Recent Trends in Computer Science & Information Technology

RTCSIT-2021

Organized by

Department of Computer Science
Guru Nanak College
Budhlada

SLM Publishers
(A Division of M/s Sohan Lall Madaan)

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About Conference:

The PG department of computer science is going to organize a "Two Day International Conference on Recent Trend in Computer Science & information Technology-2021" RTCSIT-2021. This conference is organized to provide a common platform to the experts and delegates from academia, industries and research institutes to share their experiences, research ideas and discuss various innovative ideas and issues through submission of papers.

Conference theme

The primary goal of the conference is to promote research and developmental activities in Science, Engineering & Technology, Computer science and communication. The plenary lectures will be delivered by eminent personalities at national level to introduce the theme of the conference. We solicit both academic, research and industrial contributors. We welcome technical papers presenting research and experimental results, survey papers addressing the key problems and solutions on any of the topics or research papers on work in progress.

Conference Scope

To create a world class gathering of intuitive students and innovative researchers from academia and industry. The Main objective of this conference is to address and provide platform to discuss the emerging trends in recent advancements. The conference also provides a perfect platform for academicians to upgrade their knowledge in Science engineering and technology domain. This conference is highly inter-disciplinary and encompasses all the key aspects of energy and environment and its intrinsic relationship to engineering an management. Eminent personalities are invited to deliver the special lectures.

Patron's Message

It is a matter of great pride for Guru Nanak College Budhlada that its Department of Computer Science is organizing an International Conference on Recent Trends in Computer Science and Information Technology (RTCSIT-2021). Nowadays, the field to Computer Science and Information Technology plays an important role in every sphere of our life. It has penetrated every field of existence. The Conference will provide a platform for researches, technocrats, academicians to discuss the development, implementation, use and application of emerging technologies.

I hope the conference would certainly help participants to have the latest updates about progress achieved by the computer industry today.

I congratulate the faculty and student of the department of computer science for their maiden attempt for holding National conference. On this auspicious, I welcome and convey my best wishes to all the participants.

Dr. Kuldip Singh Bal

Principal Director

Guru Nanak College

Conference Convener Message

2nd International Conference on Recent Trends in Computer Science and Information Technology (RTCSIT-2021) has received overwhelming on call for papers from all over the world. I must appreciate the persistent contribution of the members of the organizing committee and Reviewers board who worked hard to review the papers. A wide range of topics on computer science and information technology have been accepted for presentation.

All the staff members have been working hard for the success of this conference. I sincerely convey my heartily congratulation to all the teaching and non teaching staff members. Who have put the name of Guru Nanak College on global map. I hope that all local will get useful deliberations during the conference.

We are thankful to all, who have extended their helping hands in many ways for organizing the conference successfully.

Ms. Rekha Kalra.

Head, Department of Computer Science

Guru Nanak College, Budhlada

Recent Trends in Computer Science & Information Technology

RTCSIT-2021

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Translation of Compound English Sentences to Indian Sign Language

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Abstract

The idea of translating English text into Indian Sign Language using real-domain synthetic animations is illustrated in this paper. The translation system consists of a processing module that analyses the English input sentence to represent the phrase structure grammar representation on which Indian grammar rules for the reordering of English phrase terms are applied. The user parses the input English phrases through the converter module, which in turn exchanges the compound English phrases with their simpler versions through simple English grammar rules. The removal module extracts from the reordered sentence the inappropriate words. Lemmatization isperformed to translate the words into the root form since the word inflections are not used in the Indian sign language. All the words in the sentence are then checked into a lexicon containing the English word and its HamNoSys notation, and the terms that are not in the lexicon are substituted by their synonym. The terms of the sentence are replaced by their HamNoSys counter code. If the term is not in the lexicon, the HamNoSys code is used for of alphabet of words. The HamNoSys data is converted into SiGML tags, and these SiGML tags are sent to the animation module that uses avatar to convert the SiGML code into syntheticanimation.

Keywords

HamNoSys, SiGML, ISL, ASL, Machinetranslation.

1. INTRODUCTION

The system proposed is groundbreaking because videos rather than synthetic animations are used by the current working systems. Even the existing systems are limited to the translation into Indian sign language of words and predefined phrases, while our proposed system translates into actual domain English phrases into Indian sign language. In the world, about 7105 known living languages exist,divided into 136 separate families of languages. Sign language isone of the 136 families that are used to communicate their message to people with hearing impairments.[1] Depending on the area of the world, this language family includes 136 sign languages worldwide. Of the almost 7 billion inhabitants on earth, almost 72 million are deaf and hard of hearing. In such a vast number, about 4.3 million of these individuals use sign language. The remaining almost 67 million people who are deaf and hard to understand do not use any sign language to communicate. Therefore, nearly 90% of the deaf have very little to no access to education

and other data. [1]

In the world, India has the largest Deaf community. According to conservative figures, India has 70 million people with disabilities and, as per Census 2011, 18 percent of India's individuals with

disabilities have hearing impairment. Perhaps "one of every five people who are deaf in the world, live in India" makingit the country with the largest number of Deaf, and perhaps also the largest number of sign language users.But the ISL is still at itsrudimentary stage of development.

Sign language is used by the hearing impaired as a means of communication. Instead of voice, sign language utilises gestures, hand forms, hand digits and other body components. For different terms, it has numerous expressions. Sign language has its own grammar and vocabulary. Sign language differs from place to place.

Hearing disabled people who use hand shapes, fingers, facial expressions, movements and other body parts use sign language [1]. As the signer frequently explains an occurrence using the 3D space around his body [5], it is a visual- spatial language. Therefore, as sign languages do not have a well- defined structure orgrammar, outside their small world, these signs are not or even less suitable. Sign languages were not considered bona fide languages until the 1960s, but merely collections of gestures and mime. American Sign Language study by Dr. Stokoe has been shown to be a full- fledged language with its own grammar, syntax and other linguistic characteristics. For other sign languages, like Indian Sign Language [3], thereare several attempts to show the same.

The elements of a sign are the acronymHOLME.

- Hand shape (or Handform),
- Orientation (or PalmOrientation)
- Location (or Place ofArticulation)
- Movement, and Non-manual markers (or Facial Expression)

Sign languages, like oral languages, organize elementary, meaningless units into meaningful semantic units.

1. HAMNOSYS

As a computer-based sign language transcription system, Hamnosys (the Hamburg Notation System)

(http://www.signlang.unihamburg.de/software/s oftware.engl ish.html) was developed. For writing signs, HamNoSys is a notation system. In the form of signing parameters that include hand shape, hand orientation, hand position and hand movement, HamNoSys symbols define signs.

This paper introduces a method that produces HamNoSys that corresponds to the word input. The system covers all the symbols for signing parameters when creating HamNoSys. All the basic hand

and finger forms and their bending involve hand shapes. Hand orientation includes all possible views along with palm orientations,

i.e. top view, back view and right-side view. Allthe fundamental motions of hands along with curved movements are covered in hand movements. Hand position includes head, pair, mouth, trunk, upper arm, lower arm, and lower extremity information. An alphabetic system

that defines signs at the phonetic level is the Hamburg Notation System for Sign Languages (HamNoSys).

A. Structure of HamNoSys

For a single symbol, a HamNoSys notation consists of a description of the initial posture (describing non-manual features, hand shape, hand orientation and location) plus the acts that alter this posture in sequence or in parallel.

- Hand shapes: Hand shapes i.e. Palm, Flat Hand, Divided Fingers, Thumb Combination, are grouped into four basic types.

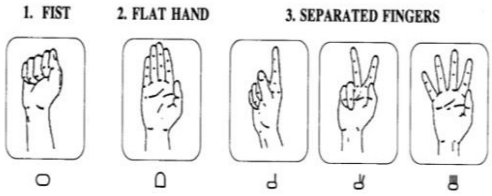

Fig. 1. Basic hand shapes.

- Hand Orientation: By integrating two elements, HamNoSys defines the orientation of the hand: extended finger position definingtwo degrees of freedom, and palm orientationdeciding the third degree. By offering symbols at a distance of 45 ° for both components. Wrist, Extended Finger and Palm Orientation execute hand orientation

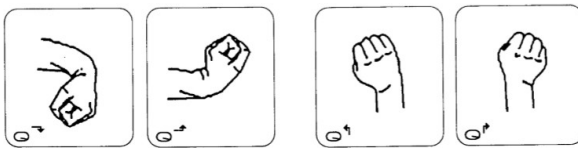

Fig. 2. Wrist Orientation

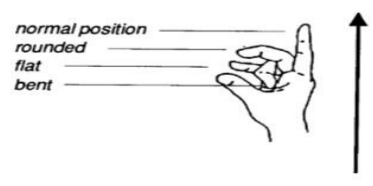

Fig. 3. Extented hand orientation

- Hand Location: The requirements of the position are split into two elements: First, the position inside the frontal plane is determined (x and y coordinates, while the z coordinate is determined by the second. A "normal" distance of the hand from the body is presumed if the second part is missing. If both parts are missing, it is presumed that the hand is in "neutral sign space", i.e. with "normal" distance in in front of the upper torso.

LITERATURE REVIEW

In the area of spoken to sign language studies, national status is not as good as international status. Despite this, researchers have worked to make it easier for hearing impaired people to communicate with others who are listening. There has been research into converting English to Indian Sign Language, Hindi to Indian Sign Language, and Bangla to Indian Sign Language.

A. Text to Sign Language Prototype

The machine translation system Prototype Text to Indian Sign Language is based on grammar transfer rules. There are five modules in the device. Input text pre-processor and parser, representation of the LFG f-structure, grammar transfer rules, generation of ISL sentences, and ISL synthesis. The subject-verb- object (SVO) grammatical structure is encoded from the minipar generated input sentence structure using lexical functional grammar. The English word structure is translated to an ISL word structure using proper conversion laws. Following that, a stream of pre-recorded videos or icons is used to view the ISL sentences. Expert input from ISL experts is used to test the system. The framework is currently being

checked on a compilation of 208 sentences, with a lexical conversion accuracy of 89.4 percent.

B. INGIT

The INGIT project is a Hindi to ISL machine translation system with a parser for a restricted domain of railway reservation. The reservation clerk's feedback is translated into a Hindi sentence by the device.ISL is the translation. There are four modules in the translation method.

The ISL grammar rules are applied to the ISL tagged string in the ISL generator module. Each word in the ISL tagged string is replaced with the appropriate character. The HamNoSys notation is then translated into SiGML tags, which are then used. Then it was animated with the aid of a virtual human. INGIT is based on a formulaic hybrid. A grammar strategy based on fluid construction grammar (FCG).

Anuja et al. (2009) devised a framework for use in the railway and banking industries. Speech Recognition Module, Language Processing Module, and 3D Animation Module are the three modules

that make up the device. The speech recognition module takes the clerk's speech as input and translates it into text. To create ISL gloss, the Language Processing Module contains an Input Text Parser, Eliminator(which eliminates unnecessary tokens from the parsed text according to the ISL dictionary), Stemmer (which transforms verbs into root form since ISL only uses simple present tense), and Phrase Reordering. The 3D Animation module transforms the ISL gloss into animation using a 3D virtual human character.Lalit Goyal and Vishal Goyal (2016) ISL dictionary was created using synthetic animation, which was a computer- generatedcartoon rather than a real individual. The sentence's words are translated into HamNoSys code, which is then converted into SiGML, which is used to construct synthetic animation.

Lalit Goyal and Vishal Goyal (2016) thetranslation was suggested using synthetic animations in the real domain. The translation method reorders the words in an English sentence using the parsing module and ISL grammar rules. The sentence's terms are replaced with their HamNoSys code counterparts. After that, the HamNoSys code is translated into SiGML tags, which are then sentto the animation module.

Thi Bich Diepnguyen and Trung-nghia Phung (2017) Vietnamese sign language syntax transformation and linguistic rules were developed using a rule-based algorithm. The results of the experiments show that the proposed algorithm is accurate and useful for developing automated Vietnamese sign language translation. The consistency of the documents automatically translated by my computer is evaluated using the BLEU process. The method's original aim was to compare two documents that were machine translated and then manually translated by linguistic experts.

1.PROPOSED METHOD

The success of the translation scheme from English to Indian Sign Language necessitated a detailed understanding of both the Indian Sign Language and English lexicons. The dictionary database for English and Indian Sign Languagesis called lexical information. The study of syntactic entails a detailed understanding of both English grammar and Indian sign language. To begin with, the dictionary of Indian Sign Language is extremely limited. Second, unlike English, where grammar has been standardized and comprehensive research has been undertaken, Indian Sign Language grammar is not standardized. In our study, we attempted to resolve the obstacles and established the English to ISL conversion method.

The following modules make up the overall architecture of the English to ISL translation system:

1) Development of an English-ISL bilingual dictionary.

2) Sentence input preparation and assessment
3) Define a word as a compound phrase, or a simple phrase.
4) Using grammar rules, translate the given sentence into a simple word, depending on the form of detection.
5) Input parsing of an English sentence
6) A sentence reordering package based on ISL grammar rules.
7) Unnecessary terms are replaced with the Eliminator.
8) Lemmatization to evaluate the lemma of each word, as well as a Synonym substitution module that replaces the unknown word with its synonymous equivalent.
9) Synthetic Animation Module

A. System Architecture

Our developed translation system receives written input in the form of an English sentence. The parser receives this English sentence and transforms it to a grammatical representation of the phrase structure, the user's input English sentences are parsed by the converter module, which then transforms compound English sentences to their simplified versions using the compound to simple module using grammar rules. Parsing the sentence yields all of the grammatical knowledge that will be useful in the next module. After that, the parsed sentence is sent to the conversion module, which reorders the English sentence words according to ISL grammar rules. Since English uses the SVO order, while ISL uses the SOV order, as well as some other interrogative and negative sentences, reordering is needed.

Unwanted terms are omitted from the sentence after the sentence structure is defined according to ISL grammar rules. This is due to the fact that the ISL only used terms of some meaning, rather than all of the supporting words such as connecting verbs, posts, and so on. The lemmatization module receives the eliminator output. Each word in the sentence is checked and translated into its lemma form by the lemmatise. Since the Sign Language uses the root form of each word, irrespective of other languages that use suffixes, gerund, different types of verb (present, past, and past forms of participle), different forms of nouns and adjectives, etc. in their sentences, lemma is the root form of the word that is needed. Each word in the sentence is checked and translated into its lemma form by the lemmatized. The root form of each word is required in Sign Language,

despite the fact that other languages use suffixes, gerunds, different types of verb (present, past, and past forms of participle), different forms of nouns and adjectives, and so on in their sentences. The English word- HamNoSys dictionary is used to replace of word in the resulting sentence with its HamNoSys equivalent (writing sign notation). For unknown words that are not found in dictionaries, HamNoSys

substitutes the word characters. The HamNoSys notation is now present in every English word or character in the ISL sentence. This HamNoSys string is translated to SiGML using SiGML rules.

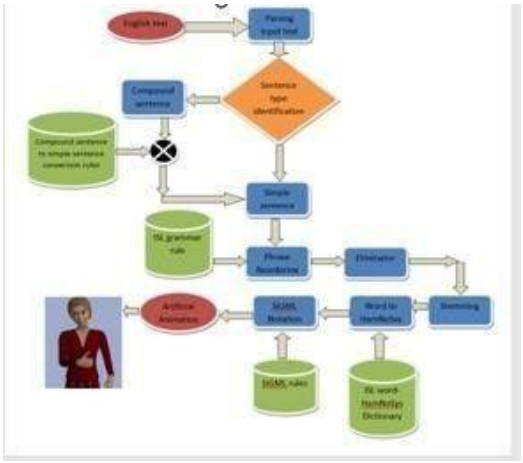

Fig. 4. Block diagram of ISL Artificialanimation representation

I. RESULT EVALUATION ANDDISCUSSION

A framework to convert/translate English language sentences into ISL synthetic video animations has been designed as part of ourstudy.

