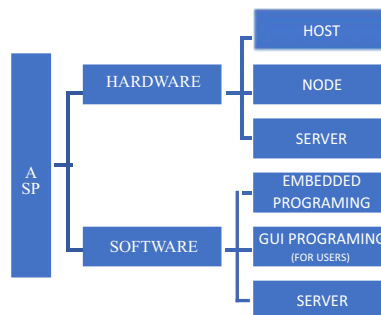
HOST-NODE architecture is designed using sensors/transducers, relay/semi-conductor switches, micro-controller, a microprocessor. Using microprocessor gives modified data to the users. This technology helps in saving the time of users and service providers and increases the selling of devices attached with the ASP.

Keywords- HOST-NODE, ASP, IoT, Sensor Relay/Power Semiconductor Switches

Introduction

In today's world, everyone is surrounded by the electronic devices and by this many problems occurs with the users using it[1]. As these devices are not designed in such a way that it gives information about the working condition of it, because of which no one can know about the real-time information about the electrical and electronic appliances; to solve this problem ASP (AUTOMATIC SERVICE PROVIDER) is introduced. ASP is used to connect a

home or small industry appliances to a HOST via different NODES. ASP provides the flexibility to the users that user connect multiple nodes (different nodes for different works) to a single host and host is connected to the user through Internet/Wi-Fi network [2]. In this way, the user does not require a lot of wireless network for controlling the nodes. The users only connect with HOST and control all nodes and also take the conditions of the appliances which are connected with nodes. In ASP whole system is work on two major parts :



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ASP also has the ability to send critical information of appliances and send a notification to the user as well as service provider [3].

This is a very new way to use sensors controller and processors with IOT to make electrical and electronics user-friendly using advanced programming [2][4][5]. Here define the proposed architecture of ASP.

Proposed Architecture Of Automatic Service Provider (ASP)

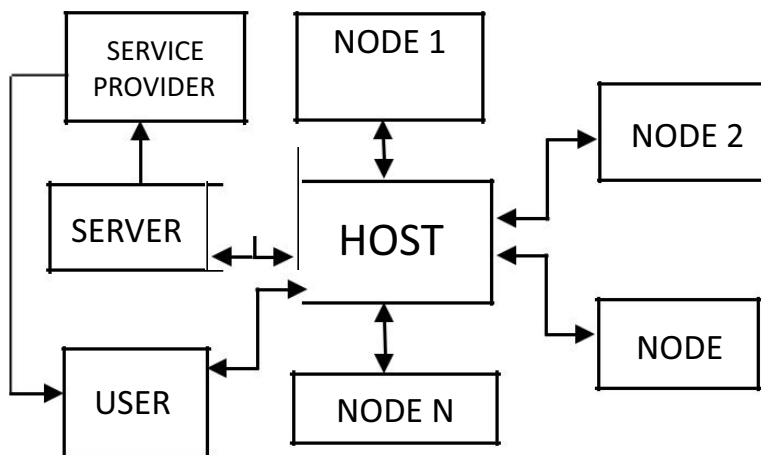


Fig 1. Proposed block diagram of ASP

ASP is able to provide the information of any device connected to it and also able to control it wirelessly.

Here we are using two modules -

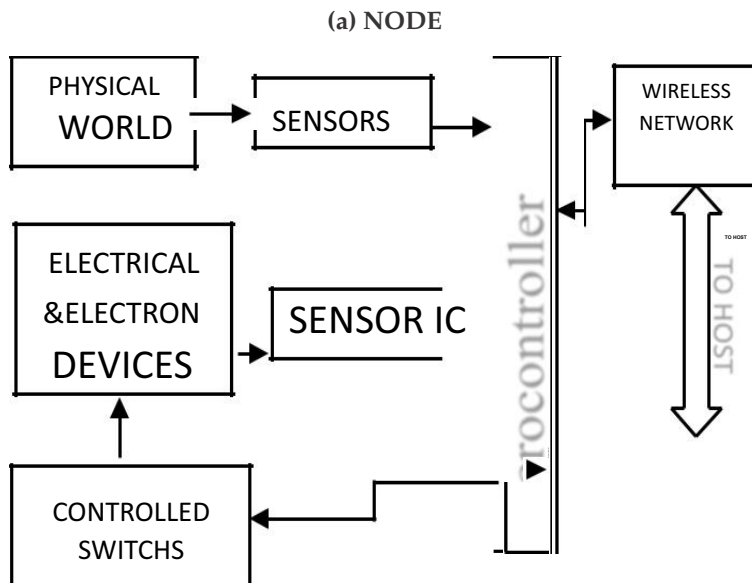


Fig 2. Proposed block diagram of NODES

Node is a controller, sensor and switches based module which is designed for the specific task [3]. Nodes provide the flexibility to the user for automation to a specific task

[6] For an individual work specific node will used. All nodes are able to perform their specific task via using of different type of sensors, transducers, switching devices and smart algorithms. For connectivity nodes have a wireless connectivity [7]. There are some concepts for some nodes:

1. Device control and device health control (use for controlling home or small industries appliances)

2. Liquid node (used for measuring flow of liquid and sensing liquid)
3. Environment sensing module (use for temperature sense, humidity, harmful gas radiation etc.)
4. Entering control nodes (use for door locking and opening identifier and control nodes) [9] [10] and many other nodes which are all specific in its field.

All nodes are wirelessly connected to other module called host.

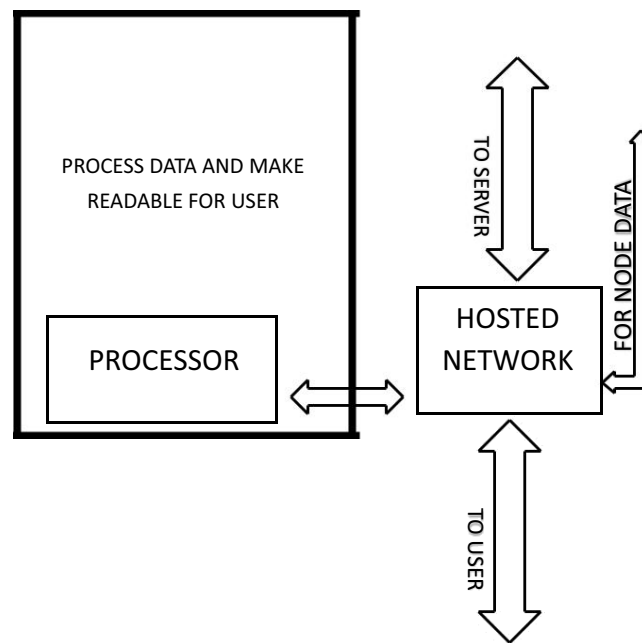
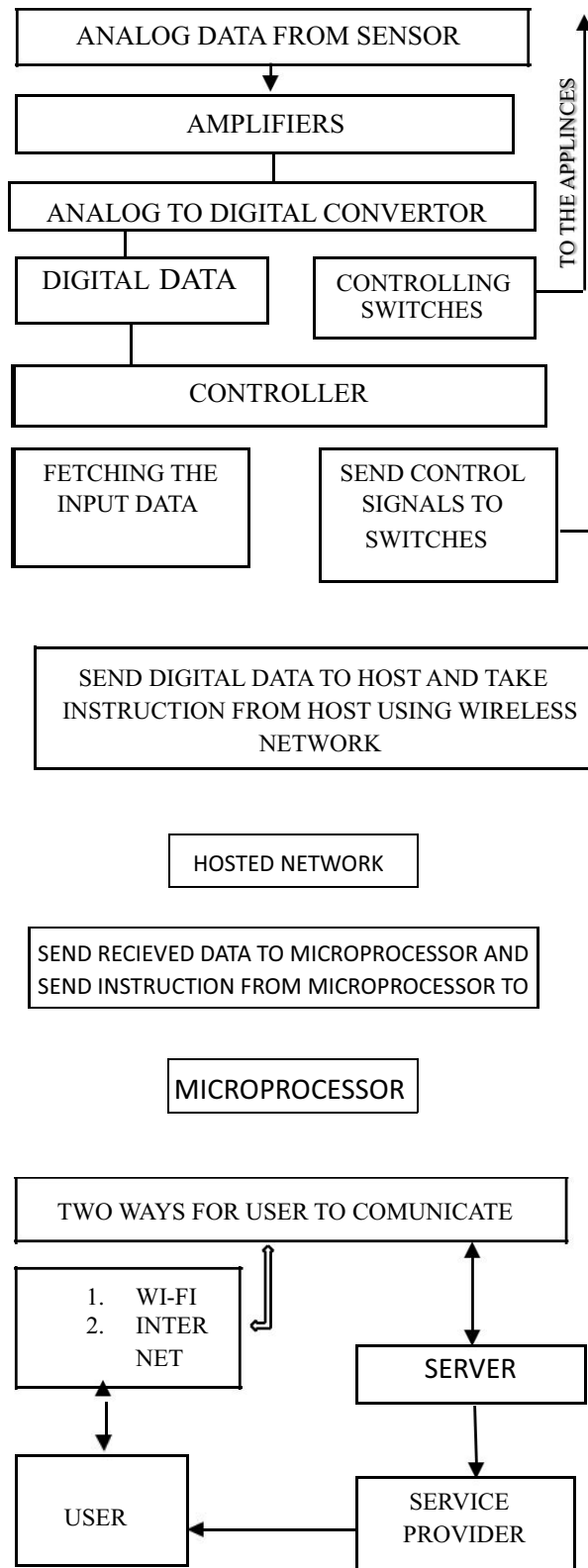


Fig 3. Proposed block diagram of HOST

It's a processor-based module used for connecting nodes and analyzing data, then it provides information of nodes to the user about the appliances/product connected with node[4]. It's a module which is defined for one or more nodes and is also wirelessly connected[8][7]. It uses Wi-Fi hotspot to connect the nodes. This is why it's less complex. It can also connect to the internet and send

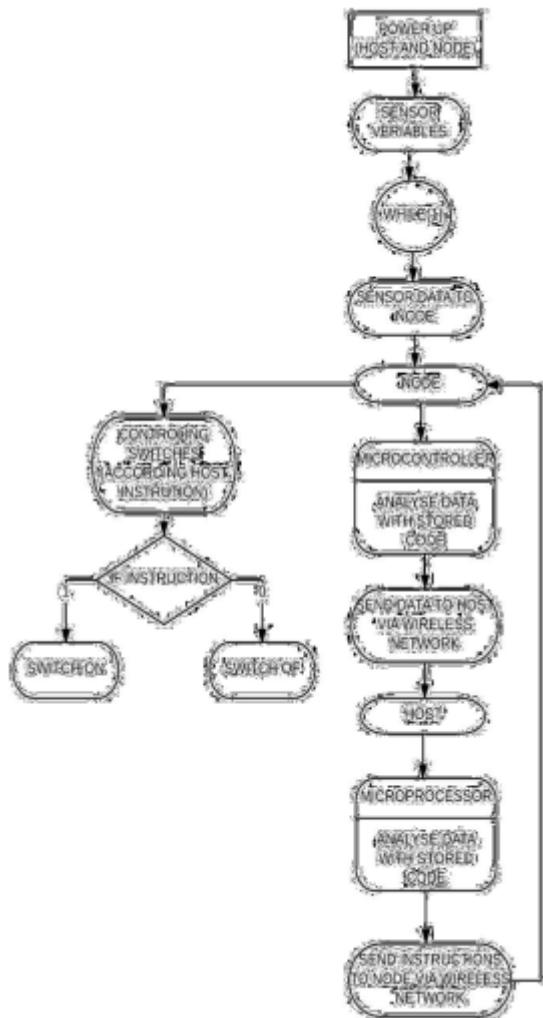
data to the database and also send the information of the connected appliances to users and provide flexibility to control them[5][12]. For a large number of nodes, we require only one host which is especially a one board computer (like pi boards) [1] [11].

Proposed flow diagram of AUTOMATIC SERVICE PROVIDER (ASP)



IV. (a) Proposed ALGORITHM FOR sensor data reading and controlling the switch

1. Firstly define sensor variables.
 2. While(1).
 3. Sensor data to node.
 4. Micro controller analyse sensor data.
 5. Send analysed data to host via wireless network.
 6. Microprocessor analyse data with store codes.
 7. After analysing data give instruction to node for controlling switches.
 8. If (instruction==1) Switch= ON.
If (instruction==0) Switch= OFF
 9. Go to statement 2.
- (b). Flow chart for sensor data reading and controlling the switch



V. (a) Proposed ALGORITHM for HOST-NODE connection

Firstly node will search for hosted network if hosted network available and same IP address which is feed in node; node send a request to host for establishing a connection

1. Now host check node previously connected or not.
2. If connected previously
3. Accept the request of the node
4. If not previously connected
5. host check authentication of node from the server
6. if node is authorised for that host
7. jump to statement 4
8. if node is not authorised
9. denied the node request

(b) Flow chart for HOST-NODE connection

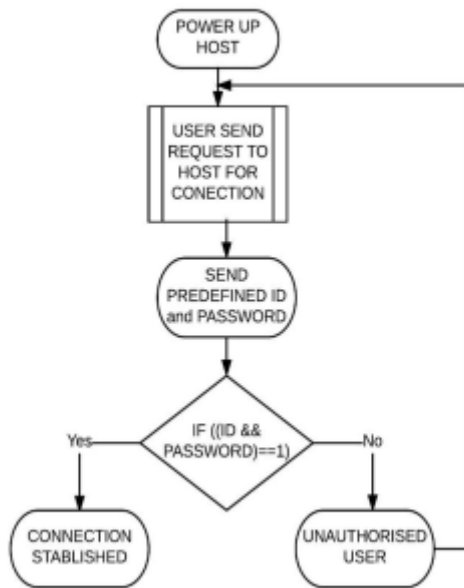


VI. (a) Proposed ALGORITHM FOR host to user Connection

In ASP multiple NODES are controlled by a single host and host is controlled by user. For authorised user host provide authentication to user for instructing host.

1. Firstly user send authentication request to host.
2. Host checks the authorised user by matching user ID and PASSWORD.
3. IF (ID & PASSSSWORD MATCHED)
4. Authorised user-connection established. else unauthorised connection- authentication failed.
5. Jump to statement 1 for new user.

(b). Flow chart for host to user connection



Conclusion

Automated house and industry are like the rising future in present time. The automatic service provider is the best solution for home as well as an industry where electrical and electronic appliances are connected to the host network wirelessly with efficient and economical manner.

The ASP design technique depends upon:-

- High sensing elements. (sensors and transducers).
- Controlling and processor by microcontroller and processor.
- Networking where the server will have all the information and directs and save for future reference.

The ASP provides a single host platform connected to a number of nodes via WiFi. A single system that is confined to a particular node is extended so as to accommodate various node systems on a single host network at the same time and it reduces the power consumption, cost and increases speed.

Future work

The parallel function of various node processed and controlled by a single processor and microcontroller make this system available to the hands of middle-class family. The server that collects and save data can be used if further improvement of existing techniques. The number of appliances set up in different houses give the runtime information to the server, server can make an average rating of all appliances set up in different houses of the same brand and if the working of that brand Detroit before the warranty /guarantee time told, the server will send message to that provider to improve its appliances, hence the feedback will help the user to opt better brand and brand provider to improve their product.

References

- [1] Eben Upton and Gareth Halfacree, *Raspberry Pi User Guide, 4th ed., vol. 1.* John Wiley & Sons Ltd., 2012, pp. 18-28.
- [2] *Computer Organization and Embedded Systems*, Carl Hamachre, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, 2nd ed., McGraw-Hill, 1996.
- [3] Elecia White, *Making Embedded Systems: Design Patterns for Great Software, 1st ed., vol. 1,* O'Reilly Media, Inc, 2011, pp. 151-178.
- [4] Ramesh S. Gaonkar, *8085 Microprocessor, 5th ed.,* Prentice Hall, 2002.
- [5] Neil Matthew and Richard Stones, *Beginning Linux Programming, 2nd ed.,* Wrox Press Ltd. pp.690-735
- [6] S. Sen, J. Wang, "Analyzing peer-to-peer traffic across large networks", *IEEE/ACM Trans. Networking*, vol. 12, no. 2, pp. 219-232, 2004.
- [7] K. Balasubramanian, A. Cellatoglu, "Analysis of remote control techniques employed in home automation and security systems", *IEEE Trans. on Consumer Electron.*, vol. 55, no. 3, pp. 1401-1407, Oct. 2009.
- [8] B. Yuksekkaya et al., "A GSM internet and speech controlled wireless interactive home automation

- system", *IEEE Trans. on Consumer Electron.*, vol. 52, no. 3, AUGUST 2006.
- [9] Rajeshwari M., Santhosh Hebbar, Praven Raj, Varaprasad G., "Automatic Detection and Notification of Potholes and Humps on Roads to Aid Drivers", *IEEE Sensors Journal*, Vol. 15, No. 8, pp. 4313–4318, March 2015.
- [10] Busra Ozdenizci, Mohammed Alsadi, Kerem Ok, and Vedat Coskun, "Classification of NFC Applications in Diverse Service Domains," *International Journal of Computer and Communication Engineering*, Vol. 2, No. 5, pp. 614–620, 2015.
- [11] M. V. Bueno-Delgado, P. Pavón-Marino, A. De-Gea-García, A. Dolón-García, "The Smart University Experience: A NFC-based Ubiquitous Environment", In *Proceedings of International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing*, pp. 799–804, 2012.
- [12] A.C. Kaveri, T. Jyothi, "Smart Home System Control Using GSM", *International Journal of Engineering and Computer Science*, Vol. 4, No. 7, pp. 13289–13291, 2015.
- [13] D.U. Jiang, Y.I. He-sheng, "Design and implementation of signatures-based P2P traffic identification model [J][J]", *Application Research of Computers*, vol. 11, pp. 092, 2009.

Internet of Things and It's Applications- A Review

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ABSTRACT

These days Internet of Things (IoT) picked up an incredible consideration from analysts, since it turns into a vital innovation that guarantees a keen person life, by permitting an interchanges between items, machines and each thing together with people groups. IoT speaks to a framework which comprises things in reality, and sensors appended to or consolidated to these things, associated with the Internet by means of wired and remote system structure. The IoT sensors can utilize different sorts of associations, for example, RFID, Wi-Fi, Bluetooth, and ZigBee, notwithstanding permitting wide territory network utilizing numerous advancements, for example, GSM, GPRS, 3G, and LTE. IoT-engaged things will share information about the condition of things and the enveloping condition with people, programming systems and diverse machines. In this paper we review an idea of numerous IoT applications.

Keywords – IOT, Smart Cities, Smart Home and Buildings, Smart Home and Buildings, Smart Energy and the Smart Grid, Smart Health, Smart.

By building up the IoT innovation, testing and sending items it will be much near executing shrewd situations by 2020. Sooner rather than later, stockpiling and correspondence administrations will be exceptionally inescapable and dispersed: individuals, machines, shrewd items, encompassing space and stages associated with remote/wired sensors, M2M gadgets, RFID labels will make a very.

Introduction

The Internet of Things (IoT), at times alluded to as the Internet of Objects, will change everything including ourselves. The Internet affects training, correspondence, business, science, government, and mankind. Obviously, the Internet is a standout among the most fundamental and incredible signs in the majority of humankind's history and now with the possibility of the snare of things, web ends up being increasingly perfect to have a brilliant life in every perspective.

Internet of Things is another innovation of the Internet getting to. By the Internet of Things, objects

perceive themselves and get insight conduct by settling on or empowering related choices thinks to the way that they can impart data about themselves. These articles can get to data that has been accumulated by different things, or they can add to different administrations. Figure 1 surveys that with the web of things, anything's will ready to impart to the web whenever from wherever to give any administrations by any system to anybody.

By building up the IoT innovation, testing and sending items it will be much near executing shrewd situations by 2020. Sooner rather than later, stockpiling and correspondence administrations will be exceptionally inescapable and dispersed:

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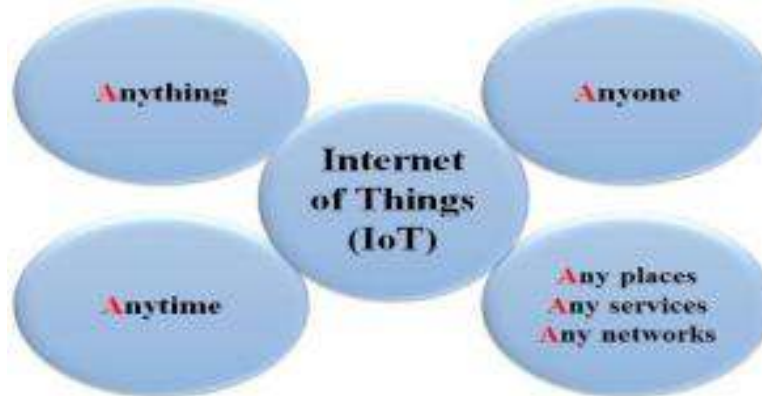


Figure 1

individuals, machines, shrewd items, encompassing space and stages associated with remote/wired sensors, M2M gadgets, RFID labels will make a very decentralized assets interconnected by a dynamic system of systems.

In the IoT, the correspondence dialect will be founded on interoperable conventions, working in heterogeneous conditions and stages. IoT in this setting is a non specific term and all articles can assume a functioning part to their association with the Internet by making brilliant situations, where the part of the Internet has changed.

Internet of Things Applications

Internet of things guarantees numerous applications in human life, making life simpler, protected and smart. There are numerous applications, for example, smart cities, homes, transportation, energy and smart environment.

A- Smart Cities

Numerous cities communities were bolstered by smart ventures, similar to Seoul, New York, Tokyo, Shanghai, Singapore, Amsterdam, and Dubai. smart

cities communities may in any case be seen as a urban communities without bounds and brilliant life, and by the advancement rate of making keen urban communities today's, it will turned out to be extremely plausible to enter the IoT innovation in urban

communities improvement. Brilliant urban communities request require cautious arranging in each stage, with help of assention from governments, subjects to actualize the web of things innovation in each angle. By the IoT, urban areas can be enhanced in numerous levels, by enhancing framework, improving open transportation diminishing activity blockage, and protecting residents, solid and more occupied with the network. By association all frameworks in the cities communities like

transportation framework, human services framework, climate checking frameworks and so forth., notwithstanding bolster individuals by the web in each place to getting to the database of air terminals, railroads, transportation following working under determined conventions, cities areas will end up more astute by methods for the internet of things.



Figure 2

B- Smart Home and Buildings

Wi-Fi's advances in home computerization have been utilized essentially due to the organized idea of conveyed gadgets where electronic gadgets, for example, TVs, cell phones, and so on are typically upheld by Wi-Fi. Wi-Fi have begun ending up some portion of the home IP arrange and due the expanding rate of reception of versatile registering gadgets like advanced cells, tablets, and so on. For instance a systems administration to give web based gushing administrations or system at homes, may give an expect to control of the device helpfulness over the framework. In the meantime cell phones guarantee that customers approach a convenient 'controller' for the hardware associated with the system. The two sorts of gadgets can be utilized as doors for IoT applications. Numerous organizations are thinking about creating stages that coordinate the building robotization with stimulation, human services checking, vitality observing and remote sensor checking in the home and building situations. By the idea of the web of things, homes and structures may work numerous gadgets and questions keenly, of the most intriguing utilization of IoT in brilliant homes and structures are shrewd lighting, savvy ecological and media, air control and focal warming, vitality administration and security.

Wireless sensor systems (WSNs) with coordination to the Internet of things innovation will gives a clever vitality administration in structures, notwithstanding the conspicuous financial and natural additions. Web together with vitality administration frameworks additionally offers a

chance to get to a structures' vitality data and control frameworks from a PC or a cell phone set anyplace on the planet. The future Internet of Things, will give a smart building administration frameworks which can be considered as a piece of a significantly bigger data framework utilized by offices directors in structures to oversee vitality utilize and vitality obtainment and to keep up structures frameworks.

C- Smart Energy and the Smart Grid

A smart grid is identified with the data and control and created to have a brilliant vitality administration. A smart grid that incorporate the information and communications technologies (ICTs) to the power system will empower a constant, two route correspondence amongst providers and purchasers, making more unique connection on vitality stream, which will help convey power all the more proficiently and reasonably. The Key segments of information and correspondences developments will incorporate recognizing and watching progresses for control streams; automated trades establishment to transmit data over the network; splendid meters with in home show to teach vitality use; coordination, control and computerization systems to add up to and process different information, and to make an exceptionally intelligent, responsive power. Numerous applications can be taking care of because of the web of things for shrewd matrices, for example, modern, sun powered power, atomic power, vehicles, clinics and urban areas control. Figure 5 demonstrates the most critical application might be empowered by the web



Figure 4

of things as in smart grid perspective. The present framework is extremely solid and can manage ordinary power variances and it will make a stride promote towards utilizing a low carbon vitality framework, by permitting joining between the sustainable power source and green advancements, and offering numerous advantage to client in cost investment funds through productive vitality use at home.

D- Smart Health

A nearby consideration that required to hospitalized patients whose physiological status ought to be observed persistently can be always done by utilizing IoT checking advancements. For keen wellbeing sensors are utilized to gather complete physiological data and utilizations portals and the cloud to examine and store the data and afterward send the investigated information remotely to guardians for advance examination and audit. It replaces the way toward having a wellbeing proficient drop by at standard interims to check the patient's fundamental signs, rather giving a nonstop computerized stream of data. Thusly, it at the same time enhances the nature of care through steady consideration and brings down the cost of care by diminishes the cost of customary methods for mind notwithstanding information accumulation and investigation. Various social orders around the universes are encountering the terrible wellbeing since they don't have arranged access to reasonable prosperity checking and may be a suspected to be as

fundamental situation patients.. Be that as it may, with little, intense remote arrangements associated through the IoT are presently making feasible for observing to go to these patients. These arrangements can be utilized to safely catch tolerant wellbeing information from an assortment of sensors, apply complex calculations to break down the information and afterward share it through remote network with medicinal experts who can make proper wellbeing suggestions.

E- Smart Transportation and Mobility

The improvement in transportation is one of the components to show the prosperity of the nation. A street condition observing and ready application is a standout amongst the most essential of IoT change application. The fundamental thought of the idea of savvy transportation and portability is to apply the standards of group sourcing and participatory detecting. The procedure started with client distinguished the course wishes and denoted a few focuses as pothole in the advanced cell's application. The keen transportation is manage three primary originations, they are transportation systematic, transportation control, and vehicle network. The transportation logical speaks to the examination of interest forecast and oddity identification. The directing of vehicles and speed control notwithstanding movement administration are altogether known as transportation control which they quite identified with the method for the vehicles network (V2X correspondence),

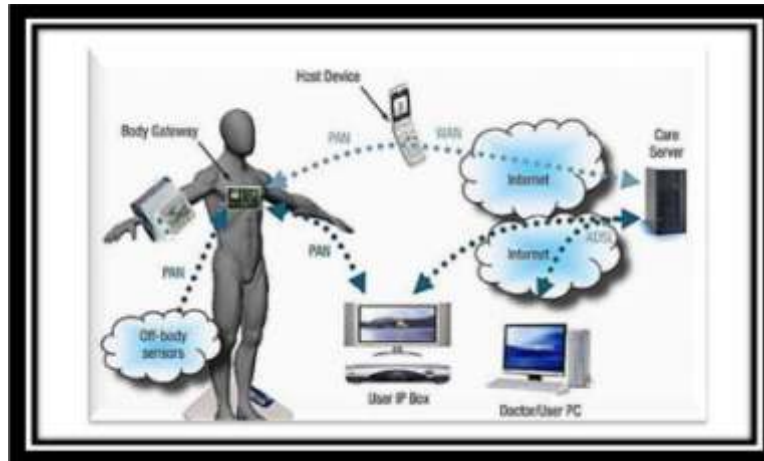


Figure 5

furthermore, general represented by multi-innovation scattering. IoT can likewise be utilized as a part of transportation is an electric vehicles, which is an essential intends to lessen both the fuel cost and the effect of a dangerous atmospheric deviation have additionally increased significant consideration from drivers. Government in numerous nations has bolstered inquires about on frameworks to screen execution of Lithium-particle (Li-on) battery for electric vehicle as investigated. The framework

exhibited was intended to distinguish the elements of Li-on control battery by getting the driving circumstance from the sensible working conditions for driver with the goal that the driver could get the possibility of the course status. This arrangement was inserted with numerous basic capacities, for example, dynamic execution trial of the Li-on battery, remote observing with on-line troubleshooting and blunder adjustment that could altogether lessen the support cost.

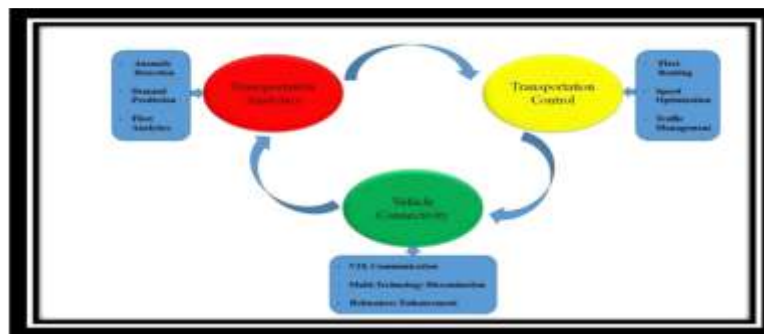


Figure 6

F- Smart Factory and Smart Manufacturing

Smart factory included other qualities in assembling unrest by coordinates computerized reasoning, machine learning, and computerization of information work and M2M correspondence with the assembling procedure. The smart factory will essentially change how items are imagined, made and dispatched. In the meantime it will enhance

laborer security and ensure the earth by empowering low emanations and low occurrence producing. These advances in the way machines and different articles convey and the subsequent manner by which basic leadership moves from people to specialized frameworks implies that assembling moves toward becoming "more astute". new innovations such ; Automation, apply autonomy, and self-ruling versatility are all gives a methods for smart manufacturing however M2M interchanges

empowered by the "mechanical" web of things will give a full importance of smart factory line and keen assembling by the method for Big Data idea which in this specific circumstance, alludes to the systematic conceivable outcomes offered by the volume and assortment of information that is created by an arranged economy to improve the mechanical procedures to inferring less support downtime, less blackouts and much lessened vitality utilization. Enterprises and assembling upset ended up a standout amongst the most created advancements these days, the development of the business advancement taken numerous ages. The original identified with the mechanical machines notwithstanding water and stream control. The second business age manage large scale

manufacturing, mechanical production systems and power. Toward the finish of the most recent century, enterprises worked under control of PCs and mechanization which perceived as third era of businesses. The savvy business as a fourth era known as industry 4.0 depends on figure physical frameworks which can ready to interface with the web. The business 4.0 idea with the web of things can accomplish an extraordinary desire for ventures determination manages numerous perspectives. By presenting the cutting edge methodology 2020 activity centering the nation's exploration and advancement arrangement on chose forward-looking tasks identified with logical and innovative improvements.



Figure 7

G- Smart Environment

Environment plays a noteworthy impact in human life. Individuals, even creatures, feathered creatures, fishes and plants might be influenced in undesirable condition. There were numerous inquires about endeavors has been paid to take care of the issues of natural contamination and waste assets. Making of a solid domain isn't simple in light of ventures and transportations squanders, with untrustworthy human exercises are every day factors that make nature harmed. Nature needs a shrewd ways and new innovations for observing and administration. Checking the earth is vital keeping in mind the end goal to evaluate the present state of the earth to takes redress life choice as indicated by gathered information from observing frameworks, and administration is needed a productive assets devouring and use notwithstanding diminish the

manufacturing plants and vehicles squanders. Both observing and waste administration give a lot of information to drive the wellbeing standard by governments or sound condition associations to secure individuals and condition, and to moderate or to evade catastrophic event that may happen. Keen condition is a vital innovation in our regular day to day existence which gives numerous offices and answers for some ecological applications, for example, water and air contamination, climate and radiation checking, squander administration, catastrophic event, and numerous other condition pointers and all may associated with every individual through home zone organize. Savvy condition gadgets incorporation with Internet of Things (IoT) innovation is created for following, detecting and checking objects of condition which give potential advantages to accomplish a green world and supportable life. There are numerous

utilizations of Internet of things in condition and that can be isolated to two primary classifications natural assets administration, and ecological quality and security administration. The assets administration identifies with every single normal asset incorporate creatures, planets and woods, feathered creatures and fishes, coal , oil , arrive, freshwater, air and substantial metals including gold, copper and iron. Every one of these assets are probably going to diminish altogether or influenced by a few components, including contamination, waste, and mishandle. IoT can gives a compelling method to convey between every one of these assets sensors with research and observing focuses to settle on suitable choices in the utilization of these sources. Sustainable assets incorporate daylight, and twist likewise can be overseen and detected to Ideal use in a few uses, for example, the arrangement of sustainable power sources. IoT can control these sources and their utilization in various imperative

applications in the earth. The IoT innovation can observing and dealing with the air quality by to gathering information from remote sensor over the city, and giving full-time geographic scope to accomplish a method for better overseeing urban activity in significant urban areas. Radiation obviously is a standout amongst the most difficult issues confronting the wellbeing of the earth. IoT will gives a methods for savvy horticulture and including extraordinary potential in asset sparing. By utilizing sensors systems, what's more, logical research databases, developing of plants and other agribusiness creations required by people like vegetables and natural products can checked and spare their generation forms in light of overseeing numerous assets, for example, climate, water and daylight. In like manner, the IoT for environmental checking can help in assessing releases from handling plants recognize woods flares or help in cultivating.

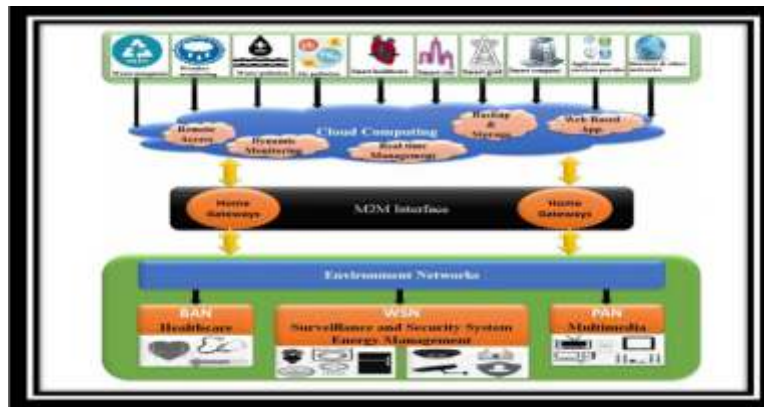


Figure 8

Conclusions

Internet of things is another innovation which gives numerous applications to interface the things to things and human to things through the web. Every protest on the planet can be recognized, associated with each other through web taking choices autonomously. All systems and advances of correspondence are utilized as a part of building the idea of the web of things such innovations are portable figuring, RFID, remote sensors arranges, and inserted frameworks, notwithstanding numerous calculations and procedures to get administration forms, putting away information, and security issues. IoT requires systematized

approach for structures, unmistakable confirmation designs, traditions and frequencies will happen parallels, each one centered for an explicit and specific use. by the web of things numerous keen applications turns out to be genuine in our life , which empower us to reach and contact with each thing notwithstanding offices numerous vital angles for human life, for example, smart healthcare, smart homes, smart energy, smart cities and smart environment. Internet of things may confront two noteworthy difficulties keeping in mind the end goal to ensure consistent system get to; the principal issue identifies with the way that today unique systems exist together and the other issue is identified with the huge information size of the IoT. Other current

issues, for example, address confinement, programmed address setup, security capacities, for example, verification and encryption, and capacities to convey voice and video flags productively will presumably be influenced in actualizing the idea of the web of things however by continuous in mechanical improvements these difficulties will be survived. The Internet of things guarantees future new advancements when identified with cloud, haze and appropriated processing, huge information, and security issues. By coordinating every one of these issues with the web of things, more astute applications will be produced as soon. This paper reviewed probably the most critical utilizations of IoT with specific spotlight on what is by and large really done notwithstanding the difficulties that confronting the usage the web of things idea, and the other future innovations make the idea of IoT plausible.

References

1. Kellman JL, Hillaire-Marcel C. "Evaluation of nitrogen isotopes as indicators of nitrate contamination sources in an agricultural watershed", *Agriculture, Ecosyst. Environ.* 2003;95(1):87-102.
2. Alahi EE. Student Member, IEEE, Li Xie, Subhas Mukhopadhyay, Fellow, IEEE, and Lucy Burkitt, "A Temperature Compensated Smart Nitrate-Sensor for Agricultural Industry". 2017;1:7333-41.
3. Dymond J, Ausseil A-G, Herzig PR A, McDowell R. "Nitrate and phosphorus leaching in New Zealand: A national perspective," *New Zealand J. Agricultural Res.* 2013;56(1):49-59.
4. Yan-e YD. Design of Intelligent Agriculture Management Information System Based on IoT *Fourth International Conference on Intelligent Computation Technology and Automation.* 2011;1:1045-9
5. Xiangyu Hu, S. Q. (n.d.). *IOT Application System with Crop Growth Models in Facility Agriculture.* IEEE 14.
6. Rifaqat A, Arup KP, Saru K, Marimuthu K, Mauro C. "A Secure Authentication and key agreement scheme using WSN for agriculture Monitoring". 2017;1:1-16.
7. Li X, Niu JW, Ma J, Wang WD, Liu CL. Cryptanalysis and improvement of a biometrics-based remote user authentication scheme using smart cards. *Journal of Network and Computer Applications.* 2011;34(1):73-9.
8. Hsieh W-B, Leu J-S. A robust user authentication scheme using dynamic identity in wireless sensor networks. *Wirel Pers Commun.* 2014;77(2):979-89.
9. Wang D, He D, Wang P, Chu C-H. Anonymous two-factor authentication indistributed systems: certain goals are beyond attainment, *IEEE Trans. Depend-able Secure Comput.* 2015;12(4):428-42.
10. Das ML. Two-factor user authentication in wireless sensor networks, *IEEE Trans. Wirel Commun.* 2009;8(3):1086-90.
11. He D, Gao Y, Chan S, Chen C, Bu J. An enhanced two-factor user authentication scheme in wireless sensor networks., *Ad Hoc Sensor. Wirel Netw.* 2010;10(4):361-71.
12. Mamishev AV, Sundara-Rajan K, Yang F, Du Y, Zahn M. "Interdigital sensors and transducers," *Proc. IEEE.* 2004;92(5): 808-45.
13. Tomo P, Nedeljko L, Ana P, Zarko Z, Bozo K, Slobodan D."Architecting an IoTenabled platform for precision agriculture and ecological monitoring. A case study". 2017;255-6.
14. Lu Y, Li L, Peng H, Yang Y. An energy efficient mutual authentication and key agreement scheme preserving anonymity for wireless sensor networks. *Sensors.* 2016;16(6):837

Home Automation System Based on Internet of Things (IOT) Approach

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ABSTRACT

In today's technological world, a need gives rise to a new idea which further transforms into a new technology. And, as our needs of making our work easier keeps on incrementing, so does the need of producing new effective and efficient ideas for welcoming new technologies in the market. More specifically, the new technologies being introduced in the day-to-day market everyday relies over utilising time by making work easier, efficient and more smarter than before.

Especially relevant, The term INTERNET OF THINGS (IOT) has been creating a lot of buzz from quite a time. And, most importantly the impact of IOT on every other thing is quite remarkable and impeccably strong. Moreover, as we all know that IOT is a growing network over the vast population i.e. from industrial machineries to consumer home appliances. Thus, it is that impeccable technology which shares information and complete different tasks and operations while we are busy with other work or activities.

Now, the main objective of this paper is to present an overview about Home Automation System based upon Internet of Things (IOT). This paper is mainly concerned with the representation of Home automation system based on Internet of Things [IOT] approach, including the general overview of clarification of home automation system and IOT to the users. This paper includes the applications of Home automation system in day-to-day life, with the advantages and disadvantages of it. Furthermore, the paper further discusses about the various components of home automation system i.e. all about what can be the part of a home automation system. And, with all these the paper justifies about the developments and made by Home automation system over the market along with its future scope.

Keywords: *IOT, Wifi, Smart Homes, Cloud, Touch Screen, Android*

Introduction

In the world where each passing day results in rapid enhancement of technology, and also the needs of the people, the technology as a result becomes smarter and effective. We all know that, in this rapid change technology comes with innovation and creativity. Also, it makes our day-to-day work easier and more effective and efficient as comparative to the changes implemented before.

The Internet of Things (IOT) is one of the most revolutionary terms that have been creating buzz from quite a time and has been enhancing and developing lives in a much better way than it was before. It works with the basic and advanced function of rapid invention of new and innovative technologies with the perspective of betterment and enhancement of various lives. Furthermore, talking about the term IOT, it is the combination of two major words i.e. Internet and Things. Now,

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according to the paper [1],The combination means any object or person which can be distinguishable by the real world can be connected to global system of interconnected computer networks and governs by standard protocol.

Home Automation System

Generally, according to [2], Home automation or domotics is building automation for a home, called a smart home or smart house.A home automation system will control lighting, climate, entertainment systems, and appliances. It may also include home security such as access control and alarm systems. When connected with the Internet, home devices are an important constituent of the Internet of Things.

Home automation system is the process, with the virtue of which, home appliances can be controlled automatically with numerous of control system technologies.Further, the home automation system works by connecting various controlled devices to a central hub or we can say a "gateway". Now on practical basis, home automation system can be applied in our homes, work places, etc. The electronic appliances or the electrical appliances used in various fields or homes can be controlled and managed using various control techniques. The appliances may be Lights, fan, timers, security systems, or air conditioning, ventilation systems.

More specifically, Home Automation System provides the users control and access over the various appliances or devices in their homes. It provides the facility of controlling and managing the appliances in the home from a mobile device without the restriction of place i.e. it gives access to control from anywhere in the world.

Home Automation System Using IOT

In reality, the introduction of technology or new techniques for the purpose of making our homes smarter and for providing comfort, stability, security within the home environment to the people occupying it is regarded as HOME AUTOMATION. However,[3]Adding intelligence to home environment can provide increased quality of life. With the introduction of the Internet of Things (IoT), the research and implementation of home

automation are getting more popular. Presently many researches have done that provide many home automation facilities with the proliferation of IOT.

Most noteworthy, Home Automation System can be classified into three important parts that are represented by the following:

1. Hardware
2. Software or Applications
3. Protocols(Communication protocols)

Additionally, all of the above parts are individually essential and important for the purpose of constructing smart homes and an effective and comfortable experience for the occupants residing in the homes. First of all, it's as essential as any other part of it would be i.e. only an accurate and correct hardware enables the ability to develop an IOT prototype repeatedly and, also responds to the technology hubwith ease. As an illustration, Protocols are the set of rules and regulations needed to govern any system or technology and to avoid any performance bottlenecks. Thus, communication protocol is an important and major part which with proper testing and consideration helps the occupants and the customers in building better and smart homes.

Applications

Certainly, Home automation system can be acknowledged as a step forward towards Internet of things i.e. in which every technology or system has a defined or assigned IP address and can also be accessed or managed remotely or wirelessly. With this in mind, following are the various applications and technologies of Home automation system using IOT:

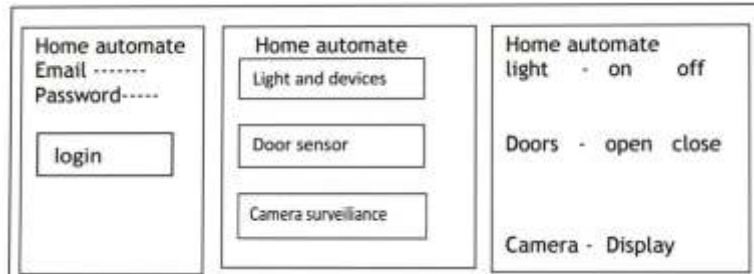
- **Light and Devices:** The user can check the status of the outside light and turn on and off the light without the need to get out of bed. These devices are also benefitting users with limited mobility that may have a difficult time getting to or even reaching their light switch.[3]
- **Webcam Surveillance:** A webcam is a video camera that feeds or streams its image in real time to or through a computer to computer network. When "captured" by the computer, the

video stream may be saved, viewed or sent on to other networks via systems such as the internet, and email as an attachment.[3]

- **Magnetic Door Sensors:** This Magnetic Door Sensor is essentially are switched, encased in a plastic shell. Normally the reed is open (no connection between the two wires). The other

half is a magnet. When the magnet is less than 13mm (0.5") away, the reed switch closes. They are often used to detect when a door is open or close.[3]

To demonstrate, following is the representation of the above applications of Home automation system using IOT:



Applications of Home Automation System Using IOT

After the following above, there are some more essential applications of Home automation system are categorised by the given data:

- Smart Energy metres
- Smoke Detectors, Leak Detection
- IPS [Indoor Positioning Systems]
- AI [Artificial Intelligence] driven digital experiences
- Home automation system [for elderly and disabled]
- AQC [Air Quality Control]
- WQC [Water Quality Control]
- HVAC [Heating, Ventilation, and Air conditioning]
- Home security and Protection

Advantages and Disadvantages

Advantages

With every technology on its way, comes both advantages and disadvantages. Also, while looking out for any product in the market, one chooses only that product which has more number of advantages and benefits. To enumerate, whenever we think of a smart home automation, we think about the most recent technological changes or updates in the market with an important viewpoint regarding budget.

Talking about the earlier years of home automation, those were the years, months, or days which were remarked or considered as a luxury. During those days only, people had to think twice or thrice before, while going out for the purpose of opting smart home automation. But, as a phrase concludes, "Time never stops, it keeps on passing by." Thus with the invention of the latest and new innovative technologiessuch as tablets, laptops, smart or Android phones and their becoming relevantly common to day-to-day household is the main reason and the cause for breaking that particular stereotype. Therefore, following are one of the most important advantages of Home automation system based on Internet of things [IOT] approach:

- **Device or Appliance Flexibility**
 - With the uses and accommodation of new appliances and devices, home automation system technology tends to become extremely flexible. As time passes by, the quality of the devices and applianceskeeps on improving by introducing new models, new developments etc.
- **Protection and Home Security**
 - One of the best advantages or we can say features provided by Home automation system is the Protection or the security for the SMART HOMES. With Smart home technology, one would be able to lock and open door through any smart or Android phone. This particular feature indeed is one of the benefits of smart home technology. It provides surety and satisfaction to the occupant as

they won't be guessing about the security and protection of the house. With the help of this technology, we can monitor the entrances and the exits of whosoever may enter or visit the house, especially in our absence.

- **Time Saving**

- Living in a world where time passes with each and every moment full of opportunities, there's less or not enough time to think or consider about our homes. But, with Smart home technology, we can manage as well as save time and can utilise it in a better and efficient way.

Henceforth, with a clear observation on the above important advantages of Home automation system using IOT, there's a clear indication over the fact that why people have been choosing and looking always forward to this technology. Even in any market, there are numerous IOT solution providers or IOT service providers with whom people can automate their homes based on Internet of things [IOT] approach.

Disadvantages

Usually, when there's a number of pros in particular technology, then cons are also mattered equally. The cons or we may say the disadvantages of any technology helps us in rectifying and altering the weak points to develop the technology with new techniques for efficient and better working.

Living in the world of technology means proper usage and application of those technologies i.e. in order of management and proper access to home automation, one should be able to communicate, handle and work easily with the basic technology i.e. computer or laptops or even phones. Identically, it specifies that vast population isn't able to obtain Smart home technologies and neither much of them are aware regarding it. Furthermore, the people having smart home technologies without proper knowledge of its operations, do also face numerous troubles on regular basis.

Nevertheless, following are the numerous disadvantages of the cons of Home automation system based on Internet of things [IOT] approach:

- **Installation-equipment costs**

- In accordance with the complexity of the Home automation system, automation of a home can be associated with a lot of financial expenses. Further, "it costs you money if you approach a contractor from outside. And, on the other side, it costs you time if you decide to do it by yourself." Moreover, the total expenses are based upon the devices or appliances one sets up in the house including its installation cost. What adds more to the expense is the superiority of the automation system. The more and extra features or new functions a system possess, the higher it costs the owner of the house.