Fig. 5. Compound toSimple/ISL Sentence converter

Fig. 6. Text to AVATAR Converter

We conferred with an ISL interpreter and various English mentors for accuracy, showing them the tool's performance, and the feedback were positive, and the work was well appreciated.

II. CONCLUSION

This paper introduces a method for translating English text into Indian sign language. For Indian sign language, the automated system is the first real-domain transaction system. The conversion module (which converts an English phrase to an ISL phrase based on grammatical rules), the exclusion module (which eliminates unnecessary terms from the ISL phrase), the synonym and lemmatization module (which converts each word from the ISL phrase to root), and the animation module are the system's key components (converts the ISL phrase to synthetic animation).The framework is currently being developed to transform English

text into synthetic animations without regard to meaning. It takes a long time to create the dictionary of English words to Indian signs, which includes the non-manual components of each sign as well as animated avatar lips that can be read by a hard-of-hearing user.

The overall conversion accuracy was tested by demonstrating the device in various deaf schools. The work of the interpreters and students was greatly appreciated. The sign language dictionary can be extended in the future by introducing more words. The meaning may also be taken into account when translating an English sentence to an ISL sentence.

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Role of Wearable Technology Sensors

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Abstract-

This chapter discusses the trends and projections for wearable technology in the workout program. Analyzing the role of wearable technology for different users and why there is such a need for these devices in everyday lives. Wearable devices are increasing in function, and through integrating technology, users are gathering more data about themselves. This work also discusses the technologies that could be used in these devices. Sensors measure a number of parameters such as acceleration, frequency, duration, intensity and patterns in the movements that the individual makes.

Keywords-

I. INTRODUCTION

Now a day, wearable technology becomes an integral part of our daily life. Wearable technology is very popular in sorts as it eliminates the risks and injuries during the physical activities. Wearable games innovation is fundamentally any gadget or mechanical assembly that connects to the user‘s body or gear,which is using sensors to calculate, transmit and record information continuously that can be later used to break down strategy or physical execution. In this field, wearable devices such as smart watches, smart glasses, wrist bands, chest belts and smart shoes are becoming popular day by day. These devices commonly monitor heart rate, temperature of body, distance covered, acceleration, biomechanical movements, wake and sleep pattern. It consists many sensors such as temperature sensor, weight sensor, heart rate measurement sensor, and step measurement sensor that monitor the heart rate, body temperature, current weight, and step covered. There is oneintegrated chip are attached to this system which will check quality and performance of the person while do practice or playing. These devicesare then linked with Bluetooth and Wi-Fi that are used to transfer real time data to user‘s personal computer

II. BACKGROUND RESEARCH

There are number of wearable devices which can calculate position of body, velocity of moves,

distance covered, and acceleration. The GNSS (Global Navigation Satellite System) which is a part of GPS (Global Positioning System) helps to provide the information about human‘s body. However, for underwater and indoors activities, GNNS measurements did not properly work and in densely build-up area‘s the accuracy of system also compromised. GPS technologies have used to describe the position, distance covered and velocity but when it works with acceleration data, there are many chances of errors [1]. There are many technology companies like ZephryTechnology, miCoach, Catapult, and Viporpod which are making technologies to easy the trainer‘s decisions, workers performance, health, and safety [2]. ZephryvTechnology made a sport bra or sport chest belt which consist a bimodule and GPS.Bimodule calculate the many parameters including breath rate, impact, heart rate, posture, and heart rate variability. This is also measuring the temperature, psychological load and intensity, confidence of heart rate. Zephry can see these results by their Personal Computer [3]. Photo plethysmography consist a skin diode which produce red light that stick the tissue and reflected backward direction. This is observed by a photo sensor. This is helpful to calculate the pulse rate. On the other side, there is some measurement errors which are depend upon Photo plethysmography of skin and these errors are increased during the exercise [4]. Approximately 500 years ago, first wearable device named pedometers were used by Leonardo da Vinci. It was used to measure the physical activity. Due the advancement in technologies, people then used accelerometer- based wearables which can monitor physical activities and improve the health issues [5]. Adidas made a MI Coach fit smart band which calculates every step. It also consists GPS. A person can monitor workout load, heart rate, steps completed, and calories burned. It is stay on wrist of user. However, person move hands and arms approximately all time, even if they are not walking. Wrist band is failed to decide these movements are calculated as steps or not [6].

III. TECHNOLOGIES THAT COULD BEUSED

A. Sensors: Sensors are used to gathered rawinformation from different measurements. This information is stored and used to calculate thedifferent activities related health, training and performance. Many sensors are used together inone module and according to need of system sensors are combined. In the system, to monitorthe different parameters four sensors are used together. These sensors are temperature

sensor,

heart rate measurement sensor, weight sensor and step measurement sensor. Temperature sensor monitors the body temperature which make estimate from skin temperature. Pedometers are used for step measurement sensors.

B. GPS: The GPS (Global positioning system) is a navigational technology which is based on satellite. This technology is widely used to calculate the real time data and this data is analysed to improve the performance in physical activities. When persons start moving, the satellite can trace the person‘s motion 10

times in a second. For calculate the position, distance covered and speed of users, GPS is commonly used. It is also helpful for improve the performance of users by providing the right directions during the training.

C. Bluetooth and Wi-Fi: Bluetooth and Wi-Fiboth are wireless technology standards. Bluetooth is used to transmit recorded data to computers without any cable. Implementation of Bluetooth in wearable devices is easy and cheaper and it needs very low power. Wi-Fi provides good services to transmit the huge

amount of data. The wearable devices which consist Wi-Fi directly make connection with internet through an access point of Wi-Fi.

IV. APPLICATIONS

The applications for wearable advancements are extending. Some applications are described below:

- Healthcare: These devices are also suitable for healthcare. Individuals can monitor their heart rate, temperature and body movements and get some suggestion about their body. They can check the warning sings about serious disease or illness and

take precautions. Some old age and disabled people are unable to go to hospital for regular check-up and seek advice from doctor. By using this device, they can monitor their health at home and get advices to improve their health.

B. Diet Management: These devices are also useful in worldwide diet supplement market. It consists some body sensors which provide information about their body changes. For weight loss or gain, some people hire some council which provide suggestions according to health of people. However, everyone

cannot go to council for many reasons such as financial, time, and traveling. People can use this kind of device to manage their diet for weight loss or gain. These devices provide

recommendations about menu for mealtime. It is also giving warning to people about any deficiencies or excesses and need of minerals and vitamins. It would eliminate the need of council.

C. Personal Training: People always experience a fundamental issue such as absence of knowledge to train proficiently, when the setting out on a personal workout program. Individuals can set up an online record and transferred seven days' information the administration would have a genuinely complete understanding of the client's present wellness. After understanding of user‘s fitness record, system will provide suggestions like do ten press ups or downs, improve the speed etc. It is very beneficial for people who want to fit ourselves with help of others.

D. Music has been appeared to modify a listener‘s physiology and improve performance in specific

environment. Music can help to movephysiological values towards more attractive state.

V. RISKS

There are some risks in proposed wearable device by me which are very important to consider. These risks are listed below:

- The highest risk in these kinds of devices is security and privacy of data. Devices use Bluetooth and Wi-Fi to transfer recorded
  information into computers. In this case, data can be leak or misuse by attackers. It may threaten in relation to security such as Data confidentiality, data integrity and authentications, which are three main issues to ensure the security.
- Wi-Fi is commonly not a perfect decisio for wearables as it generates heat just as radiation which is not prescribed for closeness to the human body.
- Bluetooth is creating problem with large distance. Sometimes data may be not transmitting to computer if computer is far away from wearable device.
- The provided recommendations and strategies are not suitable for everyone because every people have different mentality and their own perceptions about
  it.

VI. CONCLUSION

To conclude, the wearable technology plays an integral role in various fields. These sensors monitor the heartbeat, body temperature, weight, motion and speed of users. In addition to this, a chip is used to motor the quality and rate of practice and GPS technology used to monitor the direction and speed of user. Bluetooth and Wi-Fi are used to transmit all

the recorded information into athletes or user‘s computer. It provides another important feature of play music which is very helpful to change the mood swings. Technology is growing at very fast pace. So, it is estimated that in next two or three years, the many wearable devices will be launch inmarket.

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Wireless Sensor Network:- Sensor Node and Network Constraints

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Abstract—Wireless Sensor Networks (WSNs) are wireless networks for checking and recording conditions at diverse regions. In other words, WSNsare a combination of monitoring, sensing, computing and communicating in a single tiny device. The parameters which are commonly monitored are temperature, humidity, pressure, wind direction and speed, pollutant levels and vital body functions. WSNs rely on wireless connectivity and formation of networks so that the monitored data is cooperatively passed through the network to a main location or sink where it can be observed and analyzed. WSNs are normally deployed unwelcoming environments. Therefore, due to their distributed nature and their deployment in isolated areas, one of the main challenges in WSNs is the secure routing of data through the network. Security in sensor networks is, therefore, a challenging task Different types of attacks are discussed in this paper, including examination of various types of attacks and respective techniques for tackling these.

INTRODUCTION

Wireless Sensor Networks (WSNs) are wireless networks for checking and recording conditions at diverse regions. In other words, WSNs are a combination of monitoring, sensing, computing and communicating in a single tiny device. The parameters which are commonly monitored are temperature, humidity, pressure, wind direction and speed, pollutant levels and vital body functions. WSNs rely on wireless connectivity and formation of networks so that the monitored data is cooperatively

passed through the network to a main location or sink

where it can be observed and analyzed [1][2].

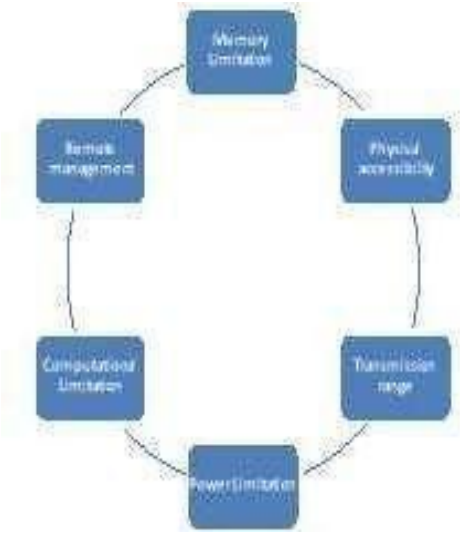
Characteristics of wireless sensor networks:

Widely used Wireless Sensor Networks (WSNs) have certain characteristics that make them unique due to the features they provide, but also in terms of the provided targets for adversaries. For that reason, the scientific and architectural distinctiveness of WSNs are highlighted in the following section covering the constraints of sensor nodes and also the constraints of the on the whole WSN topology[3].

SENSOR NODE CONSTRAINTS.

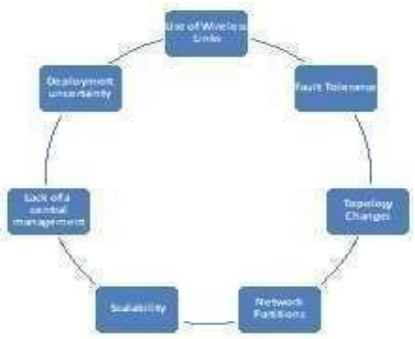
Individual sensor node in a WSN has the intrinsic limitations in resources, due to which the design of security procedures becomes morecomplicated [4][5].

- MEMORY LIMITATION: The memory present in the Sensor node is usually of very small size because half of the memory is occupied by the operating system[6].
- COMPUTATIONAL LIMITATION: The computational power of the sensor



nodes is controlled due to cost andenergy-saving considerations.

- POWER LIMITATION: A sensor node has to scrimp and save with the supplied energy that must outlast the sensor's life. Because the sensor's battery can neither be replaced nor recharged.



- TRANSMISSION RANGE: Sensor nodes should use a small transmission range .to minimize the cost of energy consumed for communication.
- PHYSICAL ACCESSIBILITY: In WSNs an attacker can easily attack nodes because they are mostly deployed in a hostile environment. Additional physical threats, such as weather and radiation, can disturb the network.

NETWORK CONSTRAINTS:

- DEPLOYMENT UNCERTAINTY: Sensor nodes are usually deployed randomly and dynamically, so that's why there is deployment uncertainty.
- USE OF WIRELESS LINKS: The transfer inWSNs is not consistent because of the use of the wireless broadcast medium in which interferences can occur.
- REMOTE MANAGEMENT: The sensor nodes have to be managed remotely due to their deployment in hostile environments.
- NETWORK PARTITIONS: In a randomlydeployed WSNs whenever there are large networks, it can happen that the network is divided into small sub- networks, so called network partitions, which sometimes may not be able to communicate with each other.
- LACK OF A CENTRAL MANAGEMENT: There is no specific central facility that governs the whole WSN system. WSNs are self-configuring and self-organizing. This leads to emerging challenges.
- SCALABILITY: Scalability has to be considered in network protocols as a large amount of sensor nodes are deployed to monitor or supervise a certain area.
- TOPOLOGY CHANGES: Though, there are no changes in

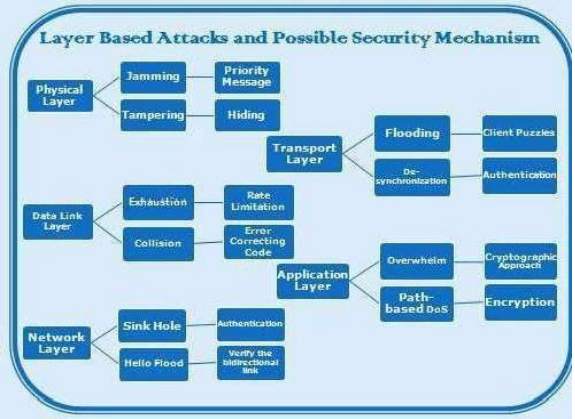
the topologies of WSNs, but it may become possible due to the node failures, which may be due to hardware failures or battery depletion.

- FAULT TOLERANCE: Sensor nodes may get fail due to the battery depletion or some hardware failures. They should be built that much robust so that it may tolerate the normal faults.

ATTACKS ON WSNs

PHYSICAL LAYER:

- Jamming —It is unwanted and troublesome, which causes denial-of-service conditions. Its caused by interfering with the radio frequencies [7].
- Tampering —Tampering happens when sensor node is physically altered or destroyed. An attacker can extract sensitive information.



DATA LINK LAYER:

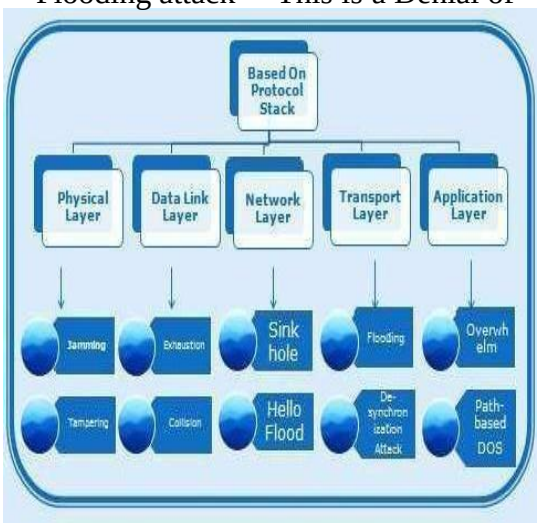
- Exhaustion :The battery power will get exhausted using an interrogation attack and compromised node sends repeated data causing battery power consumption[8].
- Collision: When packets on transmission on same frequency collide, they cause a change in the data portion.

NETWORK LAYER:

- Sinkhole attack—This attack targets the base station and the attacker blocks its way for getting the complete and accurate information
- HELLO flood: Whenever a node sends a hello packet, it is considered a member of the network by the base station. An attacker may use it as a tool to fool large number of nodes to consider it as their neighbor.