- **Human errors**

- With little or less knowledge of a technology, comes a number of problems. Identically, for the people owning a Smart house without much knowledge of its operations can get themselves or the system in problem. The adaptation to the new technology and the acknowledgement about it is as important as it seems. Without proper knowledge, one could create blunders or there could be many misconfigurations. The technology is only useful for those who know how to control or access it with ease.

- **COMPLEX TECHNOLOGY-**

- Learning, controlling and accessing things in life may sound easy or interesting to numerous of people, but sometimes they might become the reason of the complexities in life. Home automation system might be the appealing and interesting trend in the market, but it too consists of complexities as comparative to the old-fashioned technologies of switching "on" and "off" to any devices. Specifically, it's all upon the occupants or the users of what they want in their homes and up to what extent they want home automation in the household.

Components of Home Automation System

Every technology constitutes of some or more components without which it isn't possible to function or work. In the same perspective, the question arises about the kind of things which can or could be the part of home automation system. Well, to simplify it, the components may be anything which are capable of a certain connection to a network. And, those which can be automated, managed or controlled easily, just with the help of a remote. For people without the knowledge or

application of smart home systems i.e. who does not belong to industries or homes of rich people with the acknowledgement of smart homes, home automation can simply connect binary devices. The connection within binary devices includes switch "on" and switch "off" devices such as fans, lights, or different switches or electric locks, etc.

Now, according to the various Internet of Things [IOT] services based for Home automation system, there are numerous technological components through which Home automation based on IOT is possible. Following are those components:

Sensors , Firmware , Protocols [communication protocol], Gateway

Furthermore, The various components of a Home automation system includes a number of categories which are as follows:

Controlled devices, Sensing devices , I/O interface devices , Controllers , User Interfaces , Systemnetwork, Programming computer

Developments

According to[4], Home automation is a step toward what is referred to as the "Internet of Things," in which everything has an assigned IP address, and can be monitored and accessed remotely. Until fairly recently, automated central control of building-wide systems was found only in larger commercial buildings and expensive homes. Typically involving only lighting, heating and cooling systems, building automation rarely provided more than basic control, monitoring and scheduling functions and was accessible only from specific control points within the building itself.

Additionally, the very first and the most important benefits of Home automation system based on IOT approach are the smart appliances and devices which can be connected to LAN, through Wi-Fi or Ethernet. However, according to [4], electrical systems and even individual points, like light switches and electrical outlets, were also integrated into home automation networks, and businesses have even explored the potential of IP-based inventory tracking. Although the day is still far off

when you'll be able to use your mobile browser to track down a lost sock, home networks are capable of including an increasing number of devices and systems.

Therefore, following are some of the Home Automation Projects which became success widespread:

- Mark Zuckerberg's AI Personal Assistant Jarvis
- Zelda Ocarina Home Automation System
- DIY Smart Washing Machine(MQTT, ESP8266)
- Retro MS-DOS Light Controllers
- TV Remote Home Automation Using Arduino[5]

Future Scope

Home automation systems were developed with the view of making homes smarter and work easier. The future scope also involves the perception of making homes even more smarter than before. There would be more and more new technologies that are expected to introduce in the coming years for the purpose of home security systems. Furthermore, Homes would be interfaced with motion sensors, temperature sensors, light sensors, etc. On the other side, there would be more energy conservation in the new automation technologies as comparative to the latter technologies. The energy conservation would ensure the work done or not before turning "on" and "off" appliances and also the brightness before turning "on" or "off" the lights according to the necessity of the occupants. On more specific basis, the new automation technologies would focus on providing a centralised platform techniques to the occupant to access all the appliances without any complexity. As safety and security is also one of the key features provided by home automation system, in coming future there would be close system integration with Home safety and security solutions which will ensure the occupants a greater control and safety for their houses. And, the further objective or the aim of various Home Automation companies would be increasing the extent of various automation technologies to a large scale environment. That particularly means that the automation technologies would not be just limited to homes but also offices, factories, and many more organisations. Right now, it's accurate to say that the

home automation industry is in a re-evaluation stage. And, with time passing by, it's witnessing new technological advancements day-by-day. The next phase of the Home automation industries will include key improvements in the technology as well as the price points. In present and future too, the home automation solutions will constantly keep on evolving in terms of effectiveness, efficiency, and overall performance.

REFERENCES

- [1] SomayyaMadakam, R. Ramaswamy, SiddharthTripathi, "Internet of Things(IoT): A Literature Journal of Computer and Communications, 2015, 3,164-177<http://www.scirp.org/journal/jcch><http://dx.doi.org><http://dx.doi.org/2015.35021>
- [2] https://en.m.wikipedia.org/wiki/Home_automation
- [3] Shweta Singh, Kishore Kumar Ray, "HOME AUTOMATION SYSTEM USING INTERNET OF THINGS", in *International Journal of Computer Engineering and Applications, Special Edition* www.ijcea.com ISSN 2321-3469
- [4] <https://www.safewise.com/home-security-faq/how-does-home-automation-work/>
- [5] <https://www.amarinfotech.com/iot-home-automation-projects.html>

Analysis and Evaluation of Current Security Trends in IoT

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ABSTRACT

Internet of Things (IoT) is the next big boom in the field of networking. IoT refers to the physical devices that are embedded with Internet, electronics, software, sensors, actuators and network connectivity. This includes a very wide variety of domains like health care, wellbeing, smart home, building, smart meters and so on. IoT has no uniform architecture and we can encounter several category of attacks on different layers of IoT like unauthorized access to tags, tag cloning, sybil attack, sinkhole, denial of service attack, malicious code injection and man in the middle attack. In this paper we discussed IoT vision, existing security threats and providing a comparative study on different cryptographic mechanism to secure the data.

Keywords: IoT, sensors, actuators, security, attack, cryptography

Introduction

This IoT (Internet of Things) can be considered as a network of physical objects or things that are dedicated while communicating with each other. These physical objects are versed with a specific embedded technology which enables them to sense or interact with internal and external environment. The entire domain of IoT includes things / objects, communication, applications and data analysis at the end resulting in formation of an ecosystem [1] [2] [3].

The vision of IoT as stated by Friedemann Mattern et al. [2010], "Objects will be deployed as nodes through Internet and they are remotely controlled in order to achieve specific and desired actions. Internet Service considers these objects as Physical Access Points. Thus, IoT will provide open huge opportunities in almost every field but at the same time it give rise to an unwanted risk factor including technical and social challenges".

According to Gartner more than 6 billion IoT devices connecting to the Internet and the number is

continuously increasing by following geometric progression scheme. More importantly, in future IoT industrial sector generates a revenue around 300 billion [5] [6].

In Oct 2016, Dyn, DDoS (Distributed Denial of Service Attack) had been encountered by DNS (Domain Name System) service provider which caused hindrance and disruption in services of many social networking websites such as Amazon, Twitter, Facebook. This attack has been found partly from Mirai botnet with more than thousands of compromised IoT devices. [6] [7].

IoT devices not only collect the data from individuals but also involve data sharing with third parties (e.g. voice recognition, finger print) while accessing different devices or playing video games. Suck kind of data can create a privacy problem as user is unaware about the presence of any intentional and malicious attack / attacker, because the leakage of theft of the information does not have any direct influence over the current application in which user is engaged. On the other hand, user is

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also unaware of the fact that where, by whom and in what manner that information can be utilized. [8] [9].

Currently the IoT domain or technology is in its developing stage where there is utmost requirement to develop application standards and communication protocols and to design a secure centralized data service that can be implemented and used globally. However, even today, the users who are implementing the concept of IoT employ old and traditional security measures which results in consumption of several important and critical resources like memory, money and time. [8] [10]

As per Daniele Miorandi et al. in 2012, there were nearly two billion people uses Internet globally for various applications including web browsing & surfing, social networking, accessing multimedia contents & services and several other tasks. Due to which, the more concerning issue is arising related to use of Internet for communication, computation and coordination between machines and smart objects. While considering the scenario, it must be noted that in next decade Internet must provide the most essential mechanism for classical networks and networked objects. Thus, the so developed mechanism will surely give support for new ways of interaction, entertainment, live applications and working [5] [11].

In this paper we have identified and analyzed various security issues in view of architecture, implementation and proposed a favorable framework in order to achieve QoS in IoT in terms of Security.

IoT Issues

In IoT the security fails on some of the key points like network for communication, on the device regarding the physical aspect and software technology i.e. architecture and last but not the least data which can be accessed by unauthorised individual. So here we will talk about the following security issue proposed by many researcher's time to time.

Issues in Communication Technology
Issues in Network Technology
Issues in Data security

Issues in architecture of IoT

Issues in Communication Technology

To make the communication between different IoT devices there must be some technology and medium. These mediums are not properly secure and have certain limitations like NFC. NFC is used to exchange information in very short distance which forces the objects to be very close physically and the concern of security is not so much high but the limitation is still here in terms of the short range [9]. Some other technologies are RFID, Bluetooth, Wi-Fi, Zig Bee, Wireless HART, 6LowPAN, Wi-Max etc.

RFID has a main issue regarding the security of tags. The information of tags can be face an unauthorised access during the transmission, tags can be duplicated so it is also a big compromise to the security of this technology [4] [12].

Bluetooth is also a wireless technology which works in a very short range with a personal area network and low power consumption. It built a smart communication in a low cost. It follows IEEE 802.15.1 standard. The ultra low power, low cost version of this standard is named as Bluetooth Low Energy (BLE) [8].

Wi - Fi is based on IEEE 802.11 standard which works for a range of 20 m - 100 m with a frequency of 5 Ghz band - 60 Ghz band. It provides the data rate from 1 Mbps - 6.75 Gbps. The limitation of this technology is that it can be employed only in short range and physical devices can be tampered by the individual which can affect the propagation of data.

Zig Bee is a very low cost and low power consumption technology. It is based on IEEE 802.15.4 standard. Its network layer supports star, tree and mesh topologies which works at the rate of 250 Kbps to transfer the data from sensors [4] [8].

Wireless HART is a wireless sensor technology based on the highway addressable remote transducer protocol and developed as a multi vendor inter operable wireless standard. It follows IEEE 802.15.4 under 2.4 GHz ISM band for protocol operation [4] [15].

6LoWPAN has defined encapsulation and header compression mechanism that compresses the IPv6 packets before sending and receiving over IEEE 802.15.4 based network. Two security modes are defined to achieve the objective as Access Control List and Secure Mode [8][13].

Wi – Max is based on IEEE 802.16 standard of Wireless Broadband, which will work for a wide range providing the data rate up to 1 Gbps [8][14].

Issues in Network Technology

Software, Hardware, Objects and People are the four major components or parties taking part in communication over private, public and untrusted networks through IoT. This situation is exposed to issues like violation of security, privacy and open trust problems. The concept of Trusted Third Parties regarding users and servers [17, 18] must be addressed. In such situation, attainment of security can be done by having a well organized structure and framework which comprises all conceptual and technical concepts, beliefs, principles, policies, procedures, techniques, and measures required to protect individual system. Intruder models and threats assets as well as the system as a whole against any intentional or unintentional threat. IoT faces a huge amount of active and passive attacks Type Description as compared to vulnerabilities in old traditional and Intruder Dolev-Yao (DY) affect the network conventional networks. Attacks that can recover Model [16, 20]. It may intercept all or any network information without being depicted are termed message ever transmitted between as Passive attacks on the other hand attacks that IoT devices and hubs. Thus, safety directly hinder provisioning of IoT service are termed will be much stronger if our IoT as Active attacks [16, 17]. These active and passive infrastructure is designed to be DY attacks which create obstacles in its functionality and Denial-of- intruder resilient. nullify the benefits of implementing IoT services, DoS targets authenticated or applications and environment. Threats can be service attacks intended users by making the categorized into external threats that are generated (DoS) resources unavailable to them. IoT from outside and internal threats that are generated devices are most prone and within the network [16, 18, 19]. The different types of vulnerable to DoS due to limitations threats that target IoT are detailed in

the following in computational resources and subsections memory. It must also be noted that all defense mechanisms are totally A. Security and Privacy Challenges in the IoTs depending on IoT environment. DoS Physical attacks Attacks on privacy attacks like jamming channels, Large number of devices and services are connected consumption of computational together in order to exchange the information by resources, bandwidth, memory, disk making use of IoT domain and environment. Each and space, or processor time, and every IoT has specific requirements concerning trust, disruption of configuration security and privacy. If we want to develop most secure information [16, 21, 22, 23]. and ready to use IoT devices and services at low cost, Involve tampering with then we have to take care of several challenges and hardware components. issues regarding privacy and security as described Unattended and distributed below: nature of IoT Devices typically operate in a). User privacy and data protection outdoor environments IoT environment has an ubiquitous character due to Highly susceptible to which issue of privacy becomes more important. Here physical attacks. [16, 23 - devices are connected globally where communication 26] and exchanging of data takes place, causing a serious IoT preserve large volumes of threat to sensitive subjects like research works, defense information that is easily accessible information. [8, 31]. through remote access mechanisms so privacy protection becomes more b). Authentication and identity management critical and challenging.

The attackers do not require to be The combination of Authentication and Identity physically present in order to carry Management Authentication have been deployed out surveillance, rather information aiming towards management and security of can be collected whenever required Information and Resource access. Identification costing a very low amount of risk Management uniquely identifies objects, and involved. The most common attacks authentication entails validating the identity on user privacy are as follows [16, establishment between two communicating parties [16,28]:

24. It is essential to consider how to manage identity Eavesdropping and passive authentication in the IoT as multiple users and devices monitoring

need to authenticate each other through trustable Traffic analysis service.

Data Mining

c). Trust management and policy integration

Due to uncertainty in IoT environment, trust plays an important role in establishing secure communication among devices. Trust can be further dimensionally classified as under:-

Trust in the interactions between entities
Trust in the system from the users perspective

We have to deploy an effective and efficient mechanism for establishment of trust factor in dynamic and collaborative IoT environment in order to have user's trust and confidence. The main objectives of trust research in the IoT framework are the following:

Conception of new models for decentralized trust
Implementation of trust mechanisms for cloud computing
Development of applications based on node

trust (e.g., routing, data aggregation, etc.) [16, 23].

d). Authorization and access control

Authorization is typically implemented through the use of access controls. Authorization and access control are important in establishing a secure connection between a number of devices and services. The main issue to be addressed in this scenario is making access control rules easier to create, understand and manipulate. Authorization is the process of determining that an individual must have the resource when he is identified Access control is the procedure through which access is being controlled by granting or denying on the basis of certain criteria. [16, 23].

e). End-to-End security

The issue of security becomes all the more relevant when we concern security at the end points between IoT devices and Internet hosts. Employment of traditional cryptographic schemes for performing encryption and authentication is not sufficient in resource-constrained IoT environment. In order to provide complete end-to-end security:-

Individual Identity at both ends must be verified
Protocols like TLS & IPSec must be developed for negotiation of session keys dynamically

Algorithms like AES and Hash algorithms must be securely implemented With end-to-end security, both ends can typically rely on the fact that their communication is not visible to anyone else, and no one else can modify data in transit. Correct and complete end-to-end security is required, without which, many applications would not be possible. [16, 23].

f). Attack resistant security solution

A large number of devices with varying structure, storage area, computational resources are connected over Internet in IoT domain. As all these devices are more susceptible to attacks, then there must exist some solutions which are resistant to attack and providing lightweight security solutions. [16, 23].

B. Security requirement for IoTs

More specifically, authentication, confidentiality, and data integrity are the key problems related to IoT security [17, 29]. Authentication is utmost required in order to establish a connection or communication medium between two devices so that certain private and public can be transferred in order to provide confidentiality to the data which is being transferred. Confidentiality ensures that is protect from any unauthorized access whereas Integrity ensures the unauthorized modification of data. According to Vermesan and Friess [17, 30] certain security and privacy framework requirements in dealing with IoT security challenges are as follows:

Symmetric solutions to support resource constrained devices.

Key management systems to enable the establishment of trust relationships.

Cryptographic techniques that enable protected data to be stored processed and shared.

Techniques to support ("Privacy by Design")

concepts, including data identification, authentication and anonymity.

Keeping information as local as possible using decentralized computing and key management. Prevention of location privacy and personal information inference

Issues in Architecture

We can say that IoT is an extension of Internet, but certain new features are amalgamated. These features generate new level of security challenges in the IoT deployment and implementation. Here security of is of uttermost concern as it would be more disastrous in form of DDoS and DoS attacks. IoT devices when used through Internet are more prone to attacks as compared to PC or smart phones due to having less efficient protection mechanisms. Because if we deploy security mechanisms over IoT devices then the cost will be drastically increased. Also the old and traditional security solutions like firewall, proxy settings are not applicable here. Security structure can be divided into three layers which can be stated as follows:

- 1). **Perception Layer** – At perception layer, physical security is taken into consideration. IoT devices like sensors are placed at one place for longer durations, so that they can encounter physical attacks. IoT devices like smart TVs, Video Games etc. collect data which may be shared by unauthorized parties. Potential threats at this layer are unauthorized access to tags, tag cloning, eavesdropping, spoofing, RF Jamming.
- 2). **Network Layer** – Network Layer attacks include include sybil attack, sinkhole attack, sleep deprivation attack, denial of service (DoS) attack, malicious code injection, and man in middle attack [7, 32]. WSN can be categorized as Insider Attacks and Outsider attacks. Insider attacks can be compromised nodes that are controlled by malicious attacks. Middle-ware layer. The layer is composed of data storage technologies and data may be accessed by unauthorized parties and malicious insiders. DoS attacks on the middle-ware layer may result in unavailability of services.
- 3). **Application Layer** - CoAP[7, 33] (Constrained Application Protocol) is an application layer protocol and is a customized and compressed version of HTTP protocol which is estimated to be the future of application protocols. The security of

CoAP depends on the Data Transport Layer Security (DTLS) and sometimes IPsec. DTLS is lacking in some areas and it is a potential threat for the CoAP.

Issues in Data Security

Both terms Internet and IoT (Internet of Things) includes the same word “Internet”, thus abovementioned technological domains overlap each other. But in spite of the two domains may differ from each other in certain situations:

IoT involves M – M (Machine – to – Machine)

communication wherein machine includes all computing devices, sensors etc. and Internet involves communication among network devices like computers, desktops, palmtops etc.

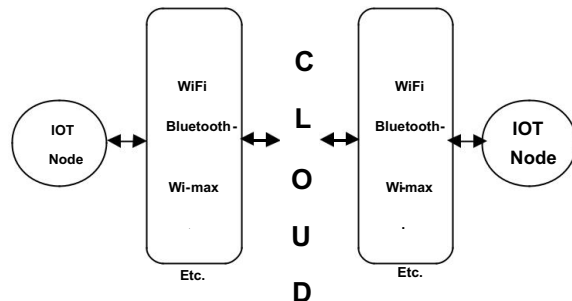
IoT is a machine operated technology while Internet is based on human efforts.

On Internet requests are send but on IoT it is pushed by the machine to perform some tasks.

IoT works on a dedicated link to send the information while Internet is used to access a large number of links available on the Network.

IoT devices can only perform specific tasks (like data gathering) assigned and designed but Internet usage is not task specific.

In spite of the abovementioned slight differences between two dimensions we find that Internet is wholly amalgamated into IoT. Now if both Internet and IoT have same architecture then similar security protocols can be applied and implemented, but there exists some difference between the two structures. Consider the given figure:-



Considering the above figure we analyzed that structure of IoT is containing IoT node / sensors both sender and receiver ends in addition to Internet Communication Network. In this paper we are not focusing on security issues on Internet Network which comprises all standards like ISO, TCP/IP protocol suites etc. We need to focus on end-to-end communicating device including sensors etc. as there is no uniform mechanism for transferring of data due to non uniformity of channel, network medium. We can not provide security to the entire channel which is not static so we focus on the security of data. We can get our data secure by implementing the concept of cryptographic algorithms.

Implementing Data Security

All Data can be secured by applying cryptographic algorithms. These algorithms can be classified into two parts:

- 1) Symmetric Key Algorithms
- 2) Asymmetric Key Algorithms

1. Symmetric Key Algorithms

In symmetric or shared key cryptography [34] [35] both sender and receiver shared the same key to encrypt and decrypt the data during transmission. This shared key must be kept secured, if anyhow it will be stolen then the information will be in the hands of unauthorized person. There are four types of symmetric algorithm:

Data Encryption Standard

Triple Data Encryption Standard Advanced Encryption Standard Blowfish

a) Data Encryption Standard

In 1977, IBM developed a block cipher algorithm standard and named it as DES (Data Encryption Standard). It follows mechanism where key is involved with text in order to perform encryption and decryption e.g. a key of 56 bits is used to encrypt the data with block size equal to 64 bits. Decryption process is the reverse of encryption which make it more vulnerable from different attacks [36].

b) Triple Data Encryption Standard

While focusing on the enhancement of security in 1978 IBM modified DES and named it as Triple Data. Like DES, a key of 56 bits is used to encrypt the data with block size equal to 64 bits. But it performs DES algorithms three times for each data block. Triple DES is comparatively more secure than DES but vulnerable to Brute force attacks [35].

c) Advanced Encryption Standard Algorithm

National Institute of Standard and Technology (NIST) replaced both (DES and Triple – DES) by developing a new algorithm called Advanced Encryption Standard (AES). Basically AES includes three block ciphers - AES-128, AES -192 and AES-256.

AES-128 has a key of length 128 bits consisting of 10 rounds.

AES-192 has a key of length 192 bits consisting of 12 rounds

AES-256 has a key length of 256 bits consisting of 14 rounds.

Where each round contains series of steps including substitution, row shifting, mixing of columns and addition of Round Key [37]. AES Algorithm is comparatively more secure and also shown strong resistance against brute force attacks. AES has a strong avalanche effect and therefore AES has been used in many applications.

d) Blowfish Encryption Algorithm

In 1993, Bruce Schneier developed an alternative encryption algorithm and named it as Blowfish Algorithm which provides effective data encryption. It has a variable key length up to 448 bits. It has a block size of 64-bits [38].

2. Asymmetric Key Algorithms.

Asymmetric Algorithm uses the concept of two keys – Private Key and Public Key, thus also known as Public Key Cryptography. By using asymmetric algorithms during transmission, sender encrypts the plaintext by using public key and receiver decrypts

the cipher text by using private key. The different types of asymmetric algorithms are Rivest Shamir Adlemen (RSA), Diffie-Hellman and Digital Signature Algorithm.

Rivest Shamir Adlemen (RSA)

In 1977, Rivest, Shamir and Adlemen in 1977 developed a public key algorithm as two keys pairs to encrypt and decrypt the message. Public key is used by the sender to encrypt the text and is known to all. However, to decrypt the encrypted text private key of the receiver is used. This private key, as the name suggests is known only to the receiver. No one else in the network has any knowledge about the key. The RSA consists of some mathematical operations through which one can calculate the encryption and decryption keys [39].

Analysis of Encryption Algorithms

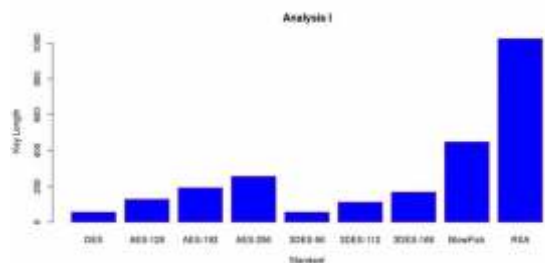
After discussing the above mentioned algorithms. We have analyzed that performance of an algorithm depends on certain factors like key length, block size, no. of rounds for encryption / decryption, power consumption, throughput and security risk. Our analysis is stated as follows:

Analysis on the basis of Key Length

DES has key length of 56 bits.

AES has 3 key lengths as 128, 192, 256 bits. 3 – DES has 3 key lengths 56, 112, 168 bits.

Blowfish has a key length ranging from 32 – 448 bits. RSA works where key length is greater than 1024 bits.