TRANSPORT LAYER:

- Flooding attack —This is a Denial of service



(DoS) attack that destroys the whole network by flooding with huge amount of traffic.

- De-synchronization Attacks: It refers to the intemiption of an existing connection. APPLICATION LAYER

- Overwhelm attack: An attacker may try to beat network nodes with sensor stimuli, which causes the network to forward bulks of traffic to a base station.
- Path-based DOS attack: In this fake or replayed packets are injected into the network.

CONCLUSION

In this paper, several constraints of wireless sensor networks and security threats have been discussed with detail. In WSNs power limitation, memory limitations, transmission range and their scalability make the security a challenge for the researchers. Wireless Sensor Networks are deployed in hostile or unattended areas where no physical security can be provided, that are why they are exposed to numerous security threats which can endanger the success of applications. This paper will help the future researchers to get basic knowledge about security attacks and different constraints of Wireless Sensor Networks.

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Evaluation and Selection of Optimization Techniques

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natural species evolve and adapt to their environments by

Abstract

Optimization algorithms are becoming increasingly important in the analysis of real-world optimization problems. Because the performance of optimization algorithms varies for different kinds of problems, selecting a specific algorithm for solving an optimization problem is extremely difficult. Standard test functions should be used to verify the choice of an optimization algorithm for a particular application. This chapter describes comparison between traditional and modern optimization algorithms and some test functions to choose best optimization algorithm. **Keywords**

Optimization, Algorithm, Genetic, Evolutionary.

I. INTRODUCTION

The term "optimization" refers to the process of determining input values in order to obtain the "best" output values. The word "best" has different meanings depending on the issue, but in mathematics, it refers to maximizing or reducing one or more objective functions by changing the input parameters. The search space is defined as the collection of all feasible solutions or values for the inputs. An optimization algorithm is a method that is iteratively implemented by comparing and adjusting test solutions until the best solution is found [1]. There are wide range of algorithms that are inspired by nature and stochastic in nature [2,3]. Also, different looking at them. Those existing natural systems and their natural evolution can be used to produce artificial systems that perform the same function.

The large number of optimization algorithms necessitates the question of which one is the best. There seems to be no one- size-fits-all solution. It is reasonable to assume that if an optimum optimization algorithm exists, all other optimization algorithms are redundant. It is obvious that there is no such thing as a universal optimization algorithm that can solve all problems encountered in practice. All of the optimization algorithms that are currently available can only be used in specific areas of application. Depending on the nature of the problem, one or more optimization algorithms may provide a better solution. Comparing optimization algorithms, also known as benchmarking, is a difficult task that requires several subtle factors in order to produce a fair and impartial assessment. In 1953, Homan presented one of the first experiments on algorithm benchmarking [4]. Box's work from 1966 is another early contributor to the field of benchmarking [5]. Optimization benchmarking studies exploded in popularity in the late 1960s. In the optimization literature, comparative studies have been conducted in many fields, including unconstrained optimization, constrained optimization, nonlinear least squares, linear programming, nonlinear programming, geometric programming, global optimization, derivative-free optimization, and many others [6-8]. Crowder et.al published the first study in 1979 that tried to

establish standards and guidelines for benchmarking mathematical

algorithms [9]. Dolan and More added performance profiles in 2002, and they quickly became the gold standard in benchmarking optimization algorithms [10], despite recent work pointing out their shortcomings [11].

I. TRADITIONAL AND MODERN OPTIMIZATION *TECHNIQUES*

The classical optimization algorithms are based on the damped least squares optimization whereas modern optimization algorithms are based on the natural evolution algorithm. The main distinction between these optimization algorithms is that traditional optimization finds the local optimum solution, while evolutionary algorithms can finds the global optimum solution. Because they do not allow for deterioration of the merit function, traditional optimization algorithms have no way of fleeing the first local optimum they discover. Unlike traditional optimization algorithms, evolutionary algorithms have the ability to escape the local optimum and continue searching for a better local optimum. The choice of the starting point for optimization is the second significant distinction. For traditional optimization, it is critical to choose an appropriate starting point from which to proceed directly to the good local optimum. The link between the starting point and the discovered optimal design is not as clear with evolutionary algorithms. The optical designer should choose the beginning optical system more conveniently, and evolutionary algorithms can fill the rest of the optical system population at random. When a good starting point or optical system is known ahead of time, traditional optimization techniques produce the best results. The fast convergence to the closest local optimum is a feature of classical optimization. Traditional optimization is an order of magnitude faster than evolutionary algorithms at finding the best solution.

a. EVOLUTIONARY ALGORITHM (EA) AND GENETIC ALGORITHM (GA)

The primary distinction between evolution strategies and genetic algorithms is the domains in which they operate. The evolution strategies were created as numerical optimization methods. The genetic algorithms were designed as a general-purpose adaptive search tool that gives above-average peoplean exponentially growing number of trials. The genetic algorithms are used in a wide range of fields, with parameter optimization being just one of them. The first distinction between evolution strategies and traditional genetics algorithm is in the way the people are represented. The EA algorithm works with floating point vectors, while the traditional GA algorithm works with binary vectors. The second distinction between genetic algorithms and evolution strategies is how selection is carried out. The next dissimilarity between evolution strategies and genetic algorithms is that the duplicate parameters for classical genetic algorithms (likelihood of

crossover, probability of mutation) remain constant throughout the evolution process, while the reproduction parameters for evolution strategieschange continuously.

The primary resemblance between evolution strategies and genetic algorithms is that both systems keep a population of prospective solutions and use the survival of fitter individuals as a selection principle. There are, nonetheless, significant differences between these methods.

b. EVALUATION OF OPTIMIZATION ALGORITHM

Several goals have prompted the use of optimization benchmarking. For instance:

i. To assist in the selection of the best algorithm for solving a real-world problem.
ii. To demonstrate the uperiority of a novel algorithm overa more conventional form.
iii. To equate the performance of a current version of optimization software to previous versions.
iv. To assess how well an optimization algorithm performsin a variety of situations.

Test sets

A test problem includes a test function as well as additional criteria including the constraint collection, feasible domain, starting points, and so on. A test set is a group of test questions. Obviously, benchmarking produces useful results only when competing algorithms are used. The same test set was used, and the same performance metrics were used. It's important to keep the comparison's specific target in mind when choosing a test range. Regardless of the target, an acceptable test set should aim to avoid the inefficiencies mentioned below.

1) Too few problems. More problems in the test setimprove the experiment's reliability and allows the results to reveal more detail about the tested algorithms' strengths and weaknesses.

2) Too little variety in problem difficulty. To define the strengths and limitations of algorithms, a test set containing only simple problems is insufficient. A test set that only contains problems that are so complicated that no algorithm can solve them, on the other hand, obviously does not provide valuable information on algorithm results.

3) Problems with unknown solutions. It is preferable to use test problems with a proven solution wherever possible. The "solution" may be interpreted as the minimum function value or a collection of global minimizes, depending on the analysis performed. Having access to the solution significantly increases one's ability to assess the algorithmic output's consistency. When the test set is made up of real-world scenarios.

4) Biased starting points. Allowing different algorithms to use different starting points would

inevitably bias the outcome. However, there might be more subtle issues.

5) Hidden structures. Many test sets have a framework that is unrealistic in real-life situations. In the test set, for example, about half of the problems have solution points that are integer valued coordinates. On these problems, an algorithm that uses some type of rounding may perform better than normal.

c. CONCLUSION

Optimization algorithms are frequently used to solve real- world problems. However, the quality of these problems' solutions varies depending on the algorithms used. The performance of some of the most commonly used optimizationalgorithms in the evaluation of standard test functions with various characteristics is compared in this chapter. The computation time and the number of iterations required for convergence can used to compare performance. In addition, the algorithms can be compared in terms of the quality of the final solution.

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Authentication Techniques For Cloud Computing

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ABSTRACT:

Information and Telecommunication Technology (ITCT) has penetrated into the depths of human life and is affecting human lifestyle in various aspects. Cloud computing is one of the newest technologies on the market. In cloud computing, users can access their files or data from anywhere using the Internet. Cloud computing is one of the most new technology in market. In cloud computing user can access their files or data from anyplace using internet. It has several positive impacts like reliability, increase throughput, reduce costs. Identifying authorized users is a big issue. Users wishing to access data or services must be registered and before accessing any data or services; Authorization must be authenticated. There are several authentication techniques including traditional and biometric but has some drawbacks. In this paper review the authentication in cloud computing.

1. INTRODUCTION

Cloud computing refers to the management of scalable and IT related services to users through the Internet. It is a computing technology in which dynamically scalable and IT connected resources are provided as a service through the Internet. Cloud computing technology is a new concept, which provides great opportunities in many areas. Cloud computing is a collection of computers and servers that are publically accessible via internet. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. Cloud computing provides the variety of internet based on demand services like software, hardware, server, infrastructure and data storage [1,2].

CHARACTERISTICS OF CLOUD COMPUTING

National Institute of Standard and Technology (NIST) describes cloud computing with five essential characteristics are [3, 4]

Broad network access – User can access cloud services using desktop, laptop, mobile phone etc. over the internet

Rapid elasticity – Cloud computing has ability to quickly allocate and de-allocate the services as per requirement.

Resource pooling – Cloud provider schedules resources to the user as per their requirement.

On-demand self-service – Cloud provides all needed computing resources as per requirement to user.

Measured service – Cloud providers

controlling on usage of resources.

SERVICE MODELS

Software as a Service (SaaS)

It has the ability to provide user any software running on a cloud substructure. Software is deployed over the internet. In this model customers licenses the applications and the cloud service providers provide the required facility to the end users when they require [3].

Platform as a Service (PaaS)

Platform can also be provided as a service. In this any kind of platform is provided as a service of which user has no control but user can use it. [4].

Infrastructure as a Service (IaaS)

Infrastructure facilitates the user by providing computing resources where user can run the software without having control on underlying infrastructure but has control over the operating system being use [4].

DEPLOYMENT MODELS

There are three Deployment Models and are described below [3,4]:

Private Model: This model is designed for individual organizations such as a home and an organization and they can use it for their own purposes.

Public Model: This infrastructure is available to the general public. The public cloud is a model in which resources are generally available to everyone or anywhere.

Hybrid Model: Hybrid Clouds is a combination of public and private cloud. This can be done private cloud require some important services from the public cloud like Private cloud can store some information on their private cloud and we can use that information on public cloud.

BENEFITS OF CLOUD COMPUTING

Increase Throughput – Cloud computing get more work done in less time with less people.

Reduce Costs – In cloud computing, user shares computer hardware, software and data so there‘s no need to spend money on hardware or software.

Improve Accessibility – In cloud computing user can access data, files anytime from anywhere via internet.

Requires Less Training – Cloud computing takes fewer people to do more work. So there is requirement of minimum training of hardware, software problems to user.

AUTHENTICATION IN CLOUD

As cloud users store their information to various services across the Internet, it can be accessible by unauthorized people. So security is the most important issue in cloud computing. To provide security we require proper authentication technique in cloud computing. Typically, authentication is done based on information about one or more of the information of the subject, such as password or secret information and tenure of the user such as passport, driver‘s license, other is biometric behavior of the user, such as voice, fingerprint ir, is, etc. the security issues of cloud computing, particularly on authentication. the

data from unauthorized user, only admitted persons access the resources. The user is verified by different access control mechanisms.

Authentication Techniques

1. **Password** – The combination of login and password is the most commonly used method of authentication but is not secure.
2. **OTP** – OTP is a One Time Password where in password is provided upon request. An OTP can prevent a password from being stolen and reuse. This password is valid for a limited period of time.

Advantages of authentication

There are various advantages of authentication systems which are used to identify the user of a home The main purpose of these systems is t[o3] authenticate the user correct to access the information, and protect against unauthorized access and identity fraud[5,6].

Disadvantages:

It is not always accurate and considered an invasion of privacy to be watched.

CONCLUSION

The services of cloud computing is based on the internet. Security is a major concern to identify authorized user in cloud computing. To provide cloud services only to the authorized user, secure authentication is necessary in cloud computing. There are so many authentication techniques like Voice recognition, password, OTP, finger recognition etc. but still it has some drawbacks like at times password techniques are not feasible, password can be easily stolen by hacker or if user uses complex password, user may forget that password etc.

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Performance of Indian IT Sector

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Abstract:

In this computer age, the development and advancement of IT sector in a developing economy can push it into thedeveloped countries category. The present study found that the IT sector of India has experienced boom and prosperity during the first decade of this century.Therefore, the supportive policies and Acts viz. Information Technology Act 2000, National broadband policy 2004, and Special Zone Act 2005 have favouable impact on IT sector of India. Meanwhile, it is moving towards recession in second half of the second decade of this century. However, the study confirms good performance of Indian IT sector in terms of the contribution in GDP, foreign exchange earnings and employment generation in Indian economies.

Keywords: GDP, IT, BPO

1. INTRODUCTION

India is an emerging economy fueled by techno-savvy manpower and a world class information technology (IT) Industry (Bhatnagar, 2006). When the government provided some basic infrastructure and human capital development roughly appropriate for software development and IT enabled services, the sector took advantage of global opportunities and took off (Singh, N. 2012). India had no driving strategy or structure for computer/software technology after independence until 1970. During this time, however, the government took many steps to begin the design and development of computers in educational institutions. The Bhabha Committee, which was formed in 1963, stressed the role of electronics and computers in India's growth. The Government of India created the Department of Electronics (DoE) in 1970 to promote the growth of electronics and computers in India, based on the recommendations of the Bhabha Committee. The government first time has made a new software scheme in 1972, enabling the import and export of software hardware, and thus making a breakpoint in the evolution of the Indian IT industry. In 1974, Tata Consultancy Services (TCS) received its first international client, Burroughs Corporationfrom the United States.

Indian IT industry has achieved phenomenal growth during the post-

economic reform period (Singhand Kaur, 2017).IT industry is contributing Rs.63 billion in 1994-95 in the GDP of India and it has increased to as Rs.1276 billion in 2004-05 (Allad and Mahindera, 2015).In terms of scale,India's IT industry has not only made significant progress in the past centurybut also has expanded at an unprecedented pace with the start of present century.All the sub-sectors of this industry (hardware products have relatively seen less progress) have made strides in revenue growth in the last two decades and fueled the growth of the Indian economy (Sirohi, 2020).

Keeping in view its contribution, the present study explores the performance of IT Sector of India during 2000- 2020 period. After brief introduction section II of the study brings the methodology part. Section III provides results and discussion on data. Last section gives conclusion.

II. METHODOLOGY

The study is based on the secondary data obtained online from various sources viz. annual reports of Ministry of Electronics & Information Technology (MeitY)(https://www.meity.gov.in), Ministry of Commerce and Industry (https://commerce.gov.in), Electronics and Computer Software Promotion Council (ESC) (https://www.escindia.in) and https://tradestat.commerce.gov.in) and Economic Survey of India 2020-21. To make percentage representative, GDP at market prices data series spliced backward from 2010-11 figure. For analyzing the collected data, simple statistical techniques like percentages and growth rates have been calculated in the present study. After liberalization, especially with the start of this century, Indian economy has experienced a sharp increase in the scale of IT Sector and its Trade with the world countries, so, growth rates has worked out by using the exponential function of the following form.

Where

b = Slope of semi-logarithmic trend, a = constant, and r =Growth rate

$$y = ab^t$$

.....(i) The Growth rate (r) has computed as under

Or

$$r = \{\text{Antilog}(b)\ 1)\} * 100$$
$$r = (b^{-1}) * 100$$

III. RESULTS AND DISCUSSION

Table 1 presents the Average Annual Growth Rate (AAGR) and percentage share of information technology (IT) sector in Indian electronics industry.The percentage share of computer hardware in Indian electronics industry has recorded 4.8 per cent in 1999-2000 reached at its peak of 5.8 per cent in 2004-05. However, after 2004-05 year it declines gradually reached at its lowest level of 1.4 per cent in 2019-20. The communication & broadcasting equipments‟ share in Indian electronics industry has registered the level of 7.6 per cent in 1999-20 and slipped to its lowest level of 2.0 per cent in 2014-15 Meanwhile, due to the robust increase in the production of smart phones and LEDs with favourable support from

Year	Computers (IT Hardware)	Communication& Broadcasting Equipments	Electronics Hardware (Sub-Total)	Software for Exports	Domestic Software	Total Software	Electronics Industry Total
1	2	3	4	5	6	7	8
Percentage Share							
1999-00	4.8	7.6	53.6	32.7	13.7	46.4	100.0
2000-01	4.9	6.5	45.2	41.2	13.7	54.8	100.0
2001-02	4.4	5.6	40.9	45.6	13.6	59.1	100.0
2002-03	4.4	4.9	38.7	47.5	13.8	61.3	100.0
2003-04	5.7	4.5	37.0	49.2	13.7	63.0	100.0
2004-05	5.8	3.1	33.1	52.6	14.3	66.9	100.0
2005-06	5.7	3.7	29.7	54.7	15.6	70.3	100.0
2006-07	5.2	3.9	27.0	57.8	15.2	73.0	100.0
2007-08	5.4	6.3	28.5	55.6	15.9	71.5	100.0

Government of India (GOI), the production of communication & broadcasting equipments has again gain momentum and recorded sharp enhancement in its production to its highest level of 14.5 percent in 2019-20.

By comparing total hardware production of Indian electronics industry with total software production of IT sector, it is held from the data that the production value share of both has recorded inverse trend in the study period. The share of electronics hardware has slipped to the level of 35.2 per cent in 2019-20 from its highest level of 53.6 per cent in 1999-20. Contrary to it, the production level of total software was recorded 46.4 per cent in 1999-20 in Indian electronic Industry that has gone up to its peak level of 79.6 per cent in 2014-15 and registered the level of 64.8 per cent in 2019-20. Moreover, the share of the production of software for export purpose has remained more than double of the share of the production of software for domestic market of Indian electronic Industry. On overall basis, the data reveals that the software has registered lion‟s share in the production of Indian electronics Industry during study period as compared to total hardware production.

TABLE 1: Production Percentage Shareof IT Sectorin Electronic Industry of India and theirAAGRduring 1999-2020.

2008-09	3.6	7.1	26.1	58.0	15.8	73.9	100.0
2009-10	3.6	7.5	26.6	57.0	16.3	73.4	100.0
2010-11	3.1	7.4	27.1	56.4	16.5	72.9	100.0
2011-12	2.9	7.1	25.2	58.6	16.2	74.8	100.0
2012-13	1.4	6.8	24.1	60.5	15.4	75.9	100.0
2013-14	2.1	3.2	21.9	64.1	14.0	78.1	100.0
2014-15	2.0	2.0	20.4	65.6	14.0	79.6	100.0
2015-16	2.1	5.7	25.8	56.7	17.5	74.2	100.0
2016-17	1.9	8.5	29.9	53.6	16.5	70.1	100.0
2017-18	1.8	11.4	33.4	51.0	15.6	66.6	100.0
2018-19	1.5	12.1	32.7	51.4	15.9	67.3	100.0
2019-20	1.4	14.5	35.2	49.3	15.5	64.8	100.0
			AAGR				
1999-2020	10.3	22.0	16.0	20.2	19.5	20.0	18.6
2001-05	29.1	3.1	13.4	29.0	23.1	27.6	21.9
2005-10	7.3	49.3	18.9	23.0	23.7	23.2	22.0
2010-15	5.1	-15.4	10.6	23.5	13.2	21.4	18.7
2015-20	2.9	41.8	22.0	10.0	10.5	10.1	13.6

In the context of progress, the AAGR of the software production is recorded almost double (20.0 per cent) as compared to computer hardware production during the whole study period of 1999-2020. It suggests that the Indian IT sector has major strength in software production as compared to hardware production. However, the Indian IT sector has experienced a healthy AAGR during the sub-period of 2001- 05 as both computer hardware and total software production has registered AAGR of 29.1 per cent and 27.6 per cent respectively. Therefore, the supportive policies and Acts viz. Information Technology Act 2000, National broadband policy 2004, and Special Zone Act 2005 have favouable impact on IT sector of India. The robust AAGRs in the production of communication & broadcasting equipments during the sub- periods of 2005- 10 (49.3 per cent) and 2015-20 (41.8 per cent) has been the main pull factor for pushing the AAGR of the production of electronic hardware. However, the AAGR of IT hardware production show dismal scenario as it gradually going down during consecutive sub-periods of the study. With the exception of smart mobile phone production as componentof communication & broadcasting equipments, the other sub- parts of the Indian electronic industry have slipped to lowest level of AAGR during the sub-period of 2015-20. On overall basis, the Indian electronic industry has experienced prosperity in first half of the study period (2001-10) and recession after second half the study period (2010-20).

Table 2 brings out the AAGR of export of IT sector of India and its share in total export & GDP of India. It is held from the data that the value of software export has lion‟s share as compared to the value of hardware of IT sector of India as it hovered around 90 per cent throughout the study period 1999- 2020.Indian software exports have been, and remain, dominate d by services (Heeks and Nicholson, 2004). Promotion of the software industry and protection of the hardware industry from external competition has resulted in this skewed growth (Gopalan, 2000). Noticeably, the computer hardware and communication & broadcasting equipments have registered insignificant share in the export of IT sector of India. However, the share of IT sector in total export from India has been not only registered an increase its share to a significant level from 11.6 percent in 1999-00 to 38.1 per cent in 2019-20 but also contributing robustly to economic growth of Indian economy. Thus, the share of IT sector export value in GDP of Indian economy has registered 0.9 per cent in 1999-00 and reached its highest level 5.2 per cent in 2014-15 and in 2019-20 recorded 4.2 per cent level. It has effect of Covid- 19 in 2019-20 year.

The data of AAGR of table 2 suggests that the hardware export of IT sector experienced sharp fluctuations during the study period of 1999-2020. Noticeably, the export of computer hardware and communication &broadcasting equipments registered enormous AAGR during the sub- periods of 2005-10 and 2015-20. It suggests that the hardware segment of IT sector will also contribute more in export earnings in future. As the Covid-19 has affected badly the

world economy and thereby, the AAGR of total IT sector export, total India‟s export and GDP have recorded decline in their levels during the sub-periods of 2015-20. On overall basis, the AAGR of share of the total export of IT sector in Indian total export has declined during the ending period of the study.

TABLE 2: Percentage Share of Export of IT Sector in Total Export & GDP of India and their AAGR during 1999-2020.

Year	Computer Hardware	Communication & Broadcasting Equipments		IT Hardware Export	IT Software Export	IT Sector Export Total	Share of IT Sector in Total Export	Share of IT Sector in GDP
1	2	3		4	5	6	7	8
				PERCENTAGE SHARE				
1999-00	1.3	0.3		7.5	92.5	100.0	11.6	0.9
2000-01	3.8	1.7		14.4	85.6	100.0	16.3	1.6
2001-02	4.3	0.4		13.7	86.3	100.0	20.2	1.9
2002-03	1.0	1.0		10.8	89.2	100.0	20.3	2.1
2003-04	2.2	0.3		11.7	88.3	100.0	22.5	2.4
2004-05	1.4	0.4		9.1	90.9	100.0	23.5	2.8
2005-06	0.9	0.4		8.5	91.7	100.0	24.9	3.2
2006-07	1.0	0.4		8.1	91.9	100.0	26.8	3.7
2007-08	0.6	0.4		7.4	92.6	100.0	27.1	3.7
2008-09	0.7	5.0		12.6	87.4	100.0	29.4	4.5
2009-10	0.7	3.0		9.9	90.1	100.0	31.1	4.2
2010-11	0.4	4.8		13.1	86.9	100.0	27.2	4.1
2011-12	0.6	4.8		11.4	88.6	100.0	25.6	4.3
2012-13	0.5	4.6		9.6	90.4	100.0	27.9	4.6
2013-14	0.3	3.8		8.1	91.9	100.0	30.1	5.1
2014-15	0.3	1.2		5.7	94.3	100.0	34.2	5.2
2015-16	0.3	1.1		6.5	93.5	100.0	33.4	4.2
2016-17	0.3	1.2		6.3	93.7	100.0	32.9	3.9
2017-18	0.3	1.4		6.2	93.8	100.0	32.3	3.7
2018-19	0.3	2.5		7.6	92.4	100.0	33.8	4.1
2019-20	0.3	2.5		9.5	90.5	100.0	38.1	4.2
			AAGR				EXPORT GROWTH	GDP GROWTH
1999-20	6.7	32.0		17.1	20.2	19.9	15.3	13.5
2001-05	-3.0	-7.8		14.0	29.0	27.1	16.9	10.3
2005-10	14.2	132.4		33.6	23.0	24.1	17.6	15.0
2010-15	6.2	-10.5		-1.0	23.5	21.0	13.7	13.4
2015-20	12.7	39.9		21.7	10.0	10.8	7.6	10.4

Table 3 provides the contribution of IT sector in terms of employment generation in Indian economy during the period 2001-2018. The data reveals that there is gradual and continue increase in generation of employment by Indian IT sector. However, the pace of generation of employment by IT services & export segment is sharp than domestic market segment of Indian IT sector. There was 1.7 lakh persons employed in IT services & export segment in 2001-02 that increased to 19.8 lakh in 2017-18. Similarly the BPO export and domestic market segments were absorbed 1.7 lakh and 2.5 lakh persons in 2001-02 that continuously increased to 11.9 lakh and 7.9 lakh persons in 2017-18 respectively. The total IT sector of India has recorded almost eight time increase in employment level from 5.2 lakh persons in 2001-02 to 39.7 lakh persons in 2017-18.

TABLE 3: Employment Generation Contribution of IT Sector of India and AAGR of this during 2001-2018. (In Lakhs)

YEAR	IT Services & Exports	BPO Exports	Domestic Market	Total Employment	Net Addition
1	**2**	**3**	**4**	**5**	**6**
2001-02	1.7	1.1	2.5	5.2	5.2
2002-03	2.1	1.8	2.9	6.7	1.5
2003-04	3.0	2.2	3.2	8.3	1.6
2004-05	3.9	3.2	3.5	10.6	2.3
2005-06	5.1	4.2	3.8	12.9	2.3
2006-07	6.9	5.5	3.8	16.2	3.3
2007-08	8.6	7.0	4.5	20.1	3.9
2008-09	9.2	7.9	5	22.1	2.0
2009-10	9.9	7.8	5.2	22.9	0.8
2010-11	11.5	8.3	5.6	25.4	2.5
2011-12	11.5	8.3	5.6	25.4	0.0
2012-13	12.9	8.8	6.0	27.7	2.3
2013-14	16.0	9.9	7.0	32.7	5.0
2014-15	17.4	10.3	7.5	34.9	2.2
2015-16	18.5	10.9	7.6	36.9	2.1
2016-17	19.2	11.5	7.9	38.6	1.7
2017-18*	19.8	11.9	7.9	39.7	1.4
			AAGR		
2001-18	16.1	13.8	7.5	12.9	
2001-06	32.5	38.5	10.8	25.6	
2006-10	17.5	17.4	9.4	15.7	
2010-14	11.3	5.5	6.8	8.3	
2014-18	5.4	5.0	3.2	5.0	

*Estimated Values

The data regarding AAGR brings out that during the sub-period of 2001-06, IT sector of India has contributed in employment generation enormously with huge growth in its every segment. However, during the sub-period of 2014-18, IT sector has registered quite low AAGR of employment generation in every segment

as passing through recession period. On overall basis,the domestic market segment of IT has recorded AAGR of 7.5 percent as compared to AAGR of 13.8 per centand 16.1 per cent of BPO exports and IT services & export segmentsin 2001-18 period respectively. The total IT sector of India has experienced AAGR of 12.9 per cent during 2001-18 period expressing strength of IT in terms of employment generation.

III. CONCLUSION

Nowadays IT sector is one of strongest segment of Indian industrial sector in terms of its contribution towards foreign exchange earnings, GDP and employment generation.With the start of the present century, India's IT industry developed at an extraordinarily fast pace, contributing a significant portion of the country's GDP and has lion‟s share in India‟s Export. Despite the global economic uncertainty, India's IT industry has steadily augmented and accelerated its growth along with healthy employment generation. This industry consumes a wide pool of professional Indian human capital, transforming India into a global IT centre. The IT industry has played a major role in shifting India's economic and governance environment. India's IT industry is gaining momentum in emerging disruptive technologies and will play a key role in the global fourth industrial revolution to achieve new millennium goals of this century.

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Wireless Mobile Computing for E-Commerce: M-Commerce

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ABSTRACT:

Wireless mobile computing and commerce are the most popular in present days due to the service offered during the mobility. Today wireless mobile computing has become the truth rather than the luxury item. Wireless business is increasing fast day by day. This paper discuss M-commerce is a division of Mobile Computing. M-commerce is comes after E-Commerce. That means the accessing of information systems by wireless devices at everywhere and every time. Today, mobile is not only used for transforming message or calling but it also used for other activities like web browsing etc. The process selling of goods and services is done by equipment called mobile which is wireless handled device. Although people have started using E- commerce but still they hesitate to use M-commerce as of security issues, payment trouble and difficulty of the mobile application etc. But in future it is going to replace the process of sales and services. M-commerce helps in improving relationship with customer. The main objective of this paper is to present and discuss the Services, advantage, problems faced by the seller and buyer during M-commerce in India.

Keyword: M-commerce, E-commerce, Wireless network, Mobile phone.

INTRODUCTION:

Now a day mobile are used in every field. M-commerce which allow direct access to information while on the move. While E-commerce continues to impact on the worldwide business environment positively, thus technologies and applications are starting to focus more on mobile computing and the wireless Web. In M-commerce each transaction can be accomplished on one handheld device called mobile phone that makes transactions possible through a wireless network. When users buy product or pay using E-banking they don't require to use personal computer due to M-commerce. Business-to-consumer transactions conducted from a mobile device are also known as M-commerce. Mobile ecommerce outcomes from convergence of

two technologies, the internet and the wireless technology.

In simple terms:

FEATURES OF M-COMMERCE

1. **Accessibility:** Tablets and mobiles like devices are all the time near, user can easily access these devices as per his convenience from wherever.
2. **Pervasiveness:** The word pervasiveness means the easy access of information in real-life. It is an easiest mode for the users to fulfill their required products query.
3. **Determination of Place:** Goal customers through mobile promotions in a predefined physical space.
4. **Archetype:** Formation of the services which customized the end-user knowledge.
5. **Inter-activity:** Mobile devices are used for quick and easy communications like a customer will directly find for a preferred group of product, there is no need for visiting all the categories of products.

APPLICATION/SERVICES

1. **Mobile payments**: M-commerce involves m-payment, that is defines as the process among two parties transforming financial assessment with a mobile device. Online payment transformation like movie tickets, buying railway tickets, bill payments using mobile phones with a range of gateways and applications like Google Pay, Phone Pay, is known as Mobile payment.
2. **Mobile banking:** Mobile banking services allows user to get information of their bank account balance through email or SMS. Several of the banking services provided by M-commerce as finance transfer among more than one accounts, trading and conformation of direct payment transfer using SMS.
3. **Mobile advertisement**: Mobile advertisement is a extremely important element of M-commerce. It is a method of advertising through mobile web posters, SMS, etc.
4. **Mobile shopping & retailing:** Mobile enhance users capability to make communication across time and generate new transaction prospects in fields of retail and purchase made using various applications online like purchase of the pen from Flip kart or purchase of a dress from Amazon.

6. **Quality Check:** Quality of products cannot be ascertained by considering them on an online platform, there are vast probability that the excellence you want may be different from the quality you external.