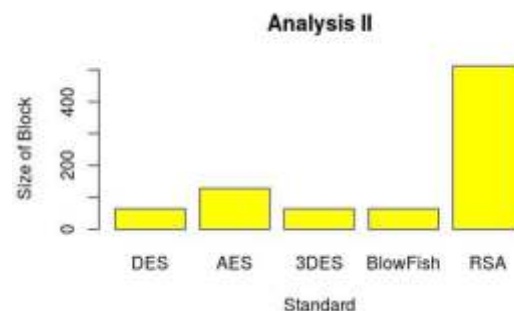


Analysis on the basis of Block Size

DES, 3 – DES and Blowfish have same block size of 64 bits.

AES has block size of 128 bits.

RSA has largest block size of minimum 512 bits.

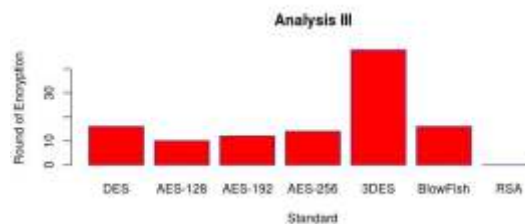


Analysis on the basis of no. of rounds for Encryption DES & Blowfish both perform encryption in 16 rounds.

3 – DES perform encryption three times than DES for each block size i.e. no. of rounds (48).

AES performs encryption in 10, 12 & 14 rounds depending on key length 128, 192, 256 respectively.

RSA performs encryption in a direct and straight manner without having any concept of rounds.



Analysis on the basis of Power Consumption

Parameter Scaling

0 – Very Low

5 – Low

15 – High

20 – Very High

3 – DES has lowest power consumption

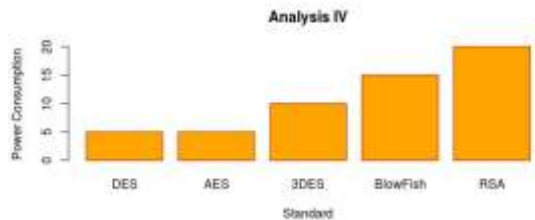
DES and AES have more power consumption as

compared to 3-DES

Blowfish has more power consumption as compared to 3-DES, DES & AES

RSA has the highest power consumption

Analysis on the basis of Throughput



Parameter Scaling

0 – Low

10 – Medium

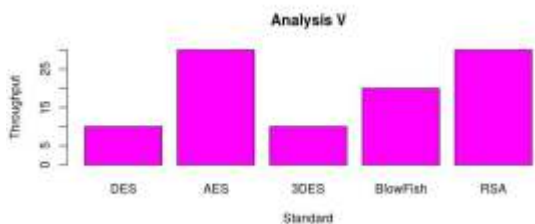
20 – High

30 – Very High

DES and 3-DES have medium throughput

Blowfish has better throughput as compared to DES & 3-DES

AES and RSA have higher throughput as compared to DES, 3-DES and Blowfish.

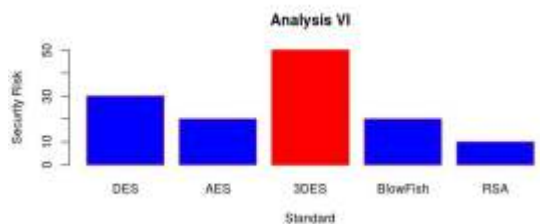


Analysis on the basis of Security Risk

DES is inadequate

Amount of risk is less in AES, Blowfish & RSA as compared to DES & 3-DES.

RSA has the lowest risk factor.



In spite of the above mentioned performance metrics we have certain other metrics too which are discussed as follows:

Algorithm	Resources	Cryptanalysis Resistance
DES	Requires more CPU cycles and memory	Vulnerable to linear and differential cryptanalysis
AES	Consumes resources when data and block size big	Strong against truncated differential, linear interpolation and square attacks
3DES	Require effective resource consumption	Vulnerable to differential brute force attackers can analyze plain text
Blowfish	Require pre processing	Vulnerable to differential brute force attackers
RSA	Very high	Brute force attack difficult to accomplish

Conclusion

We have identified several issues of IoT concerning security implications and implementations. At last we came to conclusion that in order to attain security in each and every dimension where IoT can be accessed then we have to apply CIA rule both in terms of data level and system / organization level.

If we have succeeded in doing so then we can have a secure IoT World but for doing so we have to make sure that data which is to be transferred must be encrypted before sending to the network and it must be decrypted before receiving by receiver. It must also be noted that a copy of data must always be kept somewhere either at sender or server in case of any malicious attack or network failure or breakdown.

As we are not concern with the network in this paper, so our main focus is on the security of data. To do so we give different analysis comparison and cryptanalysis but all these mechanism are too old. So as per our opinion we think that the concept of block encryption will be more helpful which is belong to the concept of Block chain technology.

References

1. Krishna Kanth Gupta, Sapna Shukla, "Internet of Things: Security Challenges for Next Generation Networks", ICICCS 2016, IEEE 2016, 978 – 1 – 5090–2084–3/16.
2. GSI, Object Name Service (ONS) Standard [Online]. <https://www.gs.org/gsm/kc/epcglobal/ons>, accessed on October 8 2014.
3. www.gartner.com
4. Mrs. Snehal Deshmukh and Dr. S. S. Sonavane, "Security Protocols for Internet of Things : A Survey", IEEE 2017, 978 – 1 – 5090–5913–3/17.
5. <https://www.gartner.com/newsroom/id/2684616>
6. Zejun Ren, Xiangang Liu, Runguo Ye, Tao Zhang, "Security and Privacy on Internet of Things", IEEE 2017, 978 – 1 – 5090–3025–5/17.
7. https://www.verizonenterprise.com/resoruces/reports/rp_da ta-breach-digest-2017-sneak-peek_xg_en.pdf
8. Mangal Sain, Young Jin Kang, Hoon Jae Lee, "Survey of Security in Internet of Things : state of the art and challenges", ISBN: 978 – 89 – 968650 – 9 – 4 in ICACT February 2017, page 19 – 22.
9. Wilton, Robin, CREDS 2014 – Position Paper: Four Ethical Issues in Online Trust, Issue brief no. CREDS-PP-2.0. Internet Society, 2014.
10. Karen Rose, Scott Eldridge, Lyman Chapin, "Understanding the Issues and Challenges of a More Connected World" in www.internetsociety.org , October 2015.
11. Daniele Miorandi, Sabrina Sicari, Francesco De Pellegrini, Imrich Chlamtac, "Internet of Things : Vision, applications and research challenges" *Ad Hoc Networks* 10 (2 0 1 2) , j o u r n a l h o m e p a g e : www.elsevier.com/locate/adhoc.
12. Chen Qiang, Guangri Quan, Bai Yu and Liu Yang, " Research on Security Issues of the Internet of Things" *international Journal of Future Generation Communication and Networking* Vol.6, No.6 (2013), pp.1-10.
13. Park, S.; Kim, K.; Haddad, W.; Chakrabarti, S.; Laganier, J. (March 2011). IPv6 over Low Power WPAN Security Analysis. IETF. I-D draft-daniel-6lowpan-security-analysis- 5. Retrieved 10 May 2016.
14. P.P. Ray" A survey on Internet of Things architectures", *Journal of King Saud University - Computer and Information Sciences*, 8 October 2016.
15. *Wireless Devices in Process Manufacturing* last accessed from <http://www.arcweb.com/market-studies/pages/wireless-devices-forprocess-industries.aspx>.
16. Mohamed Abomhara, Geir M. Koien, "Security and Privacy in the Internet of Things: Current Status and Open Issues",
17. A. K. Rai, R. R. Tewari, and S. K. Upadhyay, "Different types of attacks on integrated manet-internet communication," *International Journal of Computer Science and Security*, vol. 4, no. 3, pp. 265–274, 2010.
18. T.-G. Lupu, I. Rudas, and N. Mastorakis, "Main types of attacks in wireless sensor etworks," in *WSEAS International Conference. Proceedings. Recent Advances in Computer Engineering*, no. 9. WSEAS, 2009.
19. P. A. Diaz-Gomez, G. ValleCarcamo, and D. Jones, "Internal vs. external penetrations: A computer security dilemma," in *Proceedings of the 2010 International Conference on Security & Management*, 2010.
20. A. Armando, "Deliverable d2. 1: The high level protocol specification language," *Technical Report IST-2001-39252*, <http://www.avispaproject.org/delivs/2.1/d2-1.pdf>, Tech. Rep., 2003. [Online]. Available: <http://www.avispaproject.org/delivs/2.1/d2-1.pdf>
21. P. N. Mahalle, B. Anggorojati, N. R. Prasad, and R. Prasad, "Identity authentication and capability based access control (iacac) for the internet of things," *Journal of Cyber Security and Mobility*, vol. 1, no. 4, pp. 309–348, 2013.
22. R. Romana, J. Zhoua, and J. Lopezb, "On the features and challenges of security & privacy in distributed internet of things," *Computer Networks* (DOI: 10.1016/j.comnet.2012.12.018), 2013.
23. S. Babar, P. Mahalle, A. Stango, N. Prasad, and R. Prasad, *Proposed Security Model and Threat Taxonomy for the Internet of Things (IoT)*, ser. *Communications in Computer and Information Science*. Springer Berlin Heidelberg, 2010, vol. 89, book section 42, pp. 420–429. [Online]. Available: http://dx.doi.org/10.1007/978-3-642-14478-3_42
24. J. Sen, "A survey on wireless sensor network security," *arXiv preprint arXiv:1011.1529*, 2010.
25. S. Babar, A. Stango, N. Prasad, J. Sen, and R. Prasad, "Proposed embedded security framework for internet of things (iot)," in *Wireless*

- Communication, Vehicular Technology, Information Theory and Aerospace & Electronic Systems Technology (Wireless VITAE)*, 2011 2nd International Conference on. IEEE, 2011, pp. 1–5.
26. (32). H. Ning, H. Liu, and L. Yang, "Cyber-entity security in the internet of things," vol. 46, no. 4, pp. 46–53, 2013.
 27. A. Riahi, Y. Challal, E. Natalizio, Z. Chtourou, and A. Bouabdallah, "A systemic approach for iot security," in *Distributed Computing in Sensor Systems (DCOSS)*, 2013 IEEE International Conference on. IEEE, 2013, pp. 351–355.
 28. P. Mahalle, S. Babar, N. R. Prasad, and R. Prasad, "Identity management framework towards internet of things (iot): Roadmap and key challenges," in *Recent Trends in Network Security and Applications*. Springer, 2010, pp. 430–439.
 29. J. Lopez, R. Roman, and C. Alcaraz, "Analysis of security threats, requirements, technologies and standards in wireless sensor networks," in *Foundations of Security Analysis and Design V*. Springer, 2009, pp. 289–338.
 30. O. Vermesan and P. Friess, *Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems*. River Publishers, 2013.
 31. GS1, *Object Name Service (ONS) Standard [Online]*. <http://www.gs1.org/gsm/kc/epcglobal/ons/>, accessed on October 8, 2014
 32. Hon Sun Chiu and King-Shan Lui, "DelPHI: wormhole detection mechanism for ad hoc wireless networks," 2006 1st International Symposium on Wireless Pervasive Computing, 2006, pp. 6 pp.-.doi: 10.1109/ISWPC.2006.1613586
 33. R. A. Rahman and B. Shah, "Security analysis of IoT protocols: A focus in CoAP," 2016 3rd MEC International Conference on Big Data and Smart City (ICBDSC), Muscat, 2016, pp. 1-7. doi: 10.1109/ICBDSC.2016.7460363.
 34. T. Bala and Y. Kumar, "Asymmetric Algorithms and Symmetric Algorithms: A Review," *International Journal of Computer Applications (ICAET)*, pp.1-4, 2015.
 35. W. Stallings, *Cryptography and Network Security, 4th Ed*, pp.58-309, Prentice Hall, 2005.
 36. W. Y. Zibideh and M. M. Matalgah, "Modified-DES Encryption Algorithm with Improved BER Performance in Wireless Communication," *IEEE Radio and Wireless Symposium (RWS) Phoenix*, pp.219-222, Jan 2011.
 37. LIU Niansheng, G. Donghui, and H. Jiaxiang, "AES Algorithm Implemented for PDA Secure Communication with Java," *IEEE Anti-counter. Sec. Ident. Fujian*, pp. 217-222, April 2007.
 38. J. Bhalla, P. Nagrath, "Nested Digital Image Watermarking Technique Using Blowfish Encryption Algorithm," *ISSN International Journal of Scientific and Research Publications*, Vol. 3, pp.1-6, April 2013.
 39. Hongwei Si, Youlin Cai, Zhimei Cheng, "An Improved RSA Signature Algorithm based on Complex Numeric Operation Function," *IEEE Challenges in Environmental Science and Computer Engineering (CESCE) China*, Vol.2, pp.397-400, March 2010.

A Review on IoT: Its Merits, Demerits and Applications in Today's Life

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Ms. Shallu Singh***

ABSTRACT

The Internet will run on to become forever centric to day by day life and work, but here is a new but supplementary view for an Internet of Things (IoT), which will connect many objects (things) such as sensors, monitors, home appliances and RFID devices to the Internet at a scale that away outstrips use of the Internet as we know it, and will have many social and economic effects. IoT explains a worldwide mechanism of interconnected devices.

It has arrived in many different places and obtained further respect. In the computing technology, we have adopted a new technology known as Internet of Things (IoT). It is rising as the third ripple in the growth of the internet.

In today's world the Internet of Things is spreading everywhere in every field. It has proved to be very successful because it promises a smart human life by allowing a communication between objects, machines and other things altogether with people.

IoT is the mechanism of physical instruments, home instruments, and other electrical items equipped with software, sensors, originators, and connectivity which enable these things to connect, collect and exchange data.

This concept enables the things for sensing, which subsequently interoperate and to convey with other things for data exchange through an existing physical mechanism infrastructure.

Keywords - internet of everything, smart infrastructure, multi-modal transportation, smart grid & smart energy, smart retail and smart health care.

Introduction

In today's world, the Internet plays a vital role for every person. Activities in our daily life can be scheduled by using internet. It has innovated our daily life.

A positive use of internet makes our life easy and simple. Nowadays internet is a revolution in information technology.

Now things mostly work on Artificial Technology (AI). That technology works with the help of mechanism and human order. The Internet has a great impact on education, communication, company, science, and humankind. The Internet is most valuable and powerful form in all of human history and now with the function of the Internet of Things it became more compatible to live a smart life in every phase. By using IoT we collect or exchange the information or data. We often know Internet of Things as the Internet of everything (IoE). It is mainly defined as "A mechanism of Internet

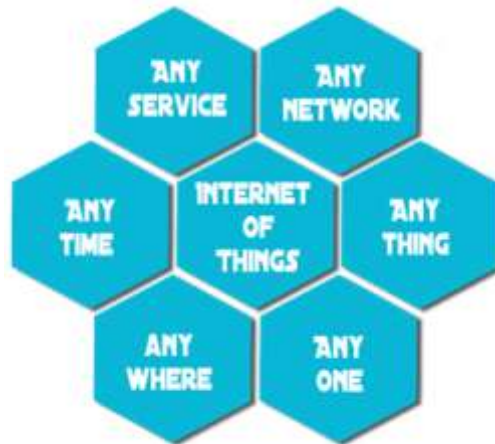
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connected things which are able to accumulate and swap the data." The word "Internet of Things" has two main parts; first 'Internet' being the spine of connectivity and other 'Things' which means 'objects/devices'. In an easy way to define it, we have "things" that logically accumulate the information and send it to the internet. This information can be sent by other "things" too. Objects make themselves identifiable and they attain brainpower by making or enabling reference linked

decisions thanks to the certainty that they can communicate information about themselves. They can approach information that has been accumulated by other things, or they can be components of complex services. This function will create a new kinds of applications such as smart vehicle and the house. It may be used to receive notifications about the security, energy saving, automation and many more aspects of different objects.



Internet of things Concept

2. Smart Cities:-

In today's world we have seen many cities. Many healthy and safe places have been built to live in these cities and work. The objects or devices of the cities are connected interconnected through internet.

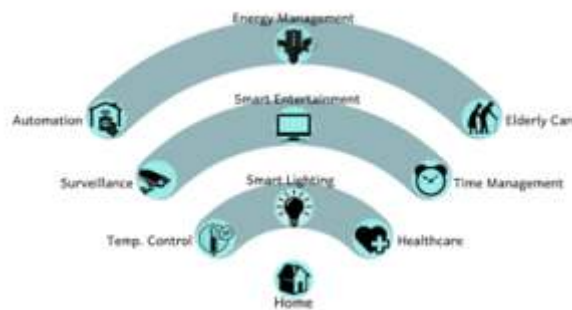
The explosive development of Smart city and applications of IoT creates a man scientific and engineered. Challenges that call for simple research efforts from both academy & industry especially for the development of efficient scalable & reliable smart city based on IoT.

The necessary components of development for a city to become a smart city should involve smart technology, smart industry, smart management & smart life.

Successful Examples of Smart City:-

I. Multi-Modal Transportation:-

A smart city is one that will decrease vehicle traffic and promises people and goods to move



SMART HOME

proficiently. The capability to do this better is a result of the cheap sensors and cameras to store data about the people. Intelligent traffic systems are an example of this and the success of sovereign vehicle transportation would be a prime example of success for a smart city, as this could decrease vehicle related deaths.

All these efforts would decrease pollution, time trapped in traffic and results in a healthier population. Technologies involved in multi-modal transportation are initiation of integrated loops of cellular ability, smart cameras and laser sensors.

ii. Infrastructure:-

From energy to water, the capability to explication of big units of data will lead to better city planning and deployment of public work resources for service. For example, testing for lead content in water in real time could interrupt public health problem like the one that has exterminate Flint, Michigan.

iii. Land use planning:-

Land use preparation is a main function of all cities. Cities need to project how and what they pleasure to like in 5, 10 or 20 years. This is done through government plans and policy decisions flow from that. These plans include studies and effect explication utilizing many different sources of data that are sourced from advisor. Land use arrangement is mature to become much more "smarter" through the use of more real time and correct data produced from smart city technologies.

iv. Services:-

From garbage accumulation to physical condition and human services, cities spend huge amount of funds on providing basic facilities to citizens. Many vendors are making garbage accumulation smarter by establishing sensors on garbage cans to better adaptation collection. Better designed health care facilities and e-records are examples of impact on health and human services.

3. Smart Grid & Smart Energy:-

A smart and controlled grid is linked to the data and is developed to have a smart energy arrangement. A smart grid that united the data and Internet communication technologies (ICTs) to the electricity networks will enable a real time two way communication between suppliers and users,

creating more movable interaction on energy flow, which will help deliver electricity more profitably and effectively. The main elements of data and communication's processing will involve sensing and monitoring processing for power flows; digital communications transportation to transfer data across the grid; smart meters within house display to inform energy usage; integrated, controlled and automated systems to collect and process various data, and to create highly interactive, responsive electricity. Many services can be maintained due to the internet of things for smart grids, such as industrial energy, solar power, nuclear power, vehicles, hospitals and city's power control. The most important service may be enabled by the internet of things as in smart grid phase. Today's grid is very authentic and can deal with normal electricity gradient and it will take a step ahead towards using a low carbon energy system, by allowing interflow between the sacred energy and green technologies, and offering many advantages to customer in cost savings through efficient energy use at home.

4. Smart Retail:-

Smart Retail is the word which explains a set of smart technologies that are made to give the customer a greater, faster, safer and smart experience during shopping. A world in which nearly everyone now carries around a smart device, where we can buy any product. In the condition of smart retail the "Things" can involve RFID inventory tracking chip, traditional in store infrared foot -traffic counter, cellular and Wi-Fi tracking systems or customer's mobile device.

By using IoT we can now realize the reference i.e. time and location of the consumer which is helpful in identifying when the customer needs help or an encouragement to purchase and we can respond with full activism.

In IoT, smart retail incorporate self power, it enables stores to transform customer services relatively saving time and money while providing the customer a seamless shopping experience.

5. Smart Health:-

There are so many places where we can see the presence of Internet of Things such as:-healthcare, monitoring to smart sensors from remote & device

integrality etc. It has the power to not only keep patients safe and healthy, but to improve how the doctors are delivering care as well as better healthcare. Internet of Things can also boost patient act and patience by allowing them to spend more time interacting with their doctors. The number of the devices that are connected and a large amount of data they collect can be a challenge for hospital IT team to manage. Here, also a question rises, "how to keep that entire data safe and protected, especially if it is being interchanged with other devices."

This important manual will look at some of the current service of healthcare IoT, including how it's being used in one Boston hospital to manage track of newborns in the NICU. After that, the guide finds some challenges of Internet of Things in healthcare, such as the need to manage many connected devices and a reduction of interoperability with EHR systems. Finally, the guide will validate the future of healthcare Internet of Things (IoT), including how the doctors can turn IoT data into actions.

6. Smart Transportation and Mobility:-

The development in transport is one of the cases to notify the goodness of the country. Situation of roads, Surveillance and warning services is one of the most essential part of Internet of Things (IoT) modification services. The main idea for conception of smart transportation and mobility is to apply the law of concourse sourcing and participatory sensing.

The process begins with user identified the path desires and marked some points as potholes in the smart phone service. The smart transportation is getting over three main conceptions; they are transportation analytic, vehicle connectivity and transportation control. The transportation analytic presents the analysis of demand prophecy detection. The path of vehicles and speed control in addition to traffic supervision all are known as transportation control which they actually reliably related to the path of the vehicles valence (V2X communication), and overall governed by multi-technology spread. IoT can also be used in the transportation of an electric vehicle, which is an important means to decrease both the fuel price and the effect of global warming have also received considerable notice from drivers. The Government of many countries

has supported discoverers to monitor performance of Lithium-ion (Li-on) battery for electric vehicle as discovered. The system was designed to detect the functions of Li-on power battery by obtaining the driving situation from the realistic working conditions for driver so that the driver was able to get the idea of the path status. This solution was embedded with many important functions such as movable performance test of the Li-on battery, remote monitoring with online debugging and error correction that could significantly decrease the maintenance cost.

7. Smart Environment:-

It is a very important application of Internet of Things (IoT). IoT is being also used to detect Pollution and Natural calamities. We can monitor the emission level of Co₂, NO etc. from the factories and vehicles to minimize air pollution. We can also see the release of harmful chemicals and waste material into rivers and sea, which is one of the major reason of water pollution. We can also check the quantity and quality of water being supplied for drinking and farming. We can detect the water level of rivers and dams under surveillance to be alert in case of floods. To detect the fire in the forest, IoT technology is also helpful.

8. Industrial Internet:-

Industrial Internet is the new buzz in the industrial sector, also termed as Industrial Internet of Industrial Things. It is making it competent industrial engineering with sensors, software and big unit's analytics to make brilliant machines.

According to Jeff Immelt, CEO, GE Electric, Internet of Things (IoT) is a "beautiful, desirable and investable" asset. The main views behind IoT are that, smart machines are more accurate and compatible than humans in communicating through data. And, this data can help companies to pick incapability and problems sooner. IoT holds great ability for properties control and sustainability. Services for tracking goods, real time data interchange about list among suppliers and retailers and automated delivery will grow the supply chain capacity.

9. Smart Factory and Smart Manufacturing:-

Smart factory added a new value in manufacturing revolution by integrates artificial intelligence, machine learning, automation of experience work and the M2M communication with the manufacturing process. The smart factory will originally change how products are invented, manufactured and shipped. At the same time it will improve worker safety and save the environment by enabling low ejections and low unpleasant incident manufacturing. These improvements in manner of interaction of machines and other objects which results in a way in which decision-making moves from humans to technical systems which means that manufacturing becomes "smarter". The preface of the Internet of Things (IoT) is becoming more prominent in enabling reach to devices and machines in manufacturing channels. This development will permit the Information Technology (IT) to move forward towards digitized manufacturing channels. The Internet of things (IoT) will connect the factory to a whole new range of services, which will run around the production. This could range from connecting the factory to the smart grid, to share the production facility as a service or permitting more fickleness and suppleness within the production channels themselves. In this sense, the production channels could be agreed one of the several Internet of Things (IoT), where a new ecosystem for smarter and more capable production could be defined.