Conclusion:

This paper presents that M-commerce is a division of E-commerce. M- Commerce has the incredibly positive result on market in India in spite of its advantages and disadvantages. The motive behind its status is the effortlessly accessibility of Smartphone at reasonable price with efficient internet data plans. People have use mobile for audio, video calls although they can access every feature of business , they can viewing the product, adding it to cart and creating the payments and attain their selected product at door . We can also use a lot of other services that are accessible in form of m-commerce like railway ticket booking. We can manage bank accounts, mail accounts etc. As all coins have two aspects therefore M-commerce also have advantages and disadvantages. Our government, cyber experts, banking system should take some steps for secure transactions.

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Customized PSO Algorithm Intended for Optimizing Makespan

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Abstract –

To get the best out of cloud service, the optimized utilization of available cloud resources is a must. The research paper particularizes the importance of load balancing. The load balancing factor is responsible to keep a check on the appropriate utilization of available servers. Load balancing is a method for reassigning the entire workload to available nodes for a group of systems, in order to utilize resources effectively and efficiently. The primary aim of performing load balancing is to evenly distribute the load to be processed among available processing nodes to avoid any kind of overutilization or underutilization. The research paper proposes a modified PSO (Particle Swarm Optimization) technique with an intention to minimize the makespan in a virtual cloud environment. The utilization of VM explains how well accessible resources can be utilized in cloud computing. The objective of the task scheduling algorithm schedule the tasks in such a manner that makespan gets minimized and the utilization of VM gets maximized is to. The emphasis has been laid on the effective use of load balancers to achieve the desired task. The research paper elaborates on the proposed technique via an algorithm, flowchart, and implementation.

Keywords – Cloud Computing, Load Balancing, Makespan, PSO, Virtual Machines.

I. INTRODUCTION

Cloud computing is an evolution of parallel, distributed, cluster, and grid computing. In parallel computing, all processors share the memory to exchange information between processors. In distributed system components

resides on computers on different networks. Each system has owned its memory and it may be at the same or different location. It communicates and coordinates by passing messages. In cluster computing groups of different distributed or parallel systems reside in the same area and are interconnected with a high-speed network to solve a problem [1, 2]. Grid computing is geographically spread and the clusters at the same or different locations are connected through the internet. The large tasks are fragmented into small sections and are executed on different machines. The cloud host is categorized into three main categories as public clouds, private clouds, and hybrid clouds. In public clouds, cloud resources are possessed and activated by CSP (Cloud Service Provider). For example, Microsoft Azure, Amazon Web Services, and Google Cloud Platform. Public clouds provide and charge cloud services to users over the Internet. Public clouds deal with the service market rather than specific enterprises. On the contrary, private clouds are built for specific organizations and are maintained by professional parties. Private clouds can only be accessed by members of the enterprise. For example, IBM, Cisco, and Sun. Private clouds also depend on public clouds to enhance their storage and computing capabilities. Hybrid clouds are a combination of public clouds and private clouds and are intended to improve scalability and efficiency. In a hybrid cloud, the scheduler regulates whether to admit or not to agree on the cloud user's request depending upon resource usage of public and private clouds [3, 4].

Load balancing in cloud computing refers to adjustments of workloads and properties related to computing. Load balancing enables organizations to manage workload demands or application demands by allocating available

resources among several networks, servers, or computers. Load balancing comprises the circulation of workload traffic existing on the Internet. With the rapid increase in the growth of the internet and organizations adapting to the cloud environment, the need for load balancing has further gained importance [5, 6]. The primary purpose of load balancing is to keep a check and prevent the server from getting overloaded and facing possible break down. If efficiently implemented, the load balancing reduces the downtimes and hence enhances the service availability. End-user contentment and efficiency highly depend upon fast response time [7]. Load balancing is highly profitable for cloud environments where enormous workloads can devastate a single server. Cloud scalability is also assisted by load balancing. By default, the cloud environment is supposed to automatically scale up in order to accommodate any kind of rush in traffic. When cloud scales up, multiple virtual servers twists up and multiple application occurrences are made to run. A load balancer is responsible for the distribution of traffic among these new instances [8]. In the absence of load balancers, the new virtual servers would not obtain the incoming traffic in a synchronized manner or if at all. Few virtual servers would remain underloaded while others may be overloaded. Load balancers can even counter the natural calamities like tsunami, earthquakes, floods, etc. Suppose if a particular region with CSPs (Cloud Service Providers) is devastated, the load balancers are smart enough to shift the traffic to another region which has not been under the influence of natural calamity [9]. Load balancers support different load balancing algorithms and they can easily find out if any particular server is likely to get overloaded more quickly. In such a case, the job of load balancers is to shift the traffic to the other nodes which seem to be healthier.Such provisions and capabilities enable and enhance the effectiveness of load balancing [10].

The research work conducted in this paper is primarily focused to minimize the makespan via load balancing. Makespan is the total length of the time consumed until all the tasks have been processed. The optimization problem in cloud computing is to minimize the makespan. The utilization of VM defines how well the available resources can be utilized in cloud computing. The makespan and utilization rate are inversely proportional to each other [11, 12]. The objective of the task scheduling

algorithm is to schedule the tasks in such a manner that makespan gets minimized and the utilization of VM gets maximized.

Particle Swarm Optimization resembles Genetic Algorithms (GA) in many aspects. The random solutions and searches are used to initialize targets via updating generations [13, 14]. PSO is free from evolution operators like transformation and crossover. Particles fly through the problem space by following the current optimum particles. Each particle moving in the solution space is fascinated by two poles, its past best position (solution) and the best position (solution) of the whole swarm (collection of particles). These poles are responsible for transforming the velocity vector of the particles at each iteration [15, 16]. The implementation of PSO is comparatively easy as compared to Genetic algorithms. PSO finds its applications in ANN (Artificial Neural Networks), function optimization, fuzzy systems, and other areas [17]. The prominent features of PSO are mentioned below.

- Reduces the dimensionality
- Improves predictive accuracy
- Reduces complexity of the training model

II. MODIFIED PSO TASK SCHEDULING ALGORITHM

This section illustrates the proposed modified algorithm and flowchart of the PSO task scheduling algorithm intended to minimize the makespan.

Algorithm

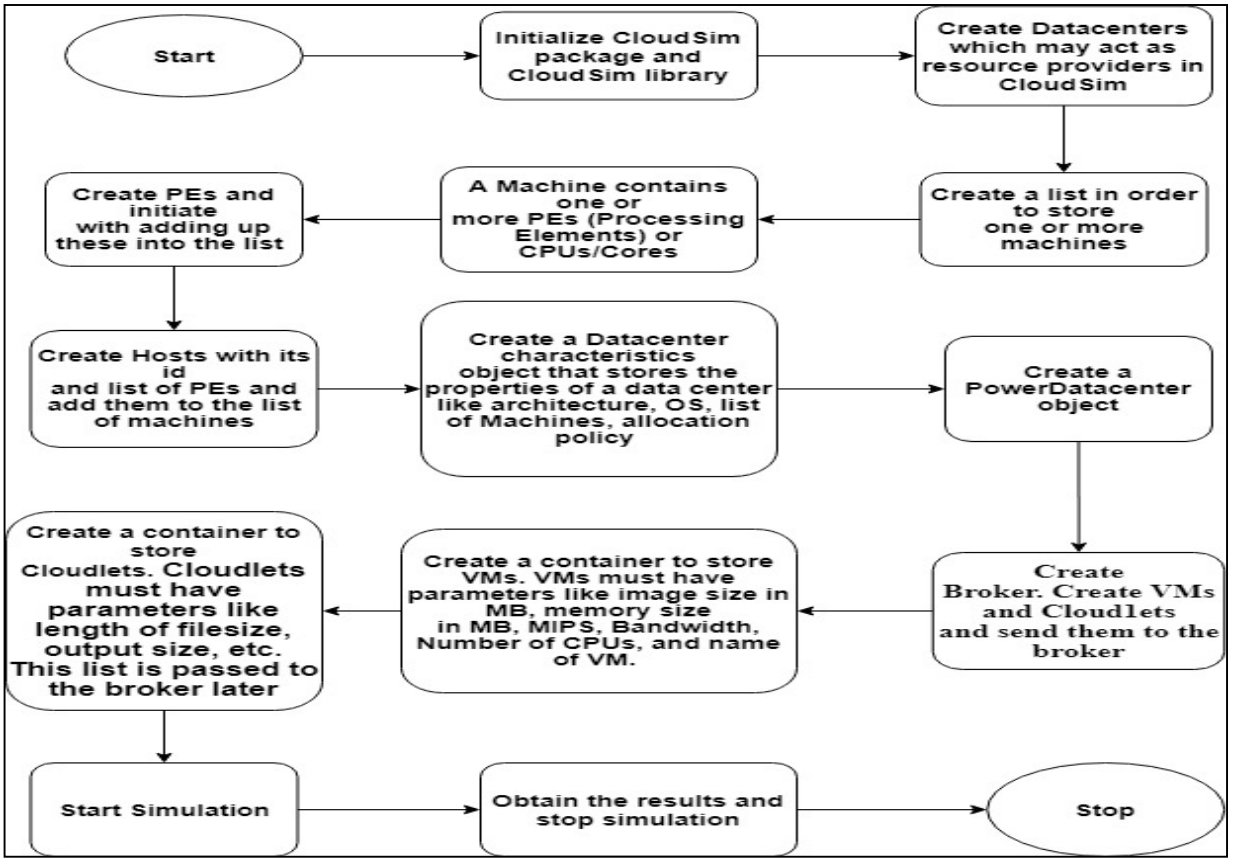
- Initialize the CloudSim package. It should be called before creating any entities and initialize the CloudSim

  Library.
- Initiate with creating Datacenters which would act as resource providers in CloudSim. At least one of the Datacenter needs to be in running state in CloudSim simulation.
- Create a list in order to store one or more machines. Each machine comprises multiple PEs or CPUs / Cores.
- A Machine contains one or more PEs (Processing Elements) or CPUs/Cores. Therefore, should create a list to store these PEs before creating a Machine.
- Create PEs and initiate with adding up these into the list for a quad-core machine. PE id and MIPS (Million Instructions per second) rating should be stored.
- Create Hosts with its id and list of PEs and add them to the list of machines.
- Create a Datacenter characteristics object that stores the properties of a data center like architecture, OS, list of Machines, allocation policy (time- or space-shared, time zone, and its price).
- Create a PowerDatacenter object.

- Create Broker.
- Create VMs and Cloud1ets and send them to the broker.
- Create a container to store VMs and cloudlets. VMs must have parameters likeimage size in
-

- MB, memory size in MB, MIPS, Bandwidth, Number of CPUs, and name of VM. Cloudlets must have parameters like length of filesize, output size, etc. This list is passed to the broker later. Start simulation.
- Print results when a simulation is over.

1 Flowchart for modified PSO algorithm



IV. RESULTS AND IMPLEMENTATIONS

This section illustrates the implementation of the proposed technique with setting parameters to a fixed value except for the number of CPUs which varies.

Case 1:

The considered parameters along with assigned values for performing the implementation are given below.Values assigned to the parameters with data types

- long size = 10000 (size of an image in MB)
- int ram = 2048 (memory allocated to ual Machine in MB)
- int mips = 250 (Number of million instructions per second)
- long bw = 1000 (bandwidth)
- int pesNumber = 1 (Number of participatingCPUs)
- Thirty cloudlets have been allocated to five virtual machines having VM_IDs as 02, 03, 04, 05, and 06. The status of executing iterations to find out the best fitness value is shown below Iterations.

18	SUCCESSFUL	5	5	328.8	3705.36	4034.16
10	SUCCESSFUL	4	4	611.3	3431.58	4042.88
13	SUCCESSFUL	2	2	131 9.69	2991.64	4311.33
15	SUCCESSFUL	6	6	166 8.02	380 6.7	5474 .72
25	SUCCESSFUL	5	5	262 0.08	4034 .16	6654 .24
12	SUCCESSFUL	4	4	264 0.24	4042 .88	6683 .12
22	SUCCESSFUL	2	2	275 8.13	4311 .33	7069 .46
19	SUCCESSFUL	6	6	169 4.36	5474 .72	7169 .07
17	SUCCESSFUL	4	4	140 9.67	6683 .12	8092 .79
26	SUCCESSFUL	5	5	174 1.58	6654 .24	8395 .81
23	SUCCESSFUL	4	4	101 3.08	8092 .79	9105 .87

20	SUCCESSFUL	6	6	214 5.86	7169 .07	9314 .94
24	SUCCESSFUL	2	2	241 5.06	7069 .46	9484 .52
27	SUCCESSFUL	5	5	226 1.71	8395 .81	1065 7.52
28	SUCCESSFUL	4	4	189 2.69	9105 .87	1059 8.56
29	SUCCESSFUL	5	5	497. 12	1065 7.52	1115 4.64

The number and sequence of

The status of executing iterations to find out the best fitness

available data centers as best solution are (6 16 18 25 26 27 29), (5 9 10 12, 17 23 28), (7 11 14 15 19 20), (1 2 8 21), and (0 3 4 13 22 24). The detailed status of execution of allocated tasks is shown below in Table I.

Table I. Table shows the execution of PSO as per readings of Case 1

Global	best	at	iteration	(00):7078.035913
Global	best	at	iteration	(10):6001.581043
Global	best	at	iteration	(20):8685.997767
Global	best	at	iteration	(30):5377.083438
Global	best	at	iteration	(40):5313.230507
Global	best	at	iteration	(50):5313.230507
Global	best	at	iteration	(60):5313.230507
Global	best	at	iteration	(70):5313.230507
Global	best	at	iteration	(80):5313.230507
Global	best	at	iteration	(90):5313.230507
Global	best	at	iteration	(100):5313.230507
Global	best	at	iteration	(110):5313.230507
Global	best	at	iteration	(120):5313.230507
Global	best	at	iteration	(130):5313.230507
Global	best	at	iteration	(140):5313.230507
Global	best	at	iteration	(150):5313.230507
Global	best	at	iteration	(160):5313.230507
Global	best	at	iteration	(170):5313.230507
Global	best	at	iteration	(180):5313.230507
Global	best	at	iteration	(190):5313.230507
Global	best	at	iteration	(200):5313.230507
Global	best	at	iteration	(210):5313.230507
Global	best	at	iteration	(220):5313.230507
Global	best	at	iteration	(230):5313.230507
Global	best	at	iteration	(240):5313.230507

Global	best	at	iteration	(0):	8228.091436
Global	best	at	iteration	(10):	6817.418662
Global	best	at	iteration	(20):	6108.189052
Global	best	at	iteration	(30):	5458.987011
Global	best	at	iteration	(40):	5013.728819
Global	best	at	iteration	(50):	4992.544666
Global	best	at	iteration	(60):	4992.544666
Global	best	at	iteration	(70):	4992.544666
Global	best	at	iteration	(80):	4992.544666
Global	best	at	iteration	(90):	4992.544666
Global	best	at	iteration	(100):	4992.544666
Global	best	at	iteration	(110):	4992.544666
Global	best	at	iteration	(120):	4992.544666
Global	best	at	iteration	(130):	4992.544666

cloudlets assigned to the best fitness value achieved is 5313.2305073435577 and the makespan is 2782.638412768983.

Case 2:

The considered parameters along with assigned values for performing the implementation are given below.

Values assigned to the parameters with data types

- long size = 10000 (size of an image in MB)
- int ram = 2048 (memory allocated to Virtual Machine in MB)
- int mips = 250 (Number of million instructions per second)
- long bw = 1000 (bandwidth)
- int pesNumber = 2 (Number of participating CPUs)

Thirty cloudlets have been allocated to five virtual machines having VM IDs as 02, 03, 04, 05 and 06.

value is shown below.

Cloudlet ID	STATUS	Data_center_ID	VM_ID	Time	Start_Time	Finish_Time
0	SUCCESSFUL	2	2	621.46	0.1	621.56
1	SUCCESSFUL	3	3	900.68	0.1	900.78
7	SUCCESSFUL	6	6	960.61	0.1	960.71
3	SUCCESSFUL	2	2	525.76	621.56	1147.32
11	SUCCESSFUL	6	6	879.92	960.71	1840.64
5	SUCCESSFUL	4	4	1968.31	0.1	1968.41
6	SUCCESSFUL	5	5	2247.86	0.1	2247.96
2	SUCCESSFUL	3	3	1418.9	900.78	2319.69
8	SUCCESSFUL	3	3	1478.9	231 9.69	2798.59
4	SUCCESSFUL	2	2	1784.32	1147.32	2931.64
9	SUCCESSFUL	4	4	1443.17	1988.41	3431.58
16	SUCCESSFUL	5	5	1485.4	2247.96	3705.36
14	SUCCESSFUL	6	6	1966.06	1840.64	3806.7
21	SUCCESSFUL	3	3	1112.96	2798.59	3919.56

Global	best	at	iteration	(140):	4992.544666
Global	best	at	iteration	(150):	4992.544666
Global	best	at	iteration	(160):	4992.544666
Global	best	at	iteration	(170):	4992.544666
Global	best	at	iteration	(180):	4992.544666
Global	best	at	iteration	(190):	4992.544666
Global	best	at	iteration	(200):	4992.544666
Global	best	at	iteration	(210):	4992.544666
Global	best	at	iteration	(220):	4992.544666
Global	best	at	iteration	(230):	4992.544666
Global	best	at	iteration	(240):	4992.544666
Global	best	at	iteration	(250):	4992.544666
Global	best	at	iteration	(260):	4992.544666
Global	best	at	iteration	(270):	4992.544666
Global	best	at	iteration	(280):	4992.544666
Global	best	at	iteration	(290):	4992.544666
Global	best	at	iteration	(300):	4992.544666
Global	best	at	iteration	(310):	4992.544666
Global	best	at	iteration	(320):	4992.544666
Global	best	at	iteration	(330):	4992.544666
Global	best	at	iteration	(340):	4992.544666
Global	best	at	iteration	(350):	4992.544666
Global	best	at	iteration	(360):	4992.544666
Global	best	at	iteration	(370):	4992.544666
Global	best	at	iteration	(380):	4992.544666
Global	best	at	iteration	(390):	4992.544666
Global	best	at	iteration	(400):	4992.544666
Global	best	at	iteration	(410):	4992.544666
Global	best	at	iteration	(420):	4992.544666
Global	best	at	iteration	(430):	4992.544666
Global	best	at	iteration	(440):	4992.544666
Global	best	at	iteration	(450):	4992.544666
Global	best	at	iteration	(460):	4992.544666
Global	best	at	iteration	(470):	4992.544666
Global	best	at	iteration	(480):	4992.544666
Global	best	at	iteration	(490):	4992.544666

Table II. Table shows the execution of PSO as per readings of Case 2

Cloudlet ID	STATUS	Data_center_ID	VM_ID	Time	Start_Time	Finish_Time
3	SUCCESSFUL	3	3	525.76	0.1	525.86
0	SUCCESSFUL	2	2	772.13	0.1	772.23
11	SUCCESSFUL	5	5	879.92	0.1	880.02
1	SUCCESSFUL	2	2	900.68	0.1	900.78
6	SUCCESSFUL	4	4	1082.14	0.1	1082.24
5	SUCCESSFUL	5	5	1897.2	0.1	1897.3
15	SUCCESSFUL	2	2	1095.35	900.78	1996.14
4	SUCCESSFUL	4	4	2001.84	0.1	2001.94
8	SUCCESSFUL	3	3	2172.34	0.1	2172.44
13	SUCCESSFUL	5	5	1301.06	880.02	2181.08
2	SUCCESSFUL	2	2	1418.9	772.23	2191.13
12	SUCCESSFUL	6	6	2348.43	0.1	2348.53
9	SUCCESSFUL	4	4	1443.17	1082.24	2525.41
10	SUCCESSFUL	4	4	611.3	2001.94	2613.24
20	SUCCESSFUL	3	3	2106.3	525.86	2632.16
7	SUCCESSFUL	6	6	2753.5	0.1	2753.6
18	SUCCESSFUL	6	6	328.8	2753.6	3082.4
22	SUCCESSFUL	5	5	1248.36	2181.08	3429.44
27	SUCCESSFUL	2	2	1267.24	2191.13	3458.37
16	SUCCESSFUL	6	6	1457.4	2348.53	3805.93

25	SUCCESSFUL	2	2	1857.82	1996.14	3853.96
14	SUCCESSFUL	5	5	1966.06	1897.3	3863.36
17	SUCCESSFUL	4	4	1409.67	2525.41	3935.08
21	SUCCESSFUL	4	4	1556.73	2613.24	4169.97
29	SUCCESSFUL	6	6	497.12	3805.93	4303.04
26	SUCCESSFUL	3	3	1840.58	2632.16	4472.74
24	SUCCESSFUL	3	3	2415.06	2172.44	4587.5
23	SUCCESSFUL	4	4	1013.08	3935.08	4948.16
28	SUCCESSFUL	5	5	1803.36	3429.44	5232.8
19	SUCCESSFUL	6	6	2223.09	3082.4	5305.49

The number and sequence of cloudlets assigned to available data centers as best solution are (7 12 16 18 19 29), (4 6 9 10 17 21, 23, (5 11 13 14 22 28), (0 1 2 15 25 27), and (3 8 20 24 26). The detailed status ofexecution of allocated tasks is shown below in Table II.

The best fitness value achieved is 4992.544665557023 and the makespan is 2397.0862791338564.

Case 3:

The considered parameters along with assigned values for performing the implementation are given below. Values assigned to the parameters with data types

- long size = 10000 (size of an image in MB)
- int ram = 2048 (memory allocated to Virtual Machine in MB)

Global	best	at	iteration	(0):	8477.748501
Global	best	at	iteration	(10):	6166.514727
Global	best	at	iteration	(20):	6027.380268
Global	best	at	iteration	(30):	5871.049399
Global	best	at	iteration	(40):	5295.155011
Global	best	at	iteration	(50):	5118.678478
Global	best	at	iteration	(60):	4921.491504
Global	best	at	iteration	(70):	4921.491504
Global	best	at	iteration	(80):	4921.491504
Global	best	at	iteration	(90):	4921.491504
Global	best	at	iteration	(100):	4921.491504
Global	best	at	iteration	(110):	4921.491504
Global	best	at	iteration	(120):	4921.491504
Global	best	at	iteration	(130):	4921.491504
Global	best	at	iteration	(140):	4921.491504
Global	best	at	iteration	(150):	4921.491504
Global	best	at	iteration	(160):	4921.491504
Global	best	at	iteration	(170):	4921.491504
Global	best	at	iteration	(180):	4921.491504
Global	best	at	iteration	(190):	4921.491504
Global	best	at	iteration	(200):	4921.491504
Global	best	at	iteration	(210):	4921.491504
Global	best	at	iteration	(220):	4921.491504
Global	best	at	iteration	(230):	4921.491504
Global	best	at	iteration	(240):	4921.491504
Global	best	at	iteration	(250):	4921.491504
Global	best	at	iteration	(260):	4921.491504
Global	best	at	iteration	(270):	4921.491504
Global	best	at	iteration	(280):	4921.491504
Global	best	at	iteration	(290):	4921.491504
Global	best	at	iteration	(300):	4921.491504
Global	best	at	iteration	(310):	4921.491504
Global	best	at	iteration	(320):	4921.491504
Global	best	at	iteration	(330):	4921.491504
Global	best	at	iteration	(340):	4921.491504
Global	best	at	iteration	(350):	4921.491504
Global	best	at	iteration	(360):	4921.491504
Global	best	at	iteration	(370):	4921.491504
Global	best	at	iteration	(380):	4921.491504
Global	best	at	iteration	(390):	4921.491504
Global	best	at	iteration	(400):	4921.491504
Global	best	at	iteration	(410):	4921.491504
Global	best	at	iteration	(420):	4921.491504
Global	best	at	iteration	(430):	4921.491504
Global	best	at	iteration	(440):	4921.491504
Global	best	at	iteration	(450):	4921.491504
Global	best	at	iteration	(460):	4921.491504

- int mips = 250 (Number of million instructions per second)
- long bw = 1000 (bandwidth)
- int pesNumber = 3 (Number of participating CPUs)

Thirty cloudlets have been allocated to five virtual

Global	best	at	iteration	(470):	4921.491504
Global	best	at	iteration	(480):	4921.491504
Global	best	at	iteration	(490):	4921.491504

machines having VM_IDs as 02, 03, 04, 05, and 06. The status ofexecuting iterations to find out the best fitness value is shown below

The number and sequence of cloudlets assigned to available datacenters as best solution are (3 16 18 19 24 29), (0 5 6 9 10 17 23), (7 11 13 14 20 28), (1 2 8 15 21 25 27), and (4 12 22 26). The detailed status of execution of allocated tasks isshown below in Table III.

Table III. Table shows the execution of PSO as per readings of Case 3

Cloudlet_ID	STATUS	Datacenter_ID	VM_ID	Time	Start_Time	Finish_Time
18	SUCCESSFUL	4	4	328.8	0.1	328.9
8	SUCCESSFUL	3	3	478.9	0.1	479
11	SUCCESSFUL	0	0	879.92	0.1	880.02
1	SUCCESSFUL	3	3	900.68	0.1	900.78
7	SUCCESSFUL	0	0	960.61	0.1	960.71
6	SUCCESSFUL	2	2	1902.14	0.1	1902.24
13	SUCCESSFUL	0	0	1301.06	0.1	1301.16

2	SUCCESSFUL	3	3	1418.9	0.1	1419
0	SUCCESSFUL	2	2	1429.76	0.1	1429.86
16	SUCCESSFUL	4	4	1457.4	0.1	1457.5
15	SUCCESSFUL	3	3	1395.35	479	1374.36
4	SUCCESSFUL	3	3	1044.32	0.1	1044.42
5	SUCCESSFUL	2	2	1966.31	0.1	1966.41
21	SUCCESSFUL	3	3	1620.96	78	2021.75
10	SUCCESSFUL	2	2	911.3	9.86	2041.17
3	SUCCESSFUL	4	4	2451.76	0.1	2451.86
12	SUCCESSFUL	3	3	2312.96	0.1	2315.06
9	SUCCESSFUL	2	2	1443.17	2.24	2225.41
19	SUCCESSFUL	4	4	2623.09	9	2631.98
22	SUCCESSFUL	3	3	2736.13	0.1	2736.23
27	SUCCESSFUL	3	3	1207.24	4.36	2041.6
14	SUCCESSFUL	6	6	1966.06	02	2040.08
29	SUCCESSFUL	4	4	437.12	1.86	2346.97
23	SUCCESSFUL	2	2	1013.08	1.17	3024.25
28	SUCC	6	6	1803.36	1.16	3104.52

	ESSFUL					
20	SUCCESSFUL	6	6	2245.86	71	3160.58
25	SUCCESSFUL	5	5	1857.82	1419	3276.83
17	SUCCESSFUL	2	2	1409.67	8.41	3330.08
24	SUCCESSFUL	4	4	2202.73	7.5	3660.23
26	SUCCESSFUL	5	5	1840.58	4.42	3085

The best fitness value achieved is 4921.491503710873and the makespan is 2285.224391203073. Table IV shows the values of the best fitness and makespan obtained after executing the three cases mentioned above.

Table IV. Table shows the readings of Best Fitness and Makespan of executed three cases

Case	Number of CPUs	Best Fitness	Makespan

Case 1	1	5313.230507345577	2782.6384127689835
Case 2	2	4992.544665557023	2397.0862791338564
Case 3	3	4921.491503710873	2285.2243912030 73

Fig. 2 shows the graphical representation of the valuesobtained in Table 4.

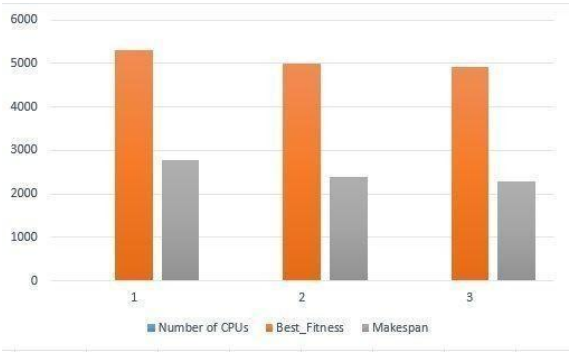


Fig. 2 Graphical representation of executed cases

CONCLUSION

The expectations from cloud computing are very high and so are the challenges. Load unbalancing is a multi- optional and multi-limitation problem responsible for the poor performance of resources in cloud computing. With time, improvement is needed in order to enhance the general system performance. The modified PSO technique proposed in the research paper has minimized the makespan. From the output of the three cases executed, it can be concluded that as the number of CPUs increases, the best fitness and makespan value keeps on decreasing. The minimum is the makespan, more effective is the load balancing.

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Big Data Analytics using Hadoop and HDFS

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Abstract

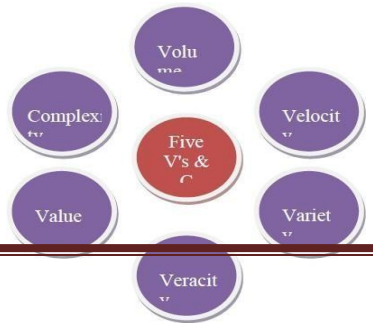
The term Big Data refers to data sets of huge volume, variety, velocity which are difficult to store, process, capture and analyze using traditional database systems. To analyze this large amount of data Hadoop can be used. Hadoop is a open source java based programming framework that supports the processing of large data sets in distributed system using Map Reduce programming Model. Hadoop works as a master slave architecture consisting of name node, data node, secondary name node, job tracker, task tracker.

Keyword:

Introduction to Big Data, Hadoop, Map Reduce

INTRODUCTION TO BIG DATA

Big Data is word used to determine techniques and technologies to capture, manage, store and analyze larger sets of data having high velocity which is either structured, semi- structured or unstructured. The data is coming from everywhere such as social media contents, images, videos, digital pictures and sensors etc. that make is difficult to handled by the traditional database systems and software technologies. Data over the size of petabytes is considered as Big Data[1]. Oracle defined Big Data in terms of four V‟s- Volume, Velocity, Variety and Value [2]. Saneh Lata Yadav and Asha Sohal defined big data in terms of fives V‟s- Volume, Variety, Velocity, Veracity, Value [3]. Oguntimilehin A and Ademola E.O. define big data in terms of fives V‟s and aC i.e. Volume, Variety, Velocity, Veracity, Value, Complexity [4].



There are many techniques and technologies that help us to better understand the big data analytics based tools, the technique which is used by an individual while considering Big data project is depends upon the type of

Fig. 1 5V‟s of Big Data

Volume: It includes Different types of data is to be supported such as storage of data, live streaming, data coming from social media.

Velocity: It means speed at which the files are created and processes are carried out refers to the velocity.

Veracity: It indicates data reliability with respectto Big Data Exploitation.

Variety : It Consists of various types of data is to besupported such as structured, semi-structured, unstructured, numeric data, email, audio, video etc. **Value**: It shows worth with respect to Big Data Exploitation. Considering what commercial value that any new source and forms of data can add to thebusiness or scientific research.

Complexity: Today‟s data comes from multiple sources and it is still an undertaking to link, match, cleanse and transform data across systems. However, it is necessary to connect and correlate relationships, hierarchies and multiple data linkages or your data can quickly spiral out of control [4].