Industries and manufacturing revolution became one of the most developed techniques nowadays, the improvement of the industry evolution taken many genealogically. The first generation related to the mechanical machines in other than this to water and stream power. The second industry generations deal with much more production, assembly lines and electricity. In the end of the last centuries, the industries operated under control of computers and automation which valid as third generation of industries. The smart industry is the fourth generation is known as industry 4.0 is based on cypher physical method which can capable to connect with the internet. The industry 4.0 belief with the internet of things can achieve the great expectations for industries resolution deals with many phases. By introducing the high-tech strategy 2020 initiative focusing the country's research and

innovation policy on assorted forward-looking projects related to the academic and the technology growth.

Challenges of Internet of Things (IoT)

The fact that Internet of things applications and scenarios outlined above, are very interesting which provides technologies for making smart everything, but there are some challenges to the application of the Internet of Things concept in cost of implementation. The expectation that the technology must be exist at lower cost with a large number of objects. Internet of Things is also faced with many other challenges such as:-

- Scalability: Internet of Things has a big belief than the traditional Internet of computers, because of things are cooperated within an open environment. Basic features such as communication and service seek therefore need to function with equal capability in both small scale and large scale environments. The Internet of Things requires new functions and methods in order to gain a capable operation for scalability.
- Self-Organizing: Smart things should not be managed as computers that require their users to configure and adjust them to particular conditions. Mobile things, which are often occasionally used, need to establish connections self, and able to be organize and configure themselves to suit their particular environment.
- Data volumes: Some application scenario of the Internet of Things (IoT) will include less communication, and gathering information form sensor networks, or form logistics and large scale networks, will accumulate a big unit volumes of data on central network nodes or servers. The term present this fact is big data which needs many operational mechanisms in addition to new technologies for storing, processing and managing data.
- Data interpretation: To support the users of smart things, we need to explain the local reference rated by sensors as appropriately as possible. For service providers to profit from the different data that will be generated, needs to be able to draw some generated conclusions from the explained sensor data.
- Automatic Discovery: In vibrant environments,

appropriate services for things must be automatically recognized, which requires appropriate acceptable means of describing their functionality.

- Software complexity:-A more considerable software infrastructure will be needed on the network and on background servers in order to manage the smart things and provide services to support them. That because the software systems in smart objects will have to function with nominal modality, as in traditional embedded systems.
- Wireless communications:-From a view point of energy, established wireless technologies such as UMTS, GSM, Bluetooth and Wi-Fi are far less compatible; more recent WPAN standards such as Zig Bee and others still under development may have a limited bandwidth, but they do use meaningfully less power.

Conclusion

Internet of Things (IoT) is a new technology which provides many applications to connect things to things and human to things through the internet. Each object in this world can be identified, connected to each other through internet taking decisions independently. All networks and technologies of communication are used in building the theory of the Internet of Things such technologies are mobile computing, RFID, wireless sensors networks, and

fixed systems, in calculation to many procedures and methods to get managing processes, storing data, and security problems. Internet of Things (IOT) may face two major limitations in order to guarantee seamless network access; the first problem is related to the fact that today different networks coexist and the other issue is related to the big data size of the Internet of Things. Other recent problems, such as address restraint, automatic address setup, protect the functions such as authentication and encryption, and functions to deliver voice and video signals powerfully will probably be affected in implementing the concept of the Internet of Things (IoT) but by being consistent in technological developments these challenges will be overcome.

References

- "Internet of Things Applications, Challenges and Related Future Technologies", "Zeinab Kamal Aldein Mohammeda, Elmustafa Sayed Ali Ahmedb", WSN 67(2) (2017) 126-148 EISSN 2392-2192
- M. A. Ezechina, K. K. Okwara, C. A. U. Ugboaja. *The Internet of Things (Iot): A Scalable Approach to Connecting Everything. The International Journal of Engineering and Science* 4(1) (2015) 09-12.
- <https://www.i-scoop.eu/internet-of-things-guide>
- S. Misra et al., *Security Challenges and Approaches in Internet of Things. Springer Briefs in Electrical and Computer Engineering*, 2016
- <https://www.mdpi.com/2078-2489/7/3/44/pdf>

Literature Review of Artificial Intelligence - Humanoid Robotics

Kalpana Pundir*

ABSTRACT

In this paper we discuss the role of artificial intelligence in the field of robotics. As now a days people are so much busy in their life and they are becoming so lazy and having very less time for doing their day to day daily life works. So to overcome this thing human made some machines which do work on the basis of human intelligence like vacuum cleaner, computers ,Alexa, mobile phone etc...This human intelligence made for machines is known as Artificial intelligence. Artificial intelligence is also known as machine learning or machine artificial intelligence. Artificial intelligence is a technology used in several purposes of national and international because today's world is a world of technology. So in today's scenario the most commonly and important machine which is a best example of artificial intelligence is Robots. Robotics is the technology used to develop machines that can substitute for humans and replicate human actions.

Keywords: Artificial intelligence, Robotics, Robots

Introduction

Artificial Intelligence:

Artificial Intelligence is also known as machine learning or machine intelligence. It is the intelligence demonstrated by machines in contrast to the natural intelligence displays by human and other animals. Artificial Intelligence is mainly used in the computer science area where Artificial Intelligence emphasizes the creation of intelligent machines that work like humans and reacts like humans. Artificial Intelligence is now a day's playing a very important role in the field of technology. As now a day's world is emphasizes more and more on technologies. Today the basic parameter of the country to be more powerful is the technology.

Technology is now making country more powerful. The modern Artificial Intelligence was originated by classical philosophers who used the process of human thinking as the mechanical manipulation.

According to the father of Artificial Intelligence John McCarthy, it is "The science and engineering of making intelligent machines, especially intelligent computer programs.

Philosophy of Artificial Intelligence:

People explored the computer system due to their curiosity it leads to wonder," Can a machine think and behave like humans do."Because of this development of Artificial Intelligence started in the field of making machines with similar intelligence as the humans have.

Goals of Artificial Intelligence:

- To make systems more Expert
- To make systems more based on Human Intelligent

Applications of Artificial Intelligence:

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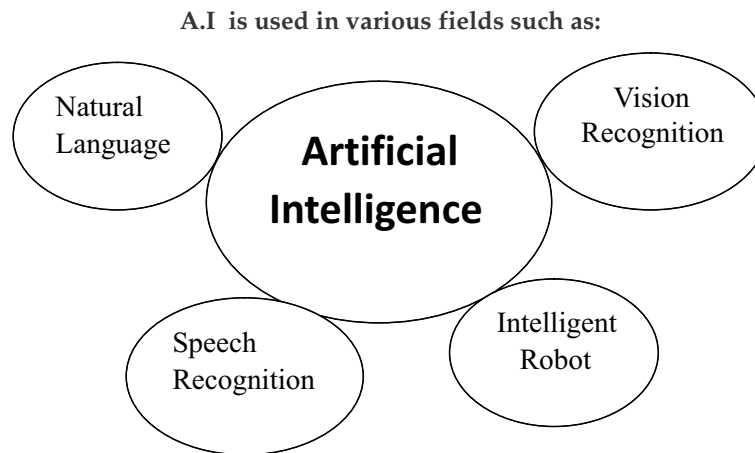


Fig 1.1 : The above figure shows various field in which Artificial Intelligence is used.

1. Gaming:

A.I plays a very important role in the field of gaming. Today people are in the habit of playing indoor games as compared to outdoor games. People used to play with themselves as all peoples are busy in their own life's. That's why they started playing games on mobiles, computers. Games are designed in the manner that people can play them using their intelligence and as well as with fun. Like chess, Ludo, snake-Ladders, candy crush etc. where machine can think a large number of possible positions based on heuristic knowledge.

2. Natural Language:

It is possible for people to interact with the computer that is understandable by humans.

3. Vision Recognition:

These systems are based on the understanding the visual input on the computers.

The most important role of Drones is the photography and videography. Drones are used for visual systems it can capture photographs of those disaster struck areas where it may not be feasible to send a person .It takes photographs which are used to figure out spatial information or map of the areas. In the medicine fields lots of Doctors are using clinically expert systems to diagnose the patients.

In the department of Police. Police is also using the software which recognize the face, hand prints, footprints of the criminal with the stored portrait made by the forensic experts.

4. Speech Recognition:

People used machines where we can recognize the speeches of the people like the recordings of any criminal used by the courts as a evidence in any cases.

5. Intelligent Robot:

Robots are the machines which can replicate human actions or can do work like as human do with the use of A.I.

Advantages of Artificial Intelligence:

- Artificial Intelligence reduces the chances of human errors and greater precision and accuracy is achieved.
- It is useful in space exploration. Humans get affected by the atmosphere of the space while the robots are not affected by atmosphere of the space.
- Computed methods and learning become common in our life. Financial institutions and Banking institutions are widely using AI To manage and organize a large number of data.
- Humans can take break but machines do not require any break the can do work for more hours as the humans do.
- It increases work efficiency
- It is heavily used in medical field.

Disadvantages of Artificial Intelligence:

- The cost of the machines is very high.
- Due to machines unemployment is increased.
- It reduces are personal connections as we all are busy with social media. We don't talk to peoples

are our relations as much we do in previous years

- We are getting addicted to these machines are we can say we are totally dependent on these machines for our even day to day work.
- Daily the technology is changing and due to this we are in the condition to live life with these machines and for that we are giving money to buy these machines to even it is not useful to us but to show off in this society we are buying it. It is the loss of our money.
- A.I is based on human intelligence which do not improve by itself and experience doesn't matter to the machines. It do not have its own originality or own creativity.

Robotics

Robotics is a multidisciplinary field: to make an operational Robot for this physics, electrical engineering, electronic engineering, mechanical engineering and computer sciences is needed Robotics is the field where everyday pioneering invention takes place. It deals with design, operation, construction and use of robots .It also deals with the computer systems for their control, sensory feedback and information processing. The above mentioned technologies are used to make machines which can substitute humans and replicate human actions.

Robots

In recent advances in artificial intelligence (AI) have inspired zealous interest in both the private and government sector across the globe, the possibility of mass-produced consumer product machinery which will use the human intelligence and do work as human do. The big breakthrough for artificial intelligence in previous and recent years was the victory of machine over humans i.e. the important victory is known as Robots. Robots are the machines made by humans for their purpose. Robots are used for many different kind of purposes but now it is mainly used in dangerous environment like bomb detection and deactivation and where human cannot survive (e.g. Space).

There are many kinds of Robots like Industrial robots, Domestic or household robots, Medical robots, Service robots, Military robots, entertainment robots, Space robots, Hobby and competition robots but in today's scenario humanoid robot is in demand Humanoid robot is a robot whose body shape built to resemble the human body. The design may be for functional purposes, such as interacting with human tools and environments, for experimental purposes. In general, humanoid robots have a torso, a head, two arms, and two legs, though some forms of humanoid robots may model only part of the body, for example, from the waist up. Some humanoid robots also have heads designed to replicate human facial features such as eyes and mouths. Androids are humanoid robots built to aesthetically resemble humans.

Manav is the first 3D printed humanoid robot of India invented by Diwakar Vaish in the year 2014. It was manufactured by A-SET Robotics for the purpose of Research, education and entertainment.

Conclusion

The conclusion of this paper is that the Artificial Intelligence playing a very important role in day to day work of every person's life. Artificial Intelligence is becoming more effective in the field of robotics. Robots are making life of humans much easier than they are living before. Now a day's humanoid Robots are in demand due to their resemblance with humans. It is much more comfortable to hire robot as compared to humans in any organizations but the cost of robot are very high so researchers are trying to make robots in affordable prices.

References:

- 1.) "A Literature Review of Artificial Intelligence" ,Sam Olds WRTG 3014 April 24, 2014
- 2.) A Systematic Review of Artificial Intelligence and Robots in Value Co-creation: Current Status and Future Research Avenues , <https://doi.org/10.1177/2394964318805625>

- 3.) *"A Literature Survey on Artificial Intelligence"*
International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181, \ICPCN - 2017 Conference Proceedings, Special Issue – 2017
- 4.) *"A Literature Review on Artificial Intelligence"*,
Volume 19, Number 4, pp. 535-570, 2008, S.A. Oke,
University of Lagos, Nigeria.
- 5.) *"A Review of Artificial Intelligence"*, 2009, E.S. Brunette, R.C. Flemmer and C.L. Flemmer, School of Engineering and Advanced Technology, Massey University, Palmerston, North, New Zealand
- 6.) carnegieendowment.org
- 7.) Antonio chella, Luca locchi, Irene Macaluso, Daniele Nardi *Airtificial Intelligence and Robotics*

AI Revolution and India's AI Development: Challenges & Issues

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ABSTRACT

Artificial Intelligence (AI), as we are familiar it today, is a definitely new field. During the past forty years, we have seen computer system shrink in size and cost by several order of magnitude. We are seeing the size of memories increasing in storage capacity to the point where they can be equal to the human brain's storage capacity. We are developing the computer system which equal or exceed human abilities and become an important part of daily life whether it was a CORTONA of MICROSOFT, OK GOOGLE ASSISTANT of GOOGLE, SIRI of APPLE, AMAZON ECHO, TESLA IN AUTOMOBILES, NETFLIX, etc.

AI is a branch of Computer Science which deals with the study and creation of computer system that manifest some kind of intelligence: a system that can learn new concepts, A system that can question and draw a useful results about the world around us, A system that can understand a natural language or perceive and apprehend a visual scene, and system that perform other types of feats that require human type of intelligence.

This paper will analyze and review about the artificial intelligence. Artificial is the latest technology and growing rapidly and we cannot deny that our future will depend upon it. So this paper emphasis about the Artificial Revolution in India and analyze where India stands in this latest technology. It is something like a race where all country is trying their best to develop the artificial intelligence and so our country is also have to be so serious about that we can also win this race or will give a better future to the upcoming generation in terms of healthcare, technology, security, education, etc.

There will also an analysis about the various challenges which we can face or facing in development of the Artificial Intelligence. India is fastest growing developing and second most populated country in the world, so there are several challenges that India can have to face about in development of AI. In a report of Rediff.com "It was mention that AI can also be the malevolent and in future it will treat us as we treat insects".

Keywords: AI, CORTONA, SIRI, INTELLIGENCE, TECHNOLOGY

Introduction

The creation of artificial human mind is the great interest of the scientist, philosopher, biologist and doctors. For some time the theories and hype exist for the artificial intelligence(AI). But as a advancement in studies it made this theories to be real.

Will human being get overrun by machine? Or AI will be beneficial for the human being or it will turn out into a malevolent in the future for the human race. But at this time, we can not predict the right answer of this question. But according the recent survey it is proved that it can make the human's life so enriched, luxurious and fulfilling. From common people to the government, college institute to business organization everyone are using the AI

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based application. Digital assistant, face detection sensors, biometric recognition, cab aggregation, targeted advertisement and online recommendation are some application using now a days.

As the artificial intelligence is made up of two words Artificial which means unnatural and intelligence means brainpowers so it is simulation of the human mind as it can also have a ability to acquire, understand, and can apply knowledge same as human's mind. Intelligence included the knowledge and feats, both conscious and unconscious, which we have acquired through study and experience, read, write, practice of driving a car, memorize and recall facts and figures, express and feel emotions, and much more. It is also necessary to know what AI is not. Don't confuse AI is not a study and creation of conventional computer system. One can question that all the programs exhibit the some kind of intelligence, but an AI program can go beyond and expresses the a high level of intelligence ti a degree that can be equal or can exceeds the intelligence of human mind to perform some task.

Position of Countries

According to a recent report of livemint.com¹ India is at third position in this race. According to a new report by professional networking site LinkedIn.com², the country US, China, India, Israel, and Germany, rank as the highest puncturing of artificial intelligence (AI) skills among their workforce.

According to a study of Boston Consulting Group (BCG) , many companies are planning to implement AI soon, but in this China, India, and Singapore have the greatest ambitions for AI production.

AI : Revolution Scopes

In 2017, the number of LinkedIn members adding AI skills to their profiles increased 190% from 2015, It is suggest that changes operate by AI technologies may still be in their in starting phase, their impact is being felt across the global labour market in all sectors. Moreover, industries of AI skills present among their workforce are also the fastest-changing industries and enforcing more to develop the AI.

Around 46% of the workforce will be engaged in entirely new jobs that do not exist today, or will be deployed in jobs that have radically-changed skill sets according to a study by EY and Nasscom predicts that by 2022. This is also borne out by the new LinkedIn study. AI skills are among the fastest-growing skills on LinkedIn — a 190% increase from 2015 to 2017.

Similar findings have been corroborated by other research firms too. According to data from job site Indeed, there has been a 179% increase in the number of searches by job seekers for AI-related jobs in India between June 2016 and June 2018. Since the start of 2018, employer demand for AI skills has been consistently twice the supply of job seekers, according to the report.

Among the discrete industries surveyed, healthcare and energy are the most ambitious in the near term; process industries and engineered products tend to be less so. For the 12 countries included in the BCG study, percentages of early-adopting companies are highest in the US (25%), China (23%), and India (19%), and lowest in Japan (11%), Singapore (10%), and France (10%).

The BCG report suggests that high level of adoption among US companies is likely due to widespread availability of AI technology there. However, China's AI growth has also been phenomenal. In fact, China overtook the US in AI funding, and accounted for nearly half of the global investment in AI startups in 2017.

India too, is getting serious about AI. The technology is poised to distort our world and India, being the fastest-growing economy with the second-largest population in the world, has a significant stake in the AI revolution, NITI Aayog acknowledged in its June 2018 discussion paper titled 'National Strategy for Artificial Intelligence'.

Challenges that Artificial Intelligence must address:
3 Risks of an AI-centric Approach That AI can contribute to development in numerous (often unconventional) ways creates a climate of hope and optimism. However, it would be native not to anticipate and forestall the potential risks of AI-driven growth. In this section, we raise the main

concerns that emerge from India's socio-economic context.

Unemployment

India is not an exception in this global AI wave, which is starting to uproot workers from their jobs. According to a study by McKinsey and Company 2014, 6-8 million workers "currently employed in routine clerical, customer service, and sales jobs could be affected by advancements in machine learning and natural language interfaces (speech recognition)." A loss of jobs at this scale will have an impact on economic well-being for a large number of people who may be dependent on these wage-earners, an important consequence for a middle-income country like India which is trying to raise a large number of citizens out of poverty. India's acclaimed IT industry is already feeling the pinch of automation, suggesting that a crisis triggered by job losses could hit the population over the next few years.

Fortify social discrimination. The caste system in India is a social hierarchy with past roots. Sadly it continues to sustain discrimination in insidious and invisible ways, affecting wages, employment, imprisonment rates (National Crime Record Bureau 2016), and access to credit from banks. With the beginning of AI, it has turned into a developing worry that data-driven calculations can get predispositions from the information they are bolstered: for instance, in the United States, calculations for evaluating recidivism rates are suspected to indicate racial inclinations (Crawford 2016). Markers of rank and religion are available in names and addresses, and can without much of a stretch influence information-driven calculations that may be utilized to survey applications for employments, credits, or safeguard. Even if we presume that the decisions, in this case, were made by human evaluators, it is a cause for concern if these decisions are eventually used to train an algorithm for screening applications.

Augmenting gender inequality. The number of mobile internet and the number of internet users in India are both expected to grow—to 300 million and 420 million, respectively, in 2017 (IAMAI and Kantar

IMRB 2017). Particularly in rural India, mobile phones are the primary access point to the Internet, where 60% of Internet access is through mobile phones. While the penetration of mobile phones seems overall a boon for AI, it could unwittingly augment the gender disadvantage. Women in South Asia are 38% less likely to own a mobile phone than men; when overlaid with patriarchal and misogynistic social norms, this means the real access rate could be even lesser. Consequently, the reach of AI may become segmented along gender lines. A second worry is that gender ratios in India's software industry are heavily skewed at all levels. Hence, there is a real risk that the AI to be consumed by the entire population will be produced with a strong male bias. This imbalance could create undesirable long-term consequences.

Policy Action Gap

It is very easy to formulate the new policies but when it comes to implementing them, it becomes difficult. Government, Corporation, and organizations are also hesitant when some new technology is to be implemented, so there exists some gap.

Funding Constraints

This is not surprising that this technology will need funding for implementation and execution but the question arises, will our government understand the need for required funding? With the next election and for the new government, is the AI plan fit in their schema or not?

AI for Development

Steps and Safeguards In this section, we propose some guiding principles for the construction of a robust AI ecosystem in India. At this point, it is imperative to build the instruments to measure India's "vital statistics". The government's "Digital India" initiative (accessed November 15, 2017) is a welcome step in this direction. In addition to public data from governmental departments, it would also be useful to create locally relevant public open sets pertaining to language, health, crops, marketplaces, and so on. In some cases, AI technologies such as computer vision and crowdsourcing could

themselves be deployed to seed the effort. It would neither be effective nor sustainable if the activity of developing AI-based solutions is confined to a small number of people and places. It is essential that a broader section of the population—especially women, linguistic minorities, and rural communities—be actively trained to create and maintain AI systems for their own needs. However, we will need both the data and the technical knowledge to develop and maintain their own translation engines. The open source movement has been reasonably successful in India, and can be expanded for the development of AI libraries, standards, and APIs. India enjoys the advantages of having an established university system and a well-trained workforce. However, the supply of knowledge and skill are no match for the demand created by a large, diverse, and developing country. Domestic centres of excellence in research could provide leadership not just in core AI technologies, but also in interdisciplinary areas. If AI is the new electricity, society would need not only electrical engineers, but also electricians. Measures to train a large workforce to build applications using vision, speech, and so on would be a positive step, which may also help by absorbing some of the shock created by job losses. Industry, especially startups, will play a vital role in identifying and realising the benefits of AI across diverse sectors. India has a thriving tech entrepreneurship ecosystem, with access to talent, capital, and large markets. There are about 300 startups in India with a focus on AI, as of May, 2017 with over USD 100 million invested in them since 2014. This number, however, is low in comparison to countries like the US and China, where investments total over USD 4 and 3 billion, respectively. Lack of data sets and talent are both challenges that startups will have to negotiate; closer collaboration with universities could help in the latter respect. Startups that are constrained to keep risk low can focus on high-volume, low margin sectors. In pace with the growth of AI, India will also have to evolve regulatory mechanisms such as safety and quality standards; legal frameworks addressing data security, privacy, and liability; and ethics review committees.

Conclusion

The AI can contribute in many ways for human welfare and create a environment of hope and

optimism. It will definitely change our future but it depend upon humans that the change can be in human favors' or not. How we will handle the AI. Our future will be so full of luxury and full of comfort that the car will automatically drive, whatever we want to eat the machine will cook delicious food for humans in different styles, AI will guard our home and offices in our absence, AI will fight at the border not a life of our single soldier will sacrifice in fight. AI will help the humans in decision making to take the bestest decision. it would not be wrong to say that AI will became the important parts of the our human life.

But at the same time, there are so many question arises in our mind, like if some miss-happening will be done by AI who will be the responsible for that, the developer or the end user? Recently Uber test their auto-drive car and done a lot of accident.

We should understand that AI is machine it can be boon for us but the well understanding about AI is necessary. The work in the right direction is necessary. India is vast country with full of diversity so it have different kinds of people with different brains and mentality but they require is create new opportunities for the peoples. India will definitely come out as a leader in this race of AI development.

References

- [1] Shivaram Kalyanakrishnan, Rahul Alex Panicker, Sarayu Natarajan, Shreya Rao, "Opportunities and Challenges for Artificial Intelligence in India" AIES 2018 Submission 52.
- [2] Angwin, J.; Larson, J.; Mattu, S.; and Kirchner, L. 2017. *Machine bias*. Pro Publica. Accessed October 10, 2017, www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing
- [3] Hirschberg, J., and Manning, C. D. 2015. *Advances in natural language processing*. *Science* 349(6245):261–266.
- [4] IAMAI, and Kantar IMRB. 2017. *Internet in India –2016*. Accessed October 26, 2017, bestmediainfo.com/wp-content/uploads/2017/03/Internet-in-India-2016.pdf.
- [5] Vempati, S. S. 2016. *India and the artificial intelligence revolution*. Accessed November 5, 2017, carnegieindia.org/2016/08/11/india-and-artificial-intelligence-revolution-pub-64299.