Big Data Analytics

data being analyzed, the technology available to you.Hadoop

Hadoop is open source java based programming framework which supports the processing of large sets of data in a distributed computing environment. It is a part of the apache project sponsored by the Apache Software Foundation. With the help of Hadoop large sets of data can be processed and analyzed over cluster of server and applications can be run on the system with thousands of nodes involving petabytes of information. It is very highly used to analyze Big Data by researchers and administrations. Hadoop is influenced by Google"s structural design, Google File System & Map Reduce. Hadoop procedures in the large data system in a spread calculating environment [5]. It decreases the risk of system failure in case of large amount of nodes failure, because of its Distributed File System. Hadoop is so popular because of its properties like flexibility, scalability, performance, cost effectiveness, computational capacity and storage. Hadoop works better with a small number of large files and not with large number of small files [6]. There are many different techniques to deal with small files problems such as:

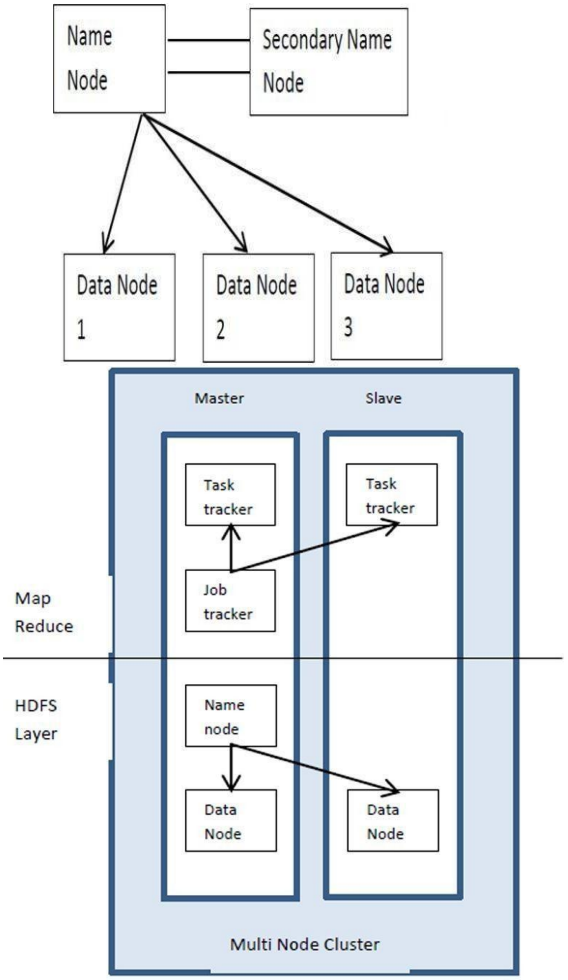


Fig. 2 Hadoop Architecture

Hadoop Archive, Improved HDFS, Extended HDFS, New HAR, Combine File Input Format. Hadoop is a HDFS software framework where an application is divided into various parts [7]. Hadoop Architecture basically consists of:

- HDFS (Hadoop Distributed File System)
- Map Reduce (Programming Framework)

HDFS and Map Reduce combine consists of Name Node, Data Node, Secondary Name

Node, Task Tracker and Job Tracker.

HDFS or Hadoop Distributed Files System basically designed for storing large files it gives the programmer unlimited storage and is the only reason behind turning to hadoop. HDFS is the underlying distributed file system that supports the persistent running of hadoop HDFS can be deployed on dedicated servers or commodity machine [8].HDFS manages storage on the clusters by breaking incoming files into pieces called „blocks" and storing each blocks redundantly across the pool of the server [9].HDFS works as a Master-Slave architecture where name node works as a master node and data node works as a slave. It stores three copies of each file by copying each piece to three different servers. HDFS provides fault tolerant data storage on commodity hardware. HDFS accepts data in any

format like text, images, videos etc. regardless of architecture and automatically optimizes for high bandwidth streaming. While storing and transforming large number of small files using HDFS creates an overhead to Map Reduce program which greatly affects the performance of name node.

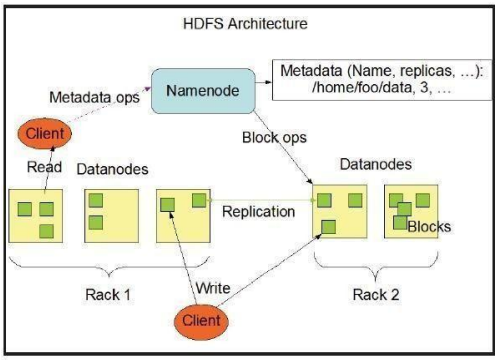


Fig. 3 HDFS Architecture

Name Node: Name Node is centrally placed node runs as Master Node. Name Node contains metadata information about the block stored in Hadoop Distributed File System.Contains Metadata The Name Node controls slave Data Nodes. It stores all the information about system and provides newly added, modified and removed information from data

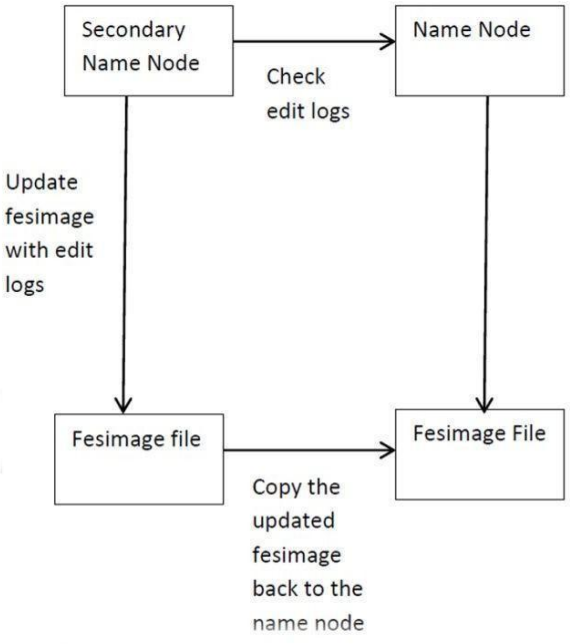


Fig. 4 Secondary Name Node

nodes in order to provide faster access to the clients on read/write requests. The name node manages and controls how files are broken down into blocks, identifies which slave node should store these blocks ,along with the overall condition and fitness of the Distributed File System [10]. It performs memory and I/O intensive tasks.

Data Node: Data Nodes are the Slave Nodes which are controlled by name node. HDFS can contain multiple data nodes on the basis of capacity and performance. It stores the actual data in HDFS. It sends the information to the name node about the files and blocks stored in that node in this way it service all the read/write requests on files stored on HDFS. When a data node is down, it doesn‟t affect the availability of data or cluster. Name Node will arrange for replication for the blocks managed by the Data Node that is not available.

Secondary Name Node: Secondary name node is not a backup node rather it is a helper node in Hadoop. Secondary name Node‟s task is to regularly check the file System and edit logs from name node after specific interval of time and apply it to fesimage file.

Map Reduce

Map Reduce is a Programming paradigm used in Apache Hadoop. Map Reduce was reduced by Google to process, analyze and store large data sets parallel on large multimode cluster of commodity hardware in a reliable and fault tolerant manner. Map Reduce enables an inexperienced programmer to develop parallel programs and create a program that can use computers in a cluster [11].

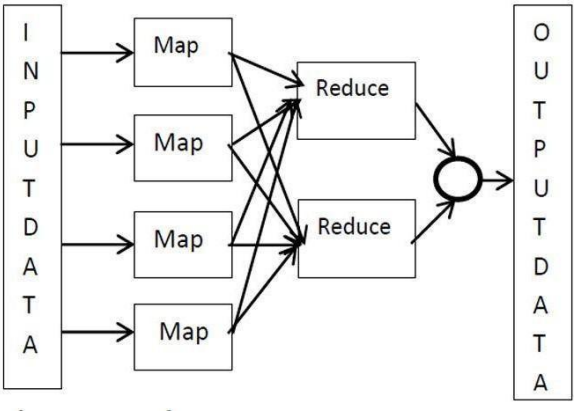


Fig. 5 Map Reduce

Map Reduce involves two main phases as Map Phase and Reduce Phase.

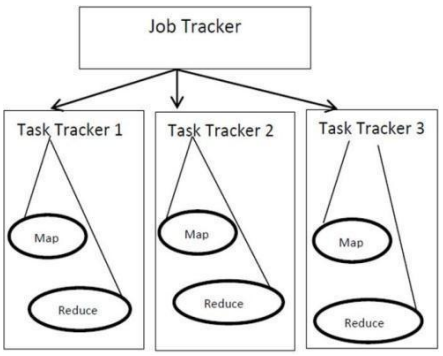
Map: Map task reads the input as a set of key, value pair. Map job parallelly analyze the individual chunks of an application. The result of Map task is sent to the reduce task as an input.

Reduce: Reducers accepts input from Mappers and then apply core processing logic to produce results in a timely manner [1].

Map- Reduce also works as Master Slave architecture in which job tracker works as a master node and Task Tracker works as a Slave Node.

Job Tracker: Job Tracker service as a master node and Monitors all the tasks of Map Reduce which are executed by task tracker on slave nodejob Tracker have two major responsibilities which are managing and controlling the cluster resources and then schedule all user jobs [3].

Task Tracker: Task Tracker service as a slave node of a cluster. It accepts the jobs from the job trackers and performs the Map Reduce operation on each cluster. Task Trackers are responsible for executing the tasks assigns by the Job Trackers. Data Engine consists of all the information about the processing of data. Fetch



manager protects and fetch the data while particular task is running.

Fig. 6 Job Tracker and Task Tracker

Conclusion: Big Data provides enterprise with more choices because of its lots of related technologies andtools. 5 V‟s and 1 C is discussed in this paper. This paper also describes the Hadoop frame work along with all its components such as Hadoop Distributed File System, Map Reduce, Data Node, Name Node, Secondary Name Node, Task Tracker and Job Tracker.

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Ascertaining Diverse Stages of Mammography for Revealing Breast Cancer

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Abstract

With the development of technology, numerous computerized methods have come up to extract the hidden information from the images. The processed images have found its application in numerous sectors and medical science is one of them. Breast cancer is the most worrying disease that affects the majority of women universally.A mammography is a paramount tool for conducting a screening of breast cancer. Appropriately did mammography helps in detecting breast cancer at initial stages and reduces the mortality rate. In cases where breast cancer is detected timely, even chemotherapy can be avoided. The limitation faced by mammography is because of low-quality images, human visual systems and controlled nature of distortions. The research paper discusses the three phases involved in the detection of breast cancer and declaring it as cancerous or non-cancerous. The three phases discussed are enhancement of mammogram image, segmentation of an image, and finally classifying it as benign or malignant. The research paper elaborates on the flowchart and algorithm elaborating on the anticipated methodology.

Keywords

Benign, Enhancement, Malignant, Mammography, Segmentation.

I. INTRODUCTION

Mammography is considered as a technique demanding examinations in medical imaging requiring fine details, high contrast, low patient motion, minimum noise levels, and appropriate viewing conditions. The mammo***graphy must be accomplished by*** means of dedicated ***mammographic*** imaging equipment with low energy output imaging competence like tungsten anode at low kilovoltage of 30kVp or less or rhodium or molybdenum x-ray tube anode. A mammography is a paramount tool for conducting screening but it undergoes high false-positive and false-negative rates. This limitation faced by mammography is because of low-quality images, limitations suffered by the human visual system and controlled nature of distortions [1, 2].

Mammograms have their own limitations like the uneven shape of masses, variation in size, and deceptive resemblance of the masses and other dense regions of breast tissue. Despite proposing several processing techniques for diagnosing breast masses, the rate of success has been on the lower side. The appropriate position of the patient and the compression of the breast is equallyimportant [3].The image classification offers doctors a second opinion which assists inaccurate diagnosis and saves physicians time and patient‘s money.

A mammography is a screening tool for breast cancer detection but it contains low-quality mammogram images with highly false-positive and false-negative rates. Lesion (cut, scratch) and masses are a sign of breast cancer in mammograms. Masses can be classified into three types, architectural distortion (benign category indicates the presence of post-surgical scars or soft tissue damage and is noncancerous and non - harmful for the human body and do not spread one part of the body to another part.), malignant (presence of palpable breast mass which is cancerous and harmful to the human as it spreads all over the body and cannot be cured easily), and bilateral asymmetry (high density in one of the breast as compared to the same area in other) [4, 5].

The two approaches for conducting image processing are analog image processing and digital image processing.

Analog image processing is opted to handle hard copies resembling photo graphs digital techniques are pre-processing enhancement and display, and information extraction. Different enhancement techniques like Grayscale manipulation, Green Channel Complement, different filters (Mean filter, Median filter, Laplacian filter, Gabor filter, etc.), Histogram Equalization, etc., are available to be used for enhancing an image. Different parameters are used to obtain numeric readings to justify the effectiveness of the research work. Subjective parameters are visual quality and computation time and objective parameters are Peak Signal Noise Ratio (PSNR), Mean Squared Error (MSE), Normalized Absolute Error (NAE), Normalized Correlation, Error Color and Composite Peak Signal to Noise Ratio (CPSNR).The PSNR (Peak Signal to Noise Ratio) block computes the peak signal-to-noise ratio, in decibels, between two images [7]. This ratio is often used as a quality measurement between the original and a compressed image. The higher the PSNR, the better the quality of the compressed, or reconstructed image. The PSNR and MSE (Mean Square Error) are the two error metrics used to compare image compression quality. The MSE represents the cumulative squared error between the compressed and the original image, whereas PSNR represents a measure of the peak error. The lower the value of MSE, the lower the error.

II. STATE OF ART

There are numerous publications relevant to image classification of mammogram images, but very few papers provide a thorough explanation of breast cancer image classification methods, feature extraction and selection measures, grouping measuring parameterizations, and image classification conclusions. This section illustrates the research work conducted in the field of mammography in the past few years.