- [6] Varakantham, P.; An, B.; Low, B.; and Zhang, J. 2017. *Artificial intelligence research in Singapore: Assisting the development of a smart nation*. *AI Magazine* 38(3):102–105.
- [7] Sharma, S. 2017. *Heres why India is likely to lose the AI race*. Accessed November 8, 2017, factordaily.com/artificial-intelligence-india/
- [8] Dan W. Patterson university of texas& learning prv ltd. *Introduction to AI and expert system*.
- [9] <https://www.livemint.com/AI/u8hvUi7qObOLP7Shq4rB1M/Why-India-ranks-among-the-top-3-countries-in-AI-skills.htm>
- [10] Hirschberg, J., and Manning, C. D. 2015. *Advances in natural language processing*. *Science* 349(6245):261–266.

An Analysis on Stock Market Predication using Data Mining Techniques for Effective Decision Making

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ABSTRACT

The stock market data analysis need the help of IT application like Web based applications, SQL query, Excel sheet and Customize Software to provide stock market related information. Introducing Data Mining Tools and Techniques into stock market prediction processes can achieve a substantial increase in growth of stock market and demand of investors in the market. Data mining techniques can be applied on past and present data to generate patterns and decision making algorithms. In this paper we have applied data mining techniques in stock market analysis for effective decision making.

Keywords: Stock Market, Data Mining, Decision Trees, Clustering and Naïve Bayes Classifiers.

Introduction:

The stock market is a backbone of fast emerging economies in India. It is considered too uncertain to be predictable due to various factors such as company's economic growth, investments, company and country's strategical plans etc. Stock market forecasting incorporates revealing business sector patterns, arranging speculation methodologies, recognizing the best time to buy the stocks and what stocks to buy. Financial institutions deliver gigantic informational collections that construct an establishment for moving toward these enormously complex and dynamic problems with various techniques. By examining the literature stock market predication can be grouped into four type i.e., Technical Analysis Approach, Fundamental Analysis Approach, Time Series and Data Mining Algorithmic methods.

The use of IT application like Web based applications, SQL query, Excel sheet and customize software are providing the stock market related information to share holders. Introducing Data Mining Tools and Techniques into stock market prediction processes can achieve a substantial

increase in growth of stock market and demand of investors in the market. It is here that Data Mining plays a vital role.

Element and Uses of Data Mining

The use of IT application like Web based applications, SQL query, Excel sheet and customize software are providing the stock market related information to share holders. Introducing Data Mining Tools and Techniques into stock market prediction processes can achieve a substantial increase in growth of stock market and demand of investors in the market. It is here that Data Mining plays a vital role.

Data Mining can be defined as a technique for extracting the "meaning" contained in information to allow the understanding needed by a user to make a "right" decision. Another definition could be providing the right information, in the right form, at the right time. It is Data Mining that enables a PC to process the consistent stream of information being produced by the modernized sensors and screens of the plant, and afterward remove from that data that makes them mean substance. Information mining

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devices and procedures can be utilized for justifying the information in order to decrease the over-burden that will in general happen and make it basic for the faculty to settle on a correct choice in stock market.

Generally, data mining is the process of analyzing data from different perspectives and summarizing it into useful information that can be used to increase revenue, cuts costs, or both. The additionally intriguing approach to utilize an data mining model is to motivate the client to really comprehend what is happening with the goal that they can make a move straightforwardly. Data mining software is one of various investigative devices for breaking down information. It enables clients to break down information from various measurements or points, classify it, and outline the connections distinguished. Technically, data mining is the process of finding correlations or patterns among dozens of fields in large relational databases. Data mining consists of five major elements:

- Extract, transform, and load transaction data onto the data warehouse system
- Store and manage the data in a multidimensional database system.
- Provided data access to business analysts and IT professionals
- Analyze the data by application software.
- Present the data in a useful format, such as a graph or table.

Different levels of analysis are available:

Decision Trees

Tree- shaped structures that represent sets of decisions. These decisions generate rules for the classification of a dataset. Specific decisions tree methods include Classification and regression trees (CART) and chi Square Automatic interaction Detection (CHAID). CART and CHAID are decisions tree techniques used for classification of a dataset. They provide a set of rules that you can apply to a new (unclassified) dataset to predict which records will have a given outcome. CART segments a dataset by creating 2- way splits while CHAID segments using chi square tests to create multi-way splits. CART typically requires less data preparation than CHAID.

Association Analysis

Association rule mining focuses on the market basket analysis or transaction data analysis, and it targets discovery of rules showing attribute-value associations that occur frequently and also help in the generation of more general and qualitative knowledge which in turn helps in decision making.

Clustering

Clustering algorithms divide data into important gatherings to such an extent that designs in a similar gathering are comparative in some sense and examples in various gathering are divergent in a similar sense . Searching for clusters involves unsupervised learning. For instance, the search engine clusters billions of website pages into various gatherings, for example, news, surveys, recordings, and sounds. Hierarchical clustering method combines data objects into subgroups; those subgroups merge into larger and high level groups and so forth and form a hierarchy tree. Hierarchical clustering methods are of two types Agglomerative (bottom-up) and Divisive (top-down) approaches. The agglomerative clustering start with one-point clusters and recursively merges two or more of the clusters. CURE (Clustering Using Representatives) are its further extension. The divisive clustering starts with a single cluster containing all data points and recursively splits that cluster into appropriate sub clusters and SVD (Singular Value Decomposition) are its further research. (ii) Partitioning algorithms discover clusters either by iteratively moving focuses between subsets or by identifying areas heavily populated with data. Its further research includes SNOB, MCLUST, k-medoids, and k-means, DBSCAN (Density Based Spatial Clustering of Applications with Noise).

Artificial Neural Networks and Genetic Algorithms

Artificial Neural Networks are used in a wide range of applications. Some of the applications are detecting the fraudulent use of credit cards. They can be used for finding of credit risk prediction for increasing rate of targeted mailings. The Non linear predictive models that learn through training and resemble biological neural networks in structure.

Optimization techniques that use processes such as genetic combination, mutation, and selection in a design based on the concepts of natural evolution.

Statistical Methods in Data Mining

In Data Mining there are different classes of statistical methods e.g. Classical Statistics (regression, curve fitting etc.), Induction of symbolic rules and Time Series. Curve fitting is a well known method of data mining. This method can be used to identify the hidden patterns of any data set and thus may lead us to knowledge discovery. The goal of linear regression is to find the line that best predicts Y from X. Linear regression does this by finding the line that minimizes the sum of the squares of the vertical distances of the points from the line. Non-Linear Regression Nonlinear regression is a general technique to fit a curve through the data. It fits data to any equation that defines Y as a function of X and one or more parameters D.

Data Visualization

The visual interpretation of complex relationship in multidimensional data Graphics are used to illustrate data relationships. The purpose of information perception is to give the client a chance to comprehend what is happening. Since data mining normally includes removing "hidden" data from a database, this understanding process can get to some degree muddled. In most standard database activities almost everything the client sees is something that they knew existed in the database as of now. A report demonstrating the breakdown of sales by item and locale is direct for the client to comprehend in light of the fact that they instinctively realize that this sort of data as of now exists in the database. If the company sells different products in different regions of the county, there is no problem translating a display of this information into a relevant understanding of the business process. The primary benefit of data mining is the ability to turn feeling into facts. Data mining can be utilized to help or refute feelings of individuals have about how organizations is going. It very well may be utilized to add validity to these sentiments and warrant devotion of more asset and time to the most gainful territories of an organization's activities. This benefit deals with situations where a company starts the

data mining process with an idea of what they are looking for.. This is called targeted data mining. Data mining can discover unexpected patterns in behavior, patterns that were not under consideration when the mining exercise commenced. This is called out of the blue data mining.

Analysis of Consistency Between Shares Price

When the units in two or more distributions are different then the various statistical measures calculated from these are not comparable. The comparison of dispersion for such distributions can be made by calculating co-efficient of variation (C.V.) defined as:

$$CV\% = (SD/Mean) * 100$$

Evidently this measure is free from any units. This measure of relative variability is extremely useful in garment industry. Greater the coefficient of variation higher is the value of the standard deviation relative to the mean. This measure can also be used to study the consistency in performance of various individual.

The average of the sum of the squares of deviation from mean is known as variance and the square root of variance is known as standard deviation.

Case Study- 1 : The average share price (in Rs.) of two units X and Y given below, state which unit share is more stable in value:

X	:55	54	52	53	5	6
Y	58	52	50	51	49	
	:108	107	105	105	1	0 6
	107	104	103	104	101	

Solution: For finding out which share is more stable in value, we have to compare the coefficient of variation of share X and Y.

Calculation of Coefficient of Variation X

Mean (X) = 53

Standard Deviation (X) = 2.64

CV% of Share X = (2.64 / 53) * 100 = 4.99

Calculation of Coefficient of Variation Y

Mean (Y) = 105

Standard Deviation (Y) = 2.0

$$CV\% \text{ of Share Y} = (2.0 / 105) * 100 = 1.90$$

Since Coefficient of variation is less for share Y as compared to share X, hence share Y is more stable in value.

Analysis of J48 and Naïve Bayes Classifiers on Stock Dataset and determine the Accuracy

J48 is an algorithm used to generate a decision tree which is C4.5 and can be used for classification. The additional features of J48 are accounting for missing values, decision tree pruning, continuous attribute value range, derivation of rules etc. The share holder in most of the cases invests on profit. The detail of sample dataset of a particular company has been given in Table.

Outlook	Purchasing Price	Selling Price	Company Growth	Nation Policy effect on stock market	Investment
Buy	82	82	Down	Good	No
Buy	80	92	Up	Good	Yes
Sell	83	89	Down	Good	Yes
Hold	70	96	Down	Bad	No
Hold	68	80	Down	Good	Yes
Hold	65	70	Up	Good	Yes
Sell	64	65	UP	Good	No
Buy	72	95	Up	Good	Yes
Buy	69	70	Down	Good	Yes
Hold	75	80	Down	Good	Yes
Buy	75	70	Up	Good	Yes
Sell	72	95	Up	Bad	Yes
Sell	81	75	Down	Bad	Yes
Hold	71	91	Up	Good	No

Output Run information By J48 on Weka Software

Scheme: weka.classifiers.trees.J48 -C 0.25 -M2

Relation: stock_market

Instances: 14

Attributes: 6

- outlook
- purchasing_price
- selling_price
- company_growth
- nation_policy_stock
- invest

Test mode: evaluate on training data and Classifier model (full training set)

J48 pruned tree: yes (14.0/5.0)

Number of Leaves : 1

Size of the tree : 1

Summary

Correctly Classified Instances	9
64.2857 %	
Incorrectly Classified Instances	5
35.7143 %	
Kappa statistic	0
Mean absolute error	0.4592
Root mean squared error	0.4792
Relative absolute error	98.9011 %

Root relative squared error 99.9306 %
Total Number of Instances 14

Detailed Accuracy By Class

	TPRate	FPRate	Precision	Recall
F-Measure	1.000	1.000	0.643	1.000
MCC	0.783	?	0.500	0.643
ROC Area	?	0.000	0.000	?
PRC Area	?	0.500	0.357	No
Class	Weighted Avg.0.643	0.643	?	0.643
	?	?	0.500	0.541

Confusion Matrix

a b <-- classified as
90 | a = yes
50 | b = no

The Naive Bayesian classifier is based on Bayes' theorem with the independence assumptions between predictors. A Naive Bayesian model is easy to build, with no complicated iterative parameter estimation which makes it particularly useful for very large datasets. Despite its simplicity, the Naive Bayesian classifier often does surprisingly well and is widely used because it often outperforms more sophisticated classification methods. The above mentioned dataset given in the table has been

applied for Naïve bayes classifier on the weka software.

Output Run information by Naive Bayes Classifier on weka software

Scheme : weka.classifiers.bayes.NaiveBayes
 Relation : stock_market
 Instances : 14
 Attributes : 6

- outlook
- purchasing_price
- selling_price
- company_growth
- nation_policy_stock
- invest

Test mode : evaluate on training data and Classifier model (full training set)

Class
 Attribute yes no
 (0.63) (0.38)

=====

Outlook	buy	sell	hold	[total]
	4.0	3.0	4.0	12.0
	3.0	2.0	3.0	8.0

purchasing_price

mean	73.3131	73.2364
std. dev.	5.4689	6.3323
weight sum	9	5
precision	1.7273	1.7273

selling_price

mean	80.3704	85.4222
std. dev.	10.6475	10.9791
weight sum	9	5
precision	3.4444	3.4444

company_growth

up	5.0	4.0
down	6.0	3.0
[total]	11.0	7.0

nation_policy_stock

good	8.0	5.0
bad	3.0	2.0
[total]	11.0	7.0

Summary

Correctly Classified Instances 9
 64.2857%

Incorrectly Classified Instances 5
 35.7143%

Kappa statistic 0.1026
 Mean absolute error 0.4231
 Root mean squared error 0.4506
 Relative absolute error 91.1245 %
 Root relative squared error 93.9810 %
 Total Number of Instances 14

Detailed Accuracy By Class

Class	Recall	F-Measure	MCC	TP Rate	FP Rate	ROC Area	Precision	PRC Area
yes	0.762	0.122	0.689	0.889	0.800	0.667	0.889	0.200
no	0.286	0.122	0.689	0.200	0.111	0.500	0.200	0.643
Weighted Avg.	0.592	0.122	0.689	0.643	0.554	0.607	0.643	0.725

Confusion Matrix

a b : classified as
 81 | a = yes
 41 | b = no

Conclusion

The proposed case study of data mining for analysis of stock market is a step forward towards those objectives. By proper use of this statistical and data mining technique it is possible to analyze the consistency of two share price and important decision making regarding investment of shares on Stock Dataset and determine its Accuracy.

References

[1] Dr. B.K. Sharma, Prof. S.K.B & Abhay Bansal, *Data Mining Tools and Techniques in Textile Industry for Effective Decision Making and Corrective Action, Asian Textile Journal, Vol No. 15, No. 8, August 2006*
 [2] Prof. S.K. Tyagi & Dr. B.K. Sharma "Evaluation of energy efficiency, monitoring and improvement through data mining tools and techniques for oil

- conservation in textile industry, *International Journal of computer sciences software engineering and electrical communication*.
- [3] D.K. Bhattacharya, Dr. B.K. Sharma & Sanjeev Saxena "Energy balance & accounting for boiler and process house in textile industry through software approach at 43rd Joint technology conference, IIT Delhi on 2-3rd march 2002.
- [4] Sanjeev Saxena & Dr. B.K. Sharma " Evaluation of Energy Efficiency, Monitoring and improvement through software for oil conservation at 5th international petroleum conference (PETROTACH-2003) organized by ministry of petroleum and natural gas on 9-12 january,2003at vigan bhawan, New Delhi
- [5] A.M. Turing, "Computing machinery and intelligence," in *Collected works of A.M. Turing: Mechanical Intelligence*, D.C. Ince, Ed., chapter 5, pp. 133{160. Elsevier Science Publishers,1992.
- [6] Stuart M. Shieber, "Lessons from a restricted Turing test," Available at the Computation and Language e-print server as *cmp-lg/9404002.*, 1994.
- [7] K. Hasida and Y. Den, "A synthetic evaluation of dialogue systems," in *Machine Conversations*, Yorick Wilks, Ed. Kluwer Academic Publishers, 1999.
- [8] Eugene Charniak, "Statistical Language Learning", MIT Press,1993.
- [9] Jason L. Hutchens, "Finding structure via compression," in *NeMLaP3 / CoNLL98: New Methods in Language Processing and Computational Language Learning*, ACL, David M. W. Powers, Ed., January 1998.
- [10] S.Parsanna, Dr. D.Ezhilmaran " An Analysis on stock market prediction using data mining techniques, *International Journal of Computer Science & Engineering Technology (IJCSET)*, vol. 4 no 2 Feb. 2013.
- [11] Chin-Yin Huang and Philip K.P. Lin " Application of integrated data mining techniques in stock market forecasting. *Cogent Economics & Finance*, 2014.

A Survey: Internet of Things and Its Smart Applications for Smart Devices

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ABSTRACT

We are drawing nearer towards another period of Computer Science where each electronic gadget will be another communicator and the concept of INTERNET OF THINGS (IoT) is making this a reality. IOT is the idea of expediting the entire world web and remote access which incorporates advancement of Smart and intelligent machines and it's not upto just Mobiles and Computers but rather the each gadget (Home apparatuses and vehicles and so on.).Being the innovation of this period it will change how individuals experience their lives.

IoT is the worldwide system of gadgets of our every day utilize like vehicles, home appliances (AC, Geyser), and other smart devices which are embedded with sensors, software's, actuators and connectivity which actually enables devices to collect transfer and exchange data. The Data is transferred to a server or cloud storage, with a motive to process it and generate some meaning out of it. Its actual use is to provide a more smart and powerful remote access to appliances and data.

Keywords: IoT, Smart Devices.

Introduction

Consistently Technology gives another blessing in the form of a new technology called "IOT" the INTERNET OF THINGS. This is the concept enabling all devices such as home appliances and vehicles and every electronic gadget with internet and providing a remote access to them. And making the gadgets Smart enough to take their very own choice.

IoT is the network of devices embedded with sensors, actuators and connectivity capable of collecting data and transferring it on server over the network where data will be processed to get some meaningful information out of it. This actually enables us to control and access the gadgets Remotely. Servers are sometimes the Cloud storage where many IoT application actually stores their data.

IoT comprises of lot of technology to provide a more smarter application. The data is collected at devices with sensors like Temperature sensor, Proximity sensor, Inactivity sensor and actuators like Raspberry pi and Adreno gpu and then the data is transferred over network or protocol generally a GPRS (General Packet Radio Service) and CNSS is used to transfer and where the data is stored and processed using some AI algorithm like algorithm of Machine Learning and Deep Learning to get some meaning out of it.

Now a days we tune in to a term called SMART HOME. This term is going to be a reality to everyone and is possible with the technology called IoT. In this Sensors like Temperature sensors and Inactivity sensors are installed in the house and daily activities are noted with the data of those sensors and then the system helps you to manage your Power consumption, your Doors and Windows even when

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you are not home. This actually provides you a Strong Remote access of your Home. This is how technology in this new era is going to help you to manage your things remotely. Iot have lot more application like traffic signal can board can also be smart according to rush time and presence on vehicle on one side by adjusting the time of traffic light.

Notice board application is also popular. Because In conventional ways a person is needed to update notice board every time a new update is received but with the IoT We can update that with just a Message we don't need to be there we can control with our smart phone remotely from where ever we are. With just a message our information is going to be displayed on the notice board.

Technologies of IoT

IoT comprise of a lot of technology that are used to create a smart device global network. Devices embedded with microprocessor and sensors are planted to collect data in the form of digital signal and this data is transferred over the network using GPRS to send data to server and here the data is made available to authorized user and is also used to generate some meaning out of it using some AI technique and ML algorithm.

Raspberry pi – Raspberry pi is a single board computer system which do not conatin the pehripehral devices such as keyboard and mouse. It is launched by Raspberry pi foundation. It is launched with a intention to make device for basic learning of iot. The sensors are now embedded on this and put to collect and send data using the Raspberry pi. Transferring – The data collected by sensors are now transferred to server over the network GPRS(General Packet Radio Service), CNSS etc.

Data Processing – The data on the server are further used to deliver some information to authorized person. Data is processed using some AI Technique and algorithm are here the data in the form of sensors signals is now converted into a meaningful information or a command which some device has to perform.

Applications of IoT

This System IoT have lot of application in different fields for different purposes. One major application is in shopping malls for advertisement boards and notice boards where every moment we have something new to show some offers and to display new advertisement.



Figure 1: IoT's Smart Applications

Smart Homes:-

- Automatic closing of windows and doors after long inactivity.
- Monitoring of Temperature and controlling Air conditioning with smart phones.

- Monitoring the Consumption of resources like power and water and also make suggestions to optimize consumption.
- Monitoring Late night activity and theft activity.
- Provides a total remote access to homes.

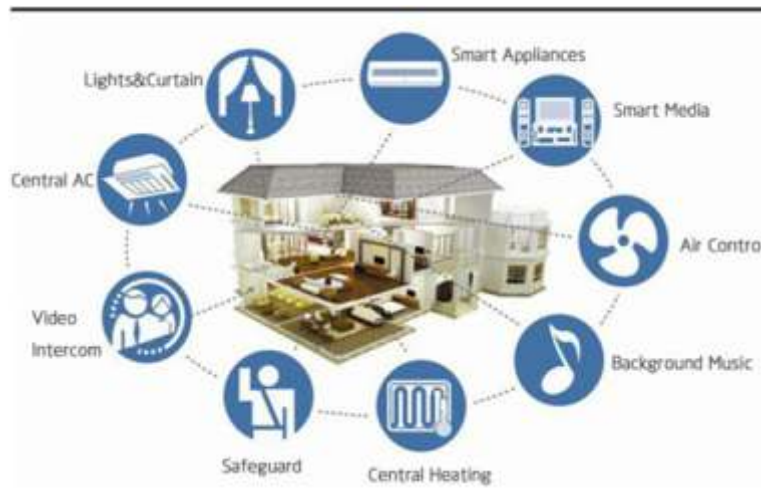


Figure 2: IoT Applications for Smart Home

Smart cities:-

- Management of Traffic signal timing according to traffic load on lanes
- Providing smart dustbin to city.
- Monitoring of climate of city.
- Monitoring the pollution by industries.
- Managing the parking space.
- Monitoring the pedestrian and vehicles to optimize traffic routes.

- Advertisement signage with latest ads with no personal involvement of changing ads.
- In shopping malls for current offer display.

Railway is also having one important application as display boards at platforms to provide currnt status of trains and new arrivals at station.

Medical:-

- Health care wristbands.
- Smart wheel chairs with navigation and user control.
- AI doctor and mobile medicine.
- Diseases diagnostic and assistance for elder people.
- Monitoring UV rays and warning public if needed.

Conclusion

The IoT promises a key change in the technology and in the level of ease of technology. This technology is providing you the access of anything from anywhere. It actually lets you control your matters of concern from remote places. This is going to put all devices on internet as communicator. As we saw the applications of this technology is in very large field. It has the capability to push the boundaries up to a new level. Being the most powerful technology of today's era under this many devices are getting on internet with unique identification but at a very slower rate we need to promote and increase the growth. A very devoted and concerted effort is required to push the scale of growth toward huge success. At Last this can change the way we use technology and understand technology.

Advanced Display:-

- Smart notice boards for notice navigation with one click remote access for authorized designatory.

References

- [1] Vandana Sharma and Ravi Tiwari "A Review Paper on IOT and its smart application" *International Journal of Science, Engineering and Technology Research (IJSETR)*, Volume 5, Issue 2, February 2016.
- [2] Ms.Pradnya.A. Hukeri¹, Mr.P.B.Ghewari^Z "Review paper on IOT based Technology", *International Research Journal of Engineering and Technology (IRJET)*, 2017.
- [3] Mahmood Hussain Mir , Dr. D. Ravindran " Role of IoT in Smart City Applications: A Review" *International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)* Volume 6, Issue 7, July 2017, ISSN:2278-1323.
- [4] Saber Talari , Miadreza Shafie-khah, *, Pierluigi Siano, Vincenzo Loia ,Aurelio Tommasetti "A Review of Smart Cities Based on the Internet of Things Concept" *Energies* 2017.

Role of Artificial Intelligence Techniques in Software Testing Process

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ABSTRACT

In this technological era, we, the human, are dependent on the machines. It's very difficult to imagine the life without computers, Mobile Phone, electronic gadgets etc. now a days. Software is one of the critical part of these machines whether system software, application software or embedded software. It's very challenging task for the software organizations to release quality software. Tremendous amount of the testing is done to ensure that the software would not fail before delivering the software to the client. Various testing techniques are adopted at various levels to achieve the confidence level. Testing is one of most critical phase of software development in which organizations spend time, cost & efforts to satisfy the client with quality product. New innovations are being done in this field to achieve maximum output in less time & cost. Automation testing has been proved very effective & captured the industry by means of its benefits. The process of software testing can be more effective by using the techniques of Artificial intelligence. In this paper, the main focus is to understand the benefits of AI, its implementation & limitations in the field of software testing.