K.Akila, L.S.Jayashree, and A.Vasuki in 2015 [7] detailed the importance of contrast enhancement technique in the arena of image processing conducted on mammograms. The enhancement conducted on the basis of contrast is broadly categorized as direct and indirect contrast enhancement. Histogram Equalization is considered a prominent enhancement technique. The authors concentrated on the working principle of several indirect contrast enhancement techniques such as HE, CLAHE, RMSHE, BBHE, and MMBEBHE. The readings of numerical parameters like EME (an effective measure of enhancement) and PSNR (Peak Signal Noise Ratio) are taken to justify the research workconducted.Saeed Khodary, M Hamouda, Reda H Abo El-Ezz, Mohammed E Wahed, 2017 [8] stated that early detection of breast cancer greatly improves the prognosis and treatment for patients, the early signs of breast cancer that appear in mammograms, digital mammography is one of the best methods detection of breast cancer. Screening the breast by mammograms is useful in the detection of cancer diseases in women without any external symptom. In this paper, author‘s aim to early detection of breast cancer by mammography depending on the production of excellent images and competent interpretation, the author‘s aims to analyze the digital mammograms by computerization for helping the radiologist to detect and classify breast cancer early. The proposed technique depends on segment digital mammograms and separates the tumor regions and classifying these images based on feature extraction, the shape of a tumor, and edge- sharpness, the system decides if mammogram image is normal or ab normal, and determines whether the abnormal one is benign or malignant. The proposed system is implemented by the MATLAB program.Abdullah-Al Nahid, Yinan Kong in 2017 [9]stated that breast cancer is the biggest cause of death among women all over the world today.Advanced engineering relevant to image classification and artificial intelligence has found its application in the classification of breast images. The authors detailed the working ofthe Convolutional Neural Network (CNN) method for breast image classification. The author‘s also explained the involvement of the conventional Neural Network (NN), Logic- Based classifiers such as the Random Forest (RF) algorithm, Support Vector Machines (SVM), Bayesian

methods, and a few of the semi-supervised and unsupervised methods which have been used for breast image classification.Hanna Dumkyet al. in 2018 [10]stated that around 8023 women were diagnosed in Sweden with breast cancer. The paper elaborates that mammography examinations vary with the positioning of the patient. The study in the paper is conducted using qualitative methods. The paper identified three main categories: positioning of the patient, positioning of the detector, and compression. A fourth category, compliance, also emerged during the analysis work and was identified by the radiographers as being an important factor to be able to succeed with positioning andcompression.Ahmed F. Yousef et al. in 2018 [11]stated that contrast-enhanced spectral mammography (CESM) enjoys high diagnostic accuracy. It works on principles having relevance with those of MRI and hasa similar acceptance of contrast enhancement. The paper studied and compared CESM and MRI in the case of breast masses. The patients under study were of age range between 30 to 60 years. All multiple histologically proven lesions were detected by CESM (100%) and MRI (100%), with no significant difference in their size and number in both modalities. CESM is valuable for the diversity of local recurrence of post-treatment scarring after breast-conserving therapy and evaluation of residual tumor after treatment, with the unknown primary site of malignancy.K. Rajendra Prasad, M. SulemanBashain 2018 [12] stated that detection of breast cancer is an emerging need that requires appropriate detection of the stages of breast cancer detection. The research paper makes use of a support vector classification method to perform mammogram classification. The paper presents the experimental results of classification performed on mammograms demonstrating the efficiency of SVM with underlying mechanisms of texture methods and it suggests the best combination of SVM and texture method to a radiologist for better medical diagnosis of breast cancer detection. K.U. Sheba, S. Gladston Raj in 2018 [13]stated the importance of detecting breast cancer at an early stage in order to reduce the death rate among women in the long term. The research paper is committed towards the growth of classification tools to distinguish among healthy, benign, and malignant breast parenchyma in digital mammograms. The system proposed in the research paper can be used as a reference reader for performing a double reading of the mammograms and assisting radiologists in conducting clinical diagnosis in order to find out suspicious abnormalities. The regions of interest (ROI) are spontaneously noticed and segmented from mammograms by means of global thresholding via making use of Otsu‘s method and morphological operations. Nasrin Tavakoli, Maryam Karimi, Alireza Norouzi, Nader Karimi, Shadrokh Samavi, S. M. Reza Soroushmehr in 2019 [14]stated that the rate of mortality because of breast cancer can be minimized by initial analysis and conduct. Despite proposing several processing techniques for diagnosing breast masses, the rate of success has been on the lower side. The authors proposed a technique base donadeep learning method for classifying the breasttissuesasbenign (cancerous) or malignant (non-cancerous). The deep learning approach comprises CNN (Convolutional neural network) and decision mechanism. The completion of the preprocessing phase is followed by assigning a block around each pixel into a trained CNN to determine the pixel as normal or abnormal. The authors stated that employing the CNN intended for classification of the pixels of the suspicious regions enabled them to achieve enhanced results by obtaining the readings of 95 percent for AUC and 94.68 for accuracy. Natascha C. D‘Amico, Enzo Grossi, Giovanni Valbusa, Francesca Rigiroli, Bernardo Colombo, Massimo Buscema, Deborah Fazzini, Marco Ali, Ala Malasevschi, Gianpaolo Cornalba, Sergio Papa in 2020 [15]performed research in which authors considered forty-five enhancing foci in 45 patients considering imaging follow-up or needle biopsy serving as a reference standard. 33 benign and 12 malignant lesions were present. There were 8 such benign lesions that had 5-year negative follow up and 15 malignant lesions were included to the dataset in order to offer reference cases to machine learning analysis.

A 1.5-T scanner was used to perform the MRI examinations. 1 3-D T1 weighted unenhanced sequence was acquired followed by 4 dynamic sequences. Sensitivity, accuracy, and specificity were calculated for each classifier as point estimates and 95% confidence intervals(CIs). Sushreeta Tripathy and Tripthi Swarnkar in 2020 [16] elaborated on the critical role played by the identification of micro calcification and architectural distortion in mammogram images. The imaging offers additional information as compared to initial screening and enables enhanced focus on skeptical masses. The preprocessing of mammograms plays an important part to minimize the rate of false positive. The authors elaborate on the performance of HE (Histogram Equalization) and CLAHE (Contrast Limited Adaptive Histogram Equalization) responsible for enhancing the mammogram images. Both the techniques were inspected on mammogram pictures. The highly contrasted pixels percentage was recorded on mammograms. The authors proposed an innovative preprocessing technique based on statistical features like CII in order to detect artifacts in mammograms. The authors proposed that in future work the proposed preprocessing can be extended to perform further attributes extraction.

III. PROPOSED WORKFLOW

The research to be conducted would involve three primary phases i.e. enhancement, segmentation, and classification of mammograms. The enhancement phase is intended to enhance the mammogram image under study by removing the noise and normalizing the mammogram image. The segmentation phase concentrates on focusing on ROI (Region of Interest) and detects any kind of micro calcification and minor of the lesions present within the mammogram image. Finally, the classification is conducted. This phase decides whether the mammogram understudy is benign (cancerous) or malignant (non-cancerous). For classification of the mammograms, supervised learning is brought into practice. Fig. 1 shows the different phases involved in analyzing mammogram images.

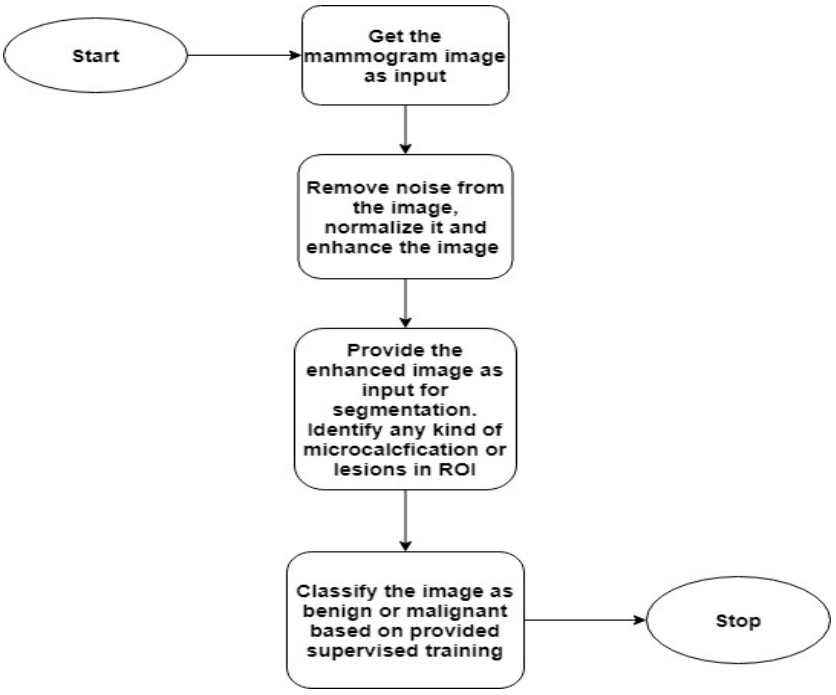

Fig. 1 Figure shows the different phases involved in analyzing mammogram images

Fig. 2 shows different techniques available for each of the three phases shown in Fig. 1.

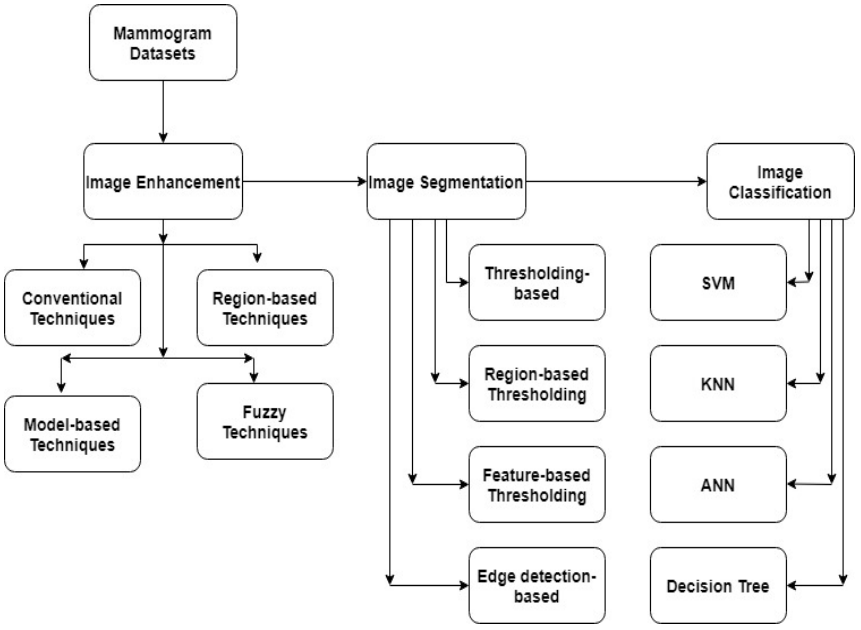

Fig. 2 Figure shows different techniques available in different phases of research

The detailed workflow to be adopted for conducting the research work is proposed below in Fig. 2 as a flowchart followed by a detailed algorithm.

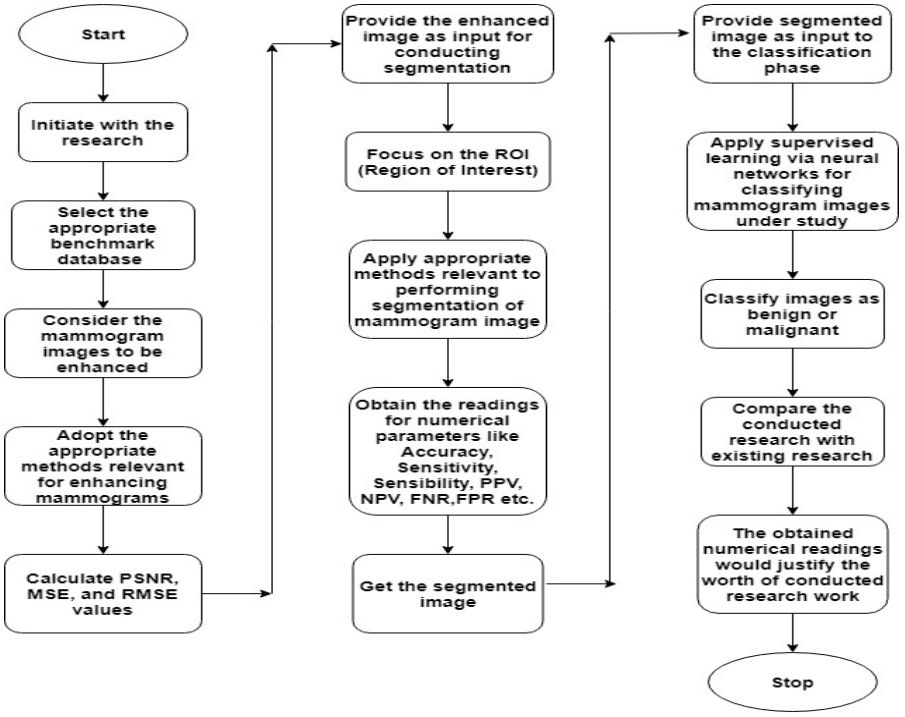

Fig. 2 Figure depicts the flowchart for the detection of breast cancer in three phases

Algorithm

1. Initiate with the research.
2. Select the mammogram images for the available benchmark databases like MIAS, DDSM, etc.
3. The mammogram image is enhanced using appropriate enhancement methods like CLAHE, Green Channel Complement, Morphological operations, etc.
4. The degree of enhancement achieved is measured using numerical metrics like PSNR (Peak Signal Noise Ratio), MSE (Mean Square Error), and RMSE (Root Mean Square Error).
5. The enhanced image is given as input to the segmentation phase. The ROI (Region of Interest) is extracted and undergo segmentation.
6. The segmentation performed is measured in terms of achieved accuracy, specificity, sensitivity, PPV, NPV, FNR, FPR, etc.
8. Classification is conducted using supervised learning via neural networks and image understudy is classified as benign (cancerous) or malignant (non-cancerous).

IV. FUTURE WORK

Detection of breast cancer is a significant social obligation as it has been a prominent cause of death among women due to cancer. Computer- aided techniques have significant importance in the detection of abnormalities which may be overlooked by even proficient radiologists. The modern digital mammography is an exciting development for conducting breast cancer screening and diagnostic applications. The research work would conduct promising initial experimental clinical tests particularly for masses with more illustrative clinical trials. The appropriate flowchart and algorithms would be constructed to accomplish each phase. The results obtained at each phase in numerical figures would be compared with the existing research and the worth of the conducted research would be compared and checked with the existing research. An appropriate simulation tool would be used for programming and calculate the figures of different performance metrics. The focus would be laid on maximizing the values of PSNR and accuracy keeping the value of MSE and RMSE as lower as possible.

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A Review on Fault Tolerance: Techniques and Mechanism in Cloud Computing

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Abstract:

Cloud computing provides services as a form of internet based computing using data centers that include servers, storage and networks. The cloud computing is an immense probable in low cost and demand services. In recent years there are increasing in the number of users using cloud computing services in many areas. Due to this reason arising issue of fault tolerance. Fault tolerance uses techniques that guarantee the reliability, availability of critical services. In this paper discuss the fault tolerance techniques, types, Metrics for measure the performance of Fault Tolerance, different types of polices, mechanism and its models.

Keywords: cloud computing, fault tolerance.

1. INTRODUCTION

Cloud computing is an extension of distributed and parallel computing. Cloud Computing is an emerging and innovative platform, which makes computing and storage available to the end-users as services. It is a technique of computing in which dynamically scalable and IT related resources are provided as a service through Internet. Cloud computing technology is a new concept, which provides great opportunities in many areas. Cloud computing is a collection of computers and servers that are publically accessible via internet. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. Cloud computing provides the variety of internet based on demand services like software, hardware, server, infrastructure and data storage.

2] CHARACTERISTICS OF CLOUD COMPUTING:

National Institute of Standard and Technology (NIST) describes cloud computing with five essential characteristics such as [1, 2, 3]

- **On-demand self-service –** Cloud provides all needed computing resources as per requirement to user.
- **Measured service –** Cloud providers controlling on usage of resources.
- **Autonomous system -** users can reconfigure and combine software and information according to their requirements.
- **Cost- -**No capital expenditure or any up-form investment is required in cloud. Payment for services is made on the basis of need.
- **User-centric interface -** cloud interfaces are not dependent on location of user. They can be accessed by well-established interfaces such as web services and internet browsers.
- **Quality of Service (QOS) -** Cloud computing assures Quality of service for users by guaranteed performance, bandwidth and memory capacity.
- **Virtualization -** Utilization of resources is increased by sharing the server and storage devices.

SERVICE MODELS

- **Software as a Service (SaaS)**

It has the ability to provide user any software running on a cloud substructure. Software is deployed over the internet. In this model customers licenses the applications and the cloud service providers provide the required facility to the end users when they require. Examples may include web browsers and

Google docs [2, 3, 4, 5].

- **Infrastructure as a Service (IaaS)**

Infrastructure facilitates the user by providing computing resources where user can run the software without having control on underlying infrastructure but has control over the operating system being used. IaaS may include IT resources such as severs, networking and storage. Users get access to the infrastructure with the help of virtual machines. It provides an elastic architecture which offers high rate of availability [2, 3, 4, 5].

- **Platform as a Service (PaaS)**

Platform can also be provided as a service. In this any kind of platform (i.e. tools, library, services) is provided as a service of which user has no control but he/she can use it. User can easily generate applications by using PaaS provided by CSP. Mostly virtual machines are used in this case. Most preferably various kinds of tools and applications are deployed to facilitate the users[2,3,4,5].

DEPLOYEMENT MODELS

There are three Deployment Models and are described below[1,2,3,4].

- **Public Model:** This infrastructure is available to the general public. As the name suggests, public