Keywords: Artificial Intelligence, Software testing, AI tools, testing techniques

Introduction

Software testing is the process in which we developer/tester test the Software or related documents in order to find out the mistakes or bugs. Software & its related documents are developed by the human being & human being can make mistake. These mistake further lead to the presence to bugs and these Bugs in the program can lead to failure which further may cause disasters. Therefore to deliver the product to the customer, software developer/tester/ independent testing team try their hard to remove all the bugs at their end. There are many principles related to the process of Software testing:

- a) We can't test each & everything before release of the software i.e. exhaustive testing is not possible. This may not be possible due to time pressure or budget.
 - b) Testing is context dependent. The efforts spend on the testing totally depends upon the type of application.
 - c) There are only few modules in the software which contains maximum defects.
 - d) Test cases should be refined time to time to find out more defects.
 - e) Testing shows the presence of defects in the software.
 - f) Testing should be started in the early phases of the Software development to save the cost & time in future.
2. **Test Process** – The set of activities carried out during testing phase in a logical sequential manner or may be in parallel or in conjunction with each other.
 - a) **Planning & Control** – The main objective in this phase is to determine the goals & objective of the

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customer; scope, risk & objective of testing; determine the test approach; implement the test policy and strategy; determining required resources, schedule planning and determining the exit criteria. Monitoring & Control are also the most important activities which are carried out in each & every phase.

- b) **Analysis & Design** – To convert our objectives into the tangible test conditions & design, there is need to do this activity in which many tasks like review the test basis, identifying test conditions, designing the tests, evaluation of requirement & test traceability, designing the test environment & set up, identification of required infrastructure tools like testing tools & supporting tools etc. are carried out.
- c) **Implementation & execution** – The main aim of this phase is to develop & prioritize the test cases determining the criticality & risk associated with the product and depending upon the testing techniques, execution of test cases, comparing the actual & expected result, logging the outcome & incidents. The retesting or confirmation testing, if required, may be done.
- d) **Evaluating exit criteria & Reporting** – Test execution is checked to assess it against the said objectives. At each test level, we need to determine whether there is need to continue testing at this particular level or to move to another level. Test summary report is prepared to share with management, client, managers etc.
- e) **Test Closure Activities** – checking the planned deliverables with actual deliverables including reports, finalize & hand over the test ware to the maintenance department, analyzed the lesson learned for future development etc.

Levels of Testing

- I. **Component Level** – At this level of testing, functionality of the individual software component – modules, programs, classes or objects are tested and verified.
- ii. **Integration Level** – in this level testing of the communication between the components &

their interfaces and interactions to the different parts of a system is tested. Top-down, bottom up, big bang strategies may be adopted at this Integration level testing.

- iii. **System Testing** – the complete system is checked to find out the behavior of the system. Functional & non functional testing like load testing, stress testing, performance testing, reliability testing, security testing and many more types of testing need to be done to verify the complete system before handing over to the client for acceptance testing.
- iv. **Acceptance Testing** – At this level of testing, the complete system is validated as per the demand/ need of the client. Acceptance, Alpha & Beta testing may be performed according to the demand of the client.

Role of Artificial Intelligence in software Testing

Artificial Intelligence is a field of computer science which is concerned with the development of computers able to engage in human-like thought processes such as learning, reasoning, and self-correction. Machines can be improved to assume some capabilities normally thought to be like human intelligence such as learning, adapting, self correction, etc.

Artificial Intelligence has helped and has been used in many fields and applications like Face book and banking networks and Finance Networks. Face book uses its cookies to track all the movements of its users of where they go, what they like and how they spend their time and this data is used by different companies in estimating their customer choices and in making decisions. Banking Sector also uses artificial intelligence in calculating the customer's financial situation and helps them in making decisions for future investments. There are also different applications like Amazon Alexa, Google now which use artificial intelligence and help the human kind in making life easier.

Since software testing process is a very costly process in terms of time, money and resources. Software need to be tested again & again. Regression

testing itself is a very time consuming activity and it's very difficult for a human being to execute the same test many times. Software organizations don't want their products became very risky to fail and loosing market. Therefore, we have to find approaches to decrease testing cost and also increase reliability. One approach is using methods to automating this process.

Researches show that automated and intelligent testing process or at least portion of it, can significantly decreasing the test cost. In automated testing, developers attempt to convert testing process which performs by human, to perform by computer's software with intelligent techniques and algorithms like Artificial Intelligence and Statistical methods.

So to improve the efficiency of the software product, we can take advantage of techniques of AI in various areas of software testing like failure patterns, to find out defect hotspots, failure predictions in advance etc. These insights will help anticipate, automate, and amplify decision-making capabilities, thereby building quality early in the project lifecycle.

Machine learning to test software is the step that comes after automation testing. Development of testing tools that can use AI to help testers find defects in their software and then fix code automatically after finding a bug. Defense Advanced Research Projects Agency (DARPA) held a major event to develop systems that can automatically and autonomously "detect, evaluate and patch software vulnerabilities" to improve cyber security. By incorporating Artificial Intelligence (AI) into testing practices, users can move beyond traditional, manual testing models and experience truly automated continuous testing.

AI is the key to making software testing smarter and more efficient. Various organizations are using this innovations in software testing like Infosys has developed an in-house, machine learning platform to get help in software testing life cycle, leading to more efficient execution and reduced effort.

Application Areas

- Easy test management & creation of test cases automatically

- To generate test code automatically by reading the user story acceptance criteria.
- Codeless test automation would create and run tests automatically on your web or mobile application without writing any code.
- Test suite optimization - Identifies duplicate/similar and unique test cases
- Predicting the next - To help predict the key parameters of software testing processes based on historical data.
- Log Analytics - Identifies hotspots and automatically execute test cases
- Traceability - Identifies complex scenarios from the requirements traceability matrix (RTM) and extract keywords to achieve test coverage
- Customer sentiment Analytics - Analyzes data from social media and provides an interactive visualization of feedback trends
- Defect analytics - Identifies high-risk areas in the application which helps in risk-based prioritization of regression test cases
- To identify the patterns based on the training data
- image recognition to improve UI testing
- Dynamic UI controls can be automatically recognized with AI
- To recognize and learn new patters that help test execution remain repeatable and stable, even as software complexity grows.

Tools

To build AI test bots, we must train the bots to process input data by asking questions to perform an intelligent action, just like Android Auto Google Assistant. To improve the performance of bots, algorithms are revised with better techniques to recognize input patterns and behaviors.

Training data Test Data + Learning Machine = Analyzed data for prediction.

Test.AI

Test.AI is a tool that will add an AI brain to Selenium and Appium. Developed by Jason Arbon, founder of appdiff, in this Tests are defined in a simple format similar to the BDD syntax of Cucumber, so there is no requirement of code and no need to mess with element identifiers. The AI identifies screens and elements dynamically in any app and

automatically drives application to execute test cases.

Mabl

Mabl is similar to Test.AI. Mabl started by a bunch of ex-Google employees runs functional tests against your apps or website. In Mabl terminology, you “train” your tests to interact with your applications. When you’re done recording, your trained tests will run at a predetermined amount of time and alert you.

ReTest

Use an artificially intelligent monkey to fully automatically test your application. That’s how ReTest markets itself. ReTest claims to be different from other test automation tools because it was built specifically with testers in mind.

Benefits

1. Increased productivity - can perform more work in the same amount of time as compared to manual testing
2. Better Quality & Accuracy - Prediction, prevention, and automation using self-learning algorithms
3. Decreased cost
4. Increased reliability
5. Usage of Cognitive Computing Technology like Speech recognition, language processing, and robotics.
6. Detailed Data captured to analyze & improve the performance
7. Decreased testing time i.e. the product could be launched in the market soon.
8. Traceability – Missing test coverage against requirement as well as, identifying dead test cases for changed or redundant requirement
9. One integrated platform – Adaptable to client technology landscape, built on open source stack

Challenges

- Identifying, perfecting all the algorithms needed
- Collecting lots of input data to train the bots
- How the bots behave from input data
- Bots can repeat tasks even when the data inputs are new.
- The process of training your bot will never end, as we’re continuously improving algorithms.

Conclusion

From last many years, most of the Research has been carried out in AI. Many organizations including Software Development organizations are using the techniques of AI for the commercial use. Since Testing is one of the most important & time consuming process during the development of the Project and we could easily reduce the Efforts & Cost of Software Testing using the Techniques of AI.

References

- *“Intelligent and Automated Software Testing Methods Classification”, Seyed Reza Shahamiri, Wan Mohd Nasir.*
- <https://pdfs.semanticscholar.org/b941/cae0bd6aa807709b667d692caa5d36ebda3b.pdf>
- <https://www.infosys.com/IT-services/validation-solutions/service-offerings/Pages/machine-learning-qa.aspx>
- *Foundations of software testing, Dorothy Graham, Erik van Veenendaal, Isabel Evans*
Rex Black
- <https://analyticsindiamag.com/artificial-intelligence-becoming-new-paradigm-software-testing/>
- <https://appdeveloper magazine.com/5771/2018/1/2/software-testing-using-artificial-intelligence/>
- <http://qaistc.com/2017/wp-content/uploads/2017/09/impact-of-ai-in-security-testing-9117.pdf>
- <https://saucelabs.com/blog/ai-test-automation-the-ai-test-bots-are-coming>
- <https://www.joecolantonio.com/2017/11/07/7-innovative-ai-test-automation-tools-future-third-wave/>

A Survey on Security Issues on Internet of Things

Avinav Pathak*

ABSTRACT

In the ongoing years, individuals need to utilize Internet at whenever and anyplace. Internet of Things (IoT) enables individuals and things to be associated Anytime, Anyplace, with Anything and Anyone, in a perfect world utilizing Any way/organize and Any administration. IoT can be thought as contrast by different advances, which give the imaginative administrations in various application spaces. This implies there are different difficulties present while sending IoT. The Internet of things empowers things to be recognized and controlled remotely transversely over existing framework structure. According to the Gartner, 260 million articles will be associated by year 2020. Several associations and governments have endeavored to make references with IoT in beginning circumstances, anyway nowadays in assembling, retail and SOC (Social Overhead Capital) enterprises, fruitful acknowledged systems are fabricated recently. The conventional security administrations are not straightforwardly connected on IoT because of various correspondence stacks and different norms. So adaptable security components are should be created, which manage the security dangers in such unique condition of IoT. Probably the most requesting of necessities for the across the board acknowledgment of numerous IoT dreams is security. IoT security has an uncommonly wide extension in no less than four measurements. As far as security scope it incorporates once in a while tended to undertakings, for example, confided in detecting, calculation, correspondence, protection, and computerized overlooking. The Internet of Things (IoT) gadgets have be-come famous in different spaces, for example, e-Health, e-Home, web based business, and e-Trafficking, and so on. With expanded arrangement of IoT gadgets in reality, they can be, and at times, as of now are liable to noxious assaults to trade off the security and protection of the IoT gadgets. While various specialists have investigated such security difficulties and open issues in IoT, there is a sad absence of a precise investigation of the security challenges in the IoT scene. In this paper, we go for spanning this hole by leading an exhaustive investigation of IoT security difficulties and issues. We present an itemized investigation of IoT assault surfaces, danger models, security issues, prerequisites, legal sciences, and challenges. It additionally requests new and better strategies for the assurance of equipment, programming, and information that thinks about physical access to IoT gadgets. Sensors and actuators are basic parts of IoT gadgets and represent a few novel security challenges including the trustworthiness of physical flags and inciting occasions. At long last, amid preparing of gathered information, one can imagine numerous semantic assaults. In this overview we present the different research issues with their respective solutions. Additionally, some open issues are found and a few clues for further research course are talked about.

Keywords—Internet-of-Things; Sensor Networks; Smart objects; Sensors; Security

Introduction

In the recent years, web has become the foremost necessary factor in people's life. Around 2 billions of individuals around the world use world wide web

for sending and receiving emails, using social networking applications, sharing a great amount of knowledge, taking part in games and lots of different things. Since the use of web is growing day-by-day, another massive space is rising to use web as a

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worldwide platform for permitting the machines and sensible objects to speak, calculate and coordinate, known as Web of Things (IoT). IoT could be a technology wherever objects around us are able to hook up with one another (e.g. machine to machine) and communicate via the internet. With the expansion of this space, it is not needed to sit at an area and access the net. Instead, web can be accessed from anyplace and from any device. Of course, web can stay as a backbone of this new space. IoT can produce a world wherever all the objects, additionally known as sensible objects, around U.S. are connected to the net and communicate with one another with minimum human intervention [1].

The motivation behind IoT is to make, Smart city [2], to improve utilization of open assets, increment the nature of administrations offered to individuals and decline the operational expenses of the administrations. The ultimate goal is to create a better world for human beings, where objects around us know what we like, what we want and what we need and act accordingly without explicit instructions [1]. The term IoT is used to refer (i) the global network which interconnects smart objects by using Internet technologies (ii) set of supporting technologies such as Radio Frequency Identifications (RFIDs), sensor/actuators, machine-to-machine communicating devices etc. (iii) combination of application and services using such technologies for business purposes [3]

The IoT depends on three building blocks, based on the ability of smart objects to: (I) be recognizable (anything distinguishes itself), (ii) to convey (anything imparts) and (iii) to connect (anything associates). The focal point of IoT is on the information and data, instead of point-to-point communication. The significant difficulties while building IoT include:

- (I) **Devices heterogeneity:** As IoT is tied in with associating a few keen gadgets, interfacing heterogeneous gadgets is real test while building IoT. Such devices execute on various platforms, they utilizes multiple protocols to communicate. So it is important to do unification of such devices.
- (ii) **Scalability:** Another major challenge is the scalability of the IoT, as everyday new

devices/objects are getting connected with the network. It involves problems like addressing/naming conventions, information management etc.

- (iii) **Ubiquitous data exchange through wireless technologies:** In IoT, wireless technologies are used to connect smart devices. It has issues problems like availability, network delays, congestion etc.
- (iv) **Energy-optimized solutions:** This is a huge difficulty of IoT. As many devices are connected via networks, energy spent for data communication will be high. The challenge is to optimize the use of energy required for communication among different devices.
- (v) **Localization and tracking capabilities:** The keen items must be recognized and tracking of them is important.
- (vi) **Self-organization capabilities:** In IoT, it is required that the brilliant articles sense the environment and autonomously react to real world situations, without much human intervention.

Primary aim of this paper is to present detailed information about the security issues in IoT. The rest of the paper is organized as follows: Section 2 describes literature review in the area IoT. Section 3 describes Definitions and Elements of IoT. Section 4 gives Security Issues / Concerns related to IoT. Section 5 presents conclusions and future research directions.

Literature Review

The basic definitions, trends and elements of IoT are presented in [4]. This paper depicts distinctive definitions given by various researches of IoT. This paper likewise shows uses of IoT and the areas which are impacted by IoT. Likewise the future research bearings identified with IoT innovation are referenced. [3] presents distinctive testing issues while building an IoT. This paper additionally examines about the security issues in IoT. Another preferred standpoint of this paper is, it depicts the on-going undertakings identified with IoT. This

paper expresses that the security in IoT contains information classification, protection and trust.

The paper [1] describes how the context aware computing is useful for IoT. Context aware computing has proven to be successful in understanding sensor data. This paper presents the basic terminology in context aware computing and also shows how this can be applicable to IoT. The survey presented in this paper includes techniques, methods, models, applications, systems, functionalities and middleware solutions related to context awareness and IoT.[5] describes different security challenges in Smart City. This paper describes the security issues when different devices are connected using Internet (IoT).[6] describes design, implementation and evaluation of an intrusion detection system, called SVELTE, for IoT.

Definitions and Elements

A. Definitions

Many definitions of IoT are presented by different researchers. Some of the definitions are presented below:

- (I) **Definition by RFID group** - The worldwide network of interconnected objects uniquely addressable based on standard communication protocols
- (ii) **Definition by [6]** - Interconnection of sensing and actuating devices providing the ability to share information across platforms through an unified framework. Developing a common operating picture for enabling innovative applications.
- (iii) **Definition by [1]**- The semantic origin of the expression, Internet of Things, is composed by two words and concepts: Internet and Thing, Where Internet can be defined as the world-wide network of interconnected computer networks, based on a standard communication protocol, the Internet suite (TCP/IP), while Thing is an object not precisely identifiable. Therefore, semantically, Internet of Things

means a world-wide network of interconnected objects uniquely addressable, based on standard communication protocols.

- (iv) **Definition by [1]**- The Internet of Things allows people and things to be connected Anytime, Anyplace, with Anything and Anyone, ideally using Any path/network and Any service.

B. IoT Elements [6]:

Radio Frequency Identification (RFID): This technology is used in embedded communication, for designing of microchips for wireless data communication.

- (I) **Wireless Sensor Networks (WSN):** These are efficient, low cost, low power devices useful remote sensing applications.
- (ii) **Addressing Schemes:** Addressing schemes are useful to uniquely identify the Things i.e. smart objects.
- (iii) **Data Storage and analytics:** IoT deals with sharing and storing of large amount of data. The data have to be stored and used intelligently for smart monitoring and actuation.
- (iv) **Visualization:** This allows interaction of the user with the environment. Extraction of meaningful information from raw data is non-trivial.

As mentioned in section 1 of this paper, there are many challenges involved while building IoT. In this section, major security related challenges while building IoT are described in brief.

Security Issues

The major security concerns that need immediate resolution are as :

A. Access Control

Access control deals with access rights given to the things/devices in IoT atmosphere. In ancient database systems, process of discrete knowledge is finished, but in IoT, process of flowing knowledge is

completed. 2 terminologies area unit represented for Access management [8]: 1) knowledge holders (Users), who send/receive knowledge to things. they have to send data to authenticated things 2) data collectors (things), that should certify users. [9] presents an identity based system for personal location in emergency scenario. Authentication downside for outsourced data stream is found in [10]. Access management of streaming data is per [11]. a number of the challenges associated with Access management in IoT context involve: a way to handle the large quantity of transmitted knowledge (i.e., within the kind of stream data) in a very common recognized representation. How to support the identification of entities?

B. Privacy Enforcement

A data tagging for managing privacy in IoT is projected in [12]. A user-controlled privacy-preserved access control protocol, supported k-anonymity privacy model is planned in [13]. [14] defines k-anonymity model by dynamic quasi-identifiers to preserve sensitive data. The privacy risk that happens once changeable name is appointed to a such IoT node is analysed in [15]. only some of the privacy problems associated with IoT are covered in recent work, there is still an outsized scope to form privacy protective mechanisms in IoT context.

C. Policy Enforcement

Policy enforcement implies to the approaches accustomed cause the appliance of a collection of outlined efforts during a system. Policies are performing rules that want to be acted for the aim of acknowledging order, security, and consistency on information. solely few works from literature describe the way to management policies social control. apart from the work in [16], there are not any definite solutions for IoT capable to assurance the social control of security conjointly privacy policies, though they are essential to assure a secure contribution of IoT example. Note that it is necessary to find the social control mechanisms allowable for the definite IoT context, locating an equilibrium between the reassurance of security and privacy problems and also the computing efforts demanded by the committed mechanisms themselves. many efforts have already been accomplished to outline

the standard languages for the specification of privacy policies, though an approved version of the language which might be applied to IoT paradigm remains depleted.

D. Trust Policy

The trust plan is employed totally different in several contexts and with different explanations. Trust may be a complicated construct regarding that no instructive acquiescence endures within the scientific literature, [7] moreover its importance is dimensionally identified. A core drawback with several applications towards trust description is that they do not contribute themselves to the demonstration of metrics and computation methodologies. The gratification of trust constraints are specifically associated with the identity negotiation and access management effects. the subsequent problems are still open in IoT-Trust environment: The introduction of well-defined trust negotiation language, trust negotiation mechanism for knowledge stream access management.

E. Mobile Security

Mobile nodes in IoT every now and again move starting with one bunch then onto the next, in which cryptography based conventions are utilized to permit quick distinguishing proof, validation, and security assurance. A specially appointed convention is exhibited in [17] which is valuable when a versatile hub joins another group. This convention additionally obliges a legitimate interest message and an answer validation message, which expediently executes distinguishing proof, verification, and security assurance. It will be valuable to shield against replay assault, spying, and following or area security assaults. Interestingly with other comparative conventions, for example, fundamental hash convention, it has less correspondence overhead, progressively secure and gives more security insurance. Condensing, additionally if the security issues of cell phones (i.e., gadgets ID and confirmation, key and certification stockpiling and trade) are under scrutiny by established researchers, the accessible arrangements mostly address these necessities, in this way requiring further endeavors so as to permit the incorporation with the other IoT technologies.

F. Secure Middleware

With many various technologies are in situ among the IoT bench mark, various kinds of middleware layer also are engaged to impact the integration and therefore the security of devices and data among the identical information network. within alike middlewares, knowledge needed to possess actual protection constraints. additionally, in middleware style and development, the various communication mediums for wide scale IoT deployments ought to be thought of. whereas several smart devices will natively support IPv6 communications [18, 19], continued deployments may not acknowledge the ip protocol among the native space scope. thus ad hoc gateways are used along with middlewares [20].

Additionally, middlewares now lack an accomplished review, adopt to controversy to all the IoT conditions, coupled in terms of security and privacy and network behavior. Also, ability is changing into an elementary challenge, so as to allot an individual construction of separated parts, able to co-act and collaborate with one another and yet as to deal data on the premise of standards. IoT includes not solely individual knowledge provided by devices/machines, however conjointly by customers, neighboring the interactions are machine-to-machine and moreover among customers and machines to boot among users and users. Therefore, the look and establishment of a middleware adhere an impression on the system composition (i.e., measurability, coupling among components).

G. Authentication & Confidentiality

Different works, describe totally different protocols and mechanisms to influence authentication of a user and confidentiality of information within the context of IoT. some of the main works associated with authentication and confidentiality in IoT are as follows: [21] presents good business security IoT application Protocol, which mixes cross-platform communications with coding, signature, and authentication, so as to boost IoT applications development capabilities. [22] specifies the implementation of two-way authentication security theme for IoT. As so much as confidentiality and

integrity thinks about, in [23], it is studied that however the present key management systems will be applied within the context of IoT. In [24, 25] Public Key Infrastructure (PKI) framework is made for IoT. of these current works are based on finding the matter of light-weight cyphering in pervasive environments. a lot of work has to be done to make standardized protocols for authentication and Confidentiality in IoT.

Conclusion and Future Work

IoT is the next step towards using net anyplace and Anytime. IoT permits to attach people and devices (things) Anytime, Anyplace, with anything and Anyone. This paper presents a quick plan regarding IoT and need of security in IoT. the most security problems associated with IoT are explained briefly. By observation, it's simple to grasp that there's no project still in work that satisfies all security problems in IoT. additionally there's no single project that provides policy enforcement within the IoT. In summary, an accomplished vision, admiring the peace of mind of security and privacy constraints in an exceedingly dissimilar setting, which means that current security services are deficient for such contradictory technologies and communication normal.

As IoT deals with interconnecting numerous heterogeneous things, presently there are several challenges occurring whereas building it. thus this space has several open analysis problems. the longer term analysis directions in the main consists of the way to wear down the challenges, could also be associated with security problems, faced by IoT. we have a tendency to hope this paper will be useful so as to allow a valuable preparation of IoT systems and in suggesting the long run analysis direction.

References

- [1] C. Perera, A. Zaslavsky, P. Christen, and D. Georgakopoulos, "Context aware computing for the Internet of Things: a survey," *IEEE Communications Surveys & Tutorials*, submitted 2013.
- [2] A. Zanella, N. Bui, A. P. Castellani, L. Vangelista, and M. Zorzi, "Internet of Things for smart cities," *IEEE Internet Things J.*, vol. 1, no. 1, pp. 22–32, Feb. 2014.

- [3] D. Miorandi, S. Sicari, F. De Pellegrini, and I. Chlamtac, "Internet of things: Vision, applications and research challenges," *Ad Hoc Networks*, vol. 10, no. 7, pp. 1497–1516, 2012.
- [4] J. Gubbi, R. Buyya, S. Marusic, and M. Palaniswami, "Internet of Things (IoT): A vision, architectural elements, and future directions," *Future Generation Computer Systems*, vol. 29, no. 7, pp. 1645–1660, 2013.
- [5] A. S. Elmaghraby and M. M. Losavio, "Cyber security challenges in Smart Cities: Safety, security and privacy," *J. Adv. Res.*, vol. 5, no. 4, pp. 491–497, Jul. 2014.
- [6] S. Raza, L. Wallgren, and T. Voigt, "SVELTE: Real-Time Intrusion Detection in the Internet of Things", *Ad Hoc Networks*, Elsevier, pp. 2661–2674, May 2013.
- [7] S. Sicari, A. Rizzardi, L. A. Grieco and A. Coen-Porisini, "Security, privacy and trust in Internet of Things: The road ahead", *Comput. Netw.* 76, 146–164, 2015,
- [8] A. Alcaide, E. Palomar, J. Montero-Castillo and A. Ribagorda, "Anonymous authentication for privacy-preserving IoT target-driven applications", *Comput. Secur.* 37, 111–123, 2013.
- [9] C. Hu, J. Zhan and, Q. Wen "An identity-based personal location system with protected privacy" in *IoT*, in: *Proceedings - 2011 4th IEEE International Conference on Broadband Network and Multimedia Technology, IC-BNMT 2011, Shenzhen, China, 2011*, pp. 192–195.
- [10] S. Papadopoulos, Y. Yang and D. Papadias, "Cads: continuous authentication on data streams", in: *Proceedings of the 33rd International Conference on Very Large Data Bases, VLDB 07, Vienna, Austria, 2007*, pp. 135–146.
- [11] B. Carminati, E. Ferrari and K.L. Tan, "Specifying access control policies on data streams", in: *Proceedings of the Database System for Advanced Applications Conference, DASFAA 2007, Bangkok, Thailand, 2007*, pp. 410–421.
- [12] D. Evans and D. Evers, "Efficient data tagging for managing privacy in the internet of things", in: *Proceedings - 2012 IEEE Int. Conf. on Green Computing and Communications, GreenCom 2012, Conf. on Internet of Things, iThings 2012 and Conf. on Cyber, Physical and Social Computing, CPSCom 2012, Besancon, France, 2012*, pp. 244–248.
- [13] X. Huang, R. Fu, B. Chen, T. Zhang and A. Roscoe, "User interactive internet of things privacy preserved access control", in: *7th International Conference for Internet Technology and Secured Transactions, ICITST2012, London, United Kingdom, 2012*, pp. 597–602.
- [14] J. Cao, B. Carminati, E. Ferrari and K.L. Tan, "CASTLE: continuously anonymizing data streams", *IEEE Trans. Dependable Secure Comput.* 8(3) (2011) 337–352.
- [15] Y. Wang and Q. Wen, "A privacy enhanced dns scheme for the internet of things", in: *IET International Conference on Communication Technology and Application, ICCTA 2011, Beijing, China, 2011*, pp. 699–702
- [16] R. Neisse, G. Steri and G. Baldini, "Enforcement of security policy rules for the internet of things", in: *Proc. of IEEE WiMob, Larnaca, Cyprus, pp. 120–127, 2014.*
- [17] J. Mao and L. Wang, "Rapid identification authentication protocol for mobile nodes in internet of things with privacy protection", *J. Networks* 7(7), 1099–1105, 2012.
- [18] M. Palattella, N. Accettura, X. Vilajosana, T. Watteyne, L. Grieco, G. Boggia and M. Dohler, "Standardized protocol stack for the internet of (important) things", *IEEE Commun. Surv. Tutorials* 15(3), pp. 1389–1406, 2013.
- [19] I. Bagci, S. Raza, T. Chung, U. Roedig and T. Voigt, "Combined secure storage and communication for the internet of things", in: *2013 IEEE International Conference on Sensing, Communications and Networking, SECON 2013, New Orleans, LA, United States, pp. 523–631, 2013.*
- [20] D. Boswarthick, O. Elloumi and O. Hersent, "M2M Communications: A Systems Approach", first ed., Wiley Publishing, 2012.
- [21] Y. Zhao, "Research on data security technology in internet of things", in: *2013 2nd International Conference on Mechatronics and Control Engineering, ICMCE 2013, Dalian, China, 2013*, pp. 1752–1755.
- [22] T. Kothmayr, C. Schmitt, W. Hu, M. Brunig and G. Carle, "DTLS based security and two-way authentication for the internet of things", *Ad Hoc Netw.* 11(8) (2013) 2710–2723.
- [23] R. Roman, C. Alcaraz, J. Lopez and N. Sklavos, "Key management systems for sensor networks in the context of the internet of things", *Comput. Electrical Eng.* 37(2) (2011) 147–159.
- [24] W. Du, J. Deng, Y. Han, P. Varshney, J. Katz and A. Khalili, "A pairwise key predistribution scheme for wireless sensor networks", *ACM Trans. Inf. Syst. Secur. (TISSEC)* 8(2) (2005) 228–258.

- [25] D. Liu and P. Ning, "Establishing pairwise keys in distributed sensor networks", in: *CCS '03 Proceedings of the 10th ACM Conference on Computer and Communications Security*, Washington, DC, USA, 2003, pp. 52–61.
- [26] BUTLER Project. <<http://www.iot-butler.eu>>.
- [27] European FP7 IoT@Work project. <<http://iot-at-work.eu>>.
- [28] HYDRA Project. <<http://www.hydrmiddleware.eu/>>.
- [29] Usable Trust in the Internet of Things. <<http://www.utrustit.eu/>>.
- [30] iCORE Project. <<http://www.iot-icore.eu>>.
- [31] HACMS Project. <<http://www.defenseone.com/technology>>.
- [32] National Science Foundation Project. <<http://www.nsf.gov>>.
- [33] FIRE EU-China Project. <<http://www.euchina-fire.eu/>>.
- [34] FIRE EU-Korea Project. <<http://eukorea-fire.eu/>>.
- [35] EU-Japan Project. <<http://www.eurojapan-ict.org/>>.

Machine Learning Techniques with Image Classification

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ABSTRACT

Machine learning is a smallest part of Artificial intelligence that enables system the ability to automatically trained and develop from experience without being explicitly programmed. Machine learning emphasizes on the growth of computer programs that can access and retrieve data and use it learn for themselves.

Learning process of machine begins with perceptions or information, for example, models, coordinate involvement, or guidance, so as to search for examples in information and settle on better choices later on dependent on the precedents that we give. The main aim is to permit the PCs learn consequently without human intervention or help and modify activities in like manner. In this research paper, Spectral reaction of a specific component will be relatively consistent throughout the image.

Keywords: Machine learning, neural network, Artificial Intelligence, spectral response, Image classification

Introduction

Machine Learning is constructing computer programs that develop solutions and improve with experience. Machine learning finds issues which can't be illuminated by enumerative strategies or calculus-based procedures. Intuition is to display human method for taking care of a few issues which require encounter when the connections between all framework factors is totally comprehended ML isn't required. Machine learning facilitate the computer system to execute some chore like Recognition, Diagnosis, Planning, Robotics Control, Prediction etc., without specific programming. Machine learning is a problem solving process which includes neural network and deep learning process.

Categorization of Machine Learning

There are four types of machine learning method:

- Supervised machine learning algorithms: Supervised learning can apply what has been learned in the past to new data using labeled

examples to predict future events. Starting from the analysis of a known training dataset, the learning algorithm delivers a gathered capacity to make expectations about the output values. The framework can give focuses to any new contribution after adequate preparing. The learning algorithm can likewise contrast its yield and the right, expected yield and find errors so as to adjust the model in like manner.

- Unsupervised machine learning algorithms: Unsupervised learning is utilized when the data used to prepare is neither grouped nor labeled. Unsupervised learning thinks about how frameworks can infer a capacity to portray a concealed structure from unlabeled data. The framework doesn't make sense of the correct yield, however it investigates the information and can attract deductions from datasets to portray concealed structures from unlabeled data.

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- Semi-supervised machine learning algorithms: Semi supervised fall some place in the middle of administered and unsupervised learning, since they utilize both marked and unlabeled information for preparing – normally a little measure of named information and a lot of unlabeled data. The frameworks that utilization this strategy can extensively enhance learning precision. Typically, semi-regulated learning is picked when the procured named information requires gifted and applicable assets so as to prepare it and gain from it. Something else, securing unlabeled information for the most part doesn't require additional resources.
- Reinforcement machine learning calculations: Re-inforcement learning is a learning method that interacts with its condition by delivering activities and finds mistakes or rewards. Experimentation seek and postponed compensate are the most pertinent attributes of fortification learning. This technique enables machines and programming specialists to naturally decide the perfect conduct inside an explicit setting so as to amplify its execution. Basic reward criticism is required for the specialist to realize which activity is best this is known as the reinforcement signal.

Approaches to Image Classification

The process of sorting pixels into a finite number of individual classes, or categories of data, based on their spectral response .Spectral Response is the measured brightness of a pixel across the image bands, as reflected by the pixel's spectral signature. In this research paper, I will discuss only two learning algorithm supervised and unsupervised.

Unsupervised Classification

Unsupervised classification identifies groups of pixels that exhibit a similar spectral response. These spectral classes are then assigned “meaning” by the analyst .There is three process of unsupervised classification.

- Determine a general classification scheme: A general classification scheme relies on the

reason for the classification. With unsupervised classification, the plan shouldn't be quite certain.

- Assign pixels to spectral classes (ISODATA): Unsupervised classification group pixels into gatherings of comparative qualities dependent on pixel esteem connections in multi-dimensional component space (grouping) and iterative ISODATA technique is the most widely recognized strategy.
- Assign spectral classes to informational classes: Unsupervised classification,Once the spectral clusters in the picture are distinguished, the analyst must allocate them to the "educational" classes of the classification scheme (i.e., arrive cover)

Supervised Classification

Supervised classification uses image pixels representing regions of known, homogenous surface composition -- training areas -- to classify unknown pixels.The underlying assumption is that spectral response of a particular feature (i.e., land-cover class) will be relatively consistent throughout the image.There are five process of classification:

Determine Classification Scheme: Classification scheme depends upon the purpose of the classification and make the scheme as specific as resources and available reference data.

Create Training Areas:

- Digitizing: drawing polygons around areas in the image
- Seeding: “grows” areas based on spectral similarity to seed pixel
- Using existing data: existing maps, field data (GPS, etc.), high-resolution imagery
- Feature space image training areas

Generate Training Areas Signatures

Training area generates signatures represent the collective spectral properties of all the training areas defined for a particular class. There are two type of signature:

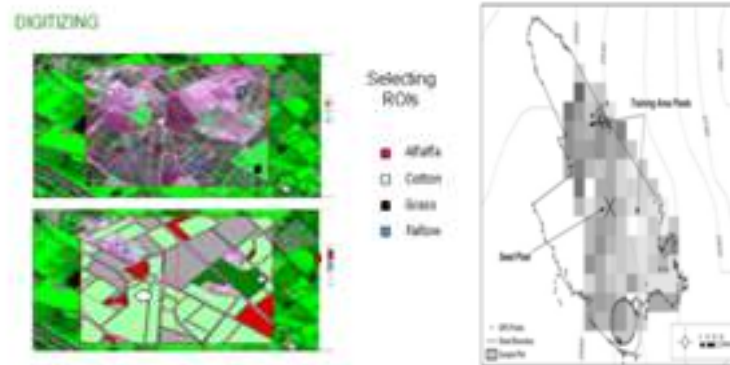


Figure1: Digitizing and Seeding

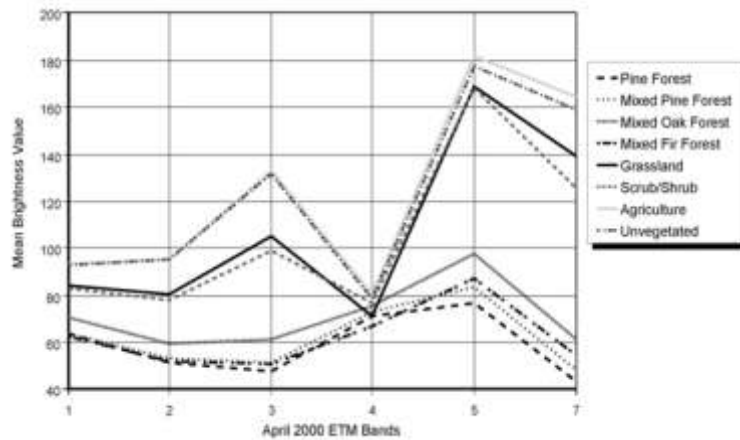


Figure 2: mean of the pixels that are in the training area

Parametric: signature that is based on statistical parameters (e.g., mean) of the pixels that are in the training area (normal distribution assumption)

Non-parametric: signature that is not based on statistics, but on discrete objects (polygons or Types of Signatures).

Evaluate and Refine Signatures

It Attempt to reduce or eliminate overlapping, non-homogeneous, non-representative signatures. Signatures should be as “spectrally distinct” as possible. There are three signature Evaluation Methods

- Contingency matrices
 - Training area histograms
 - Signature plots

Contingency Matrix

Contingency analysis produces a matrix showing the percentage of pixels that are classified correctly in a preliminary image classification of only the training areas

Assign Pixels to Classes

- Each pixel is independently compared to each signature relative to the selected classification criteria, or “decision rule”
- Pixels that satisfy the criteria for a class signature are assigned to that class

Non-Parametric “Decision Rules”: There are two parallelepiped and feature space classifier:

Parallelepiped Classifier

- The pixels values are compared to upper and lower limits of each signature class (i.e., the min/max pixel values in each band, or the mean of each band +/- 2 standard deviations).

If the pixel value lies above the low threshold and below the high threshold for all n bands evaluated, it is assigned to that class.

When an unknown pixel does not satisfy any of the criteria, it is assigned to an unclassified category.

We can visually see the two dimensional box, but this could be extended to n dimensions.

Feature Space Classifier

- Classifies pixels that fall within non-parametric signatures identified in the feature space image not used very often because it is difficult to accurately create and evaluate non-parametric signatures. There are two parametric decision rule

Minimum Distance Classifier

- Classifies pixels based on the spectral distance between the candidate pixel and the mean value of each signature (class) in each image band.

Minimum Distance Classifier

- Advantages: fast, no unclassified pixels
- Disadvantages: does not incorporate variability of signatures
- In most cases, a maximum likelihood classifier is a better choice

Maximum Likelihood Classifier

- Classifies pixels based on the probability that a pixel falls within a certain class
- If you know that the probabilities are not equal for all classes, you can specify weight factors
- For example, if you know that a large percentage of a particular image area is forested, you may want to weight that class with a higher probability than other classes.



Training Data selection Supervised Classification Results
Figure 3: Image Classification

MACHINE LEARNING METHOD

- Decision Trees
- Artificial Neural Networks (ANN)
- Instance-Based Learning

Decision Tree

- Approximation of discrete functions by a decision tree.
- In the nodes of trees are attributes and in the leaves are values of discrete function.

Algorithm to derive a tree

Until each leaf node is populated by as homogeneous a sample set as possible:

- Select a leaf node with an inhomogeneous sample set.
- Replace that leaf node by a test node that divides the inhomogeneous sample set into minimally inhomogeneous subsets, according to an entropy calculation.

How do we construct the data set?

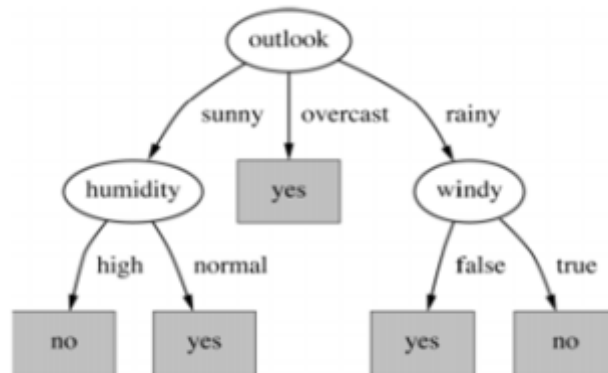


Figure4: Decision



Figure5: Open an image

2) Label the pixels with colors

[Y,U,V,color] entries are created for each pixel labeled



Figure 6:Label the Pixel

3) Use the ML method and display results

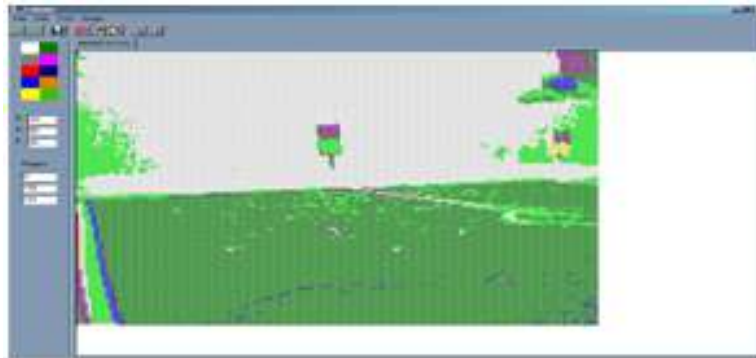


Figure 7: Use ML Method

Result

- The data set is divided into training and validation set
- After training the tree is evaluated with validation set.
- Training should be done carefully, avoiding bias.



Figure 8: Output

4.2 Artificial Neural Network: Artificial neural network is made up of interconnected

processing elements which respond in parallel to a set of input signals given to each

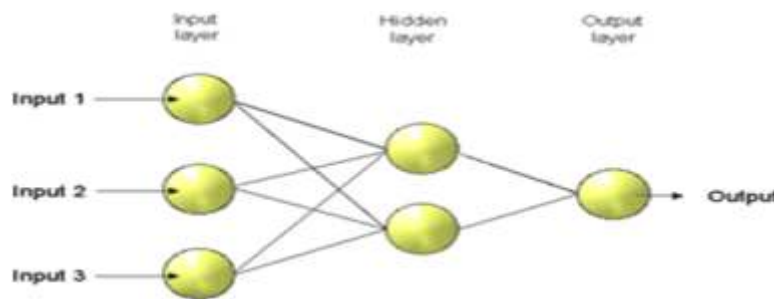


Figure 9: Artificial Neural Network Algorithm

Training algorithm adjusts the weights reducing the error between the known output values and the actual values

As cases are reintroduced repeatedly ANN gives more right answers.

At first, the outputs are arbitrary.

Test set is used to stop training. ANN is validated with unseen data (validation set)

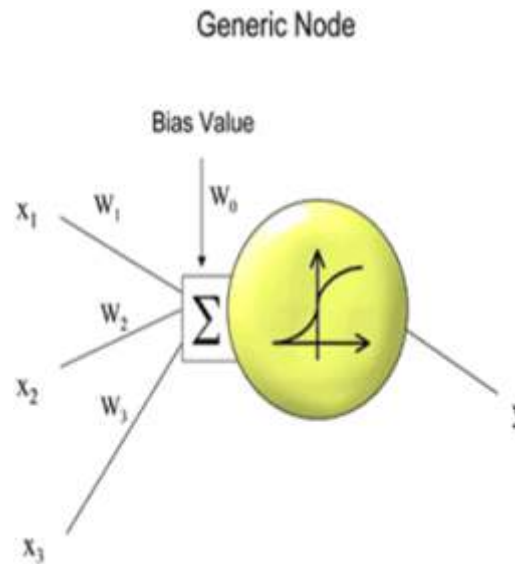


Figure 10: OUTPUT of Artificial Neural Network

4.3 Instance Base Learning

- A learn-by-memorizing method: K-Nearest Neighbor
- Given a data set $\{X_i, Y_i\}$ it estimates values of Y for X 's other than those in the sample.
- The process is to choose the k values of X_i nearest the X and average their Y values.

Here k is a parameter to the estimator. The average could be weighted, e.g. with the closest neighbor having the most impact on the estimate.

FACTS of K-Nearest Neighbor

- Database of knowledge about known instances is required – memory complexity
- “Lazy learning”, no model for the hypothesis
- Ex: Color classification
- A voting method is applied in order to output a color class for the pixel.

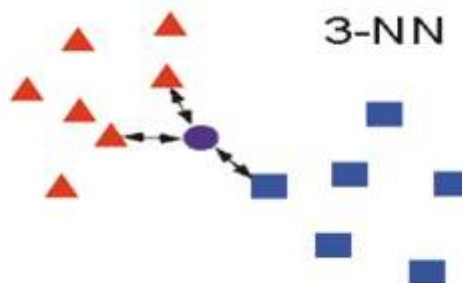


Figure 11: Nearest Neighbour

Application of Machine Learning

Machine Learning focuses on developing algorithms with the capability of teaching itself to grow and adapt when exposed to new sets of data.

There are many application of machine learning like image classification, classification of sentences, facial recognition, image style transfer, object detection, music generation, speech to text synthesis, gaming bots, text correction etc.

Conclusion

Unsupervised classification has no prior knowledge of the image area is required. It produces minimum error, fast and easy to perform. Unsupervised classification produces unique spectral classes. Spectral classes do not represent features on the ground it does not consider spatial relationships in the data. It can be very time consuming to interpret spectral classes. Spectral properties vary over time, across images. Supervised classification Generates informational classes representing features on the ground and Training areas are reusable (assuming they do not change; e.g. roads). Supervise classification, Information classes may not match spectral classes (e.g., a supervised classification of "forest" may mask the unique spectral properties of pine and oak stands that comprise that forest). Homogeneity of information classes varies, Difficulty and cost of selecting training sites and training areas may not encompass unique spectral classes.

References

- Anandkumar, D. (2012). *A spectral algorithm for latent dirichlet allocation*. *Neural Information Processing Systems*, 926-934.
- G.Lugosi, N.-B. a. (2006). *Prediction, learning and games*. Cambridge University Press.
- Gaussians, K. a. (2008). *Spectral methods for learning mixture of heavy-tailed distributions*. *Proceeding of COLT*.
- K.Sinha, M. a. (2010). *Polynomial learning of Distribution families*. *Foundation of Computer Science*.
- L.Schulman, S. G. (2000). *A two-round variant of me for Gaussian mixtures*. *Proceedings of UAI*.
- R.Kannan, S. a. (2005). *Learning mixtures of arbitrary gaussians*. *Journals of Applied Probability*, 69-92.
- S.C.Brubaker. (2009). *Robust PCA and Clustering on noisy mixtures*. *Proc.of SODA*.
- Y.Mansour, A. a. (2007). *Learning, Regret Minimization and Equilibria*. Book chapter in *Algorithmic Game Theory*.

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- 2 Rowling, J.K. (2001) Harry Potter and the Socerer's Stone. London: Bloomsburg Children's.
- 3 Tyagi, R.M, and Malik, S.P. (2007) Job Satisfaction Working Paper No 46, Indian Institute of Travel Management, Gwalior.
- 5 Jacoby, W. G. (1994). Public attitudes toward government spending. American Journal of Political Science, 38(2), 336-361. Retrieved from <http://www.jstor.org>.

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The Computer & IT Department is running two courses successfully: Master of Computer Application (MCA) is approved by All India Council for Technical Education (AICTE) and affiliated to Dr. A.P.J. Abdul Kalam Technical University (APJAKTU) Lucknow and Bachelor of Computer Application (BCA) is affiliated to the Chaudhary Charan Singh University, Meerut. The other courses are running under IPEM group of Institution are Master of Business Administration (MBA) and Master of Applied Management (MAM) approved by all India Council for Technical Education (AICTE) and affiliated to DR. A.P.J. Abdul Kalam Technical University (APJAKTU) Lucknow. The Post Graduate Diploma in Management (PGDM) is approved by All India Council for Technical Education (AICTE) Govt. of India, Ministry of HRD. The Bachelor of Business Administration (BBA), Bachelor of Law (LLB) (3 years) BALLB (5 Years) approved by Bar Council of India and affiliated to the Chaudhary Charan Singh University, Meerut, Bachelor of Education (B.Ed.) and Basic Teacher Certificate (BTC) approved by National Council for Teacher Education (NCTE). Bachelor of Education (B.Ed.) is affiliated to the Chaudhary Charan Singh University, Meerut and Basic Teacher Certificate (BTC) is affiliated to the State Council of Educational Research and Training (SCERT) Lucknow.

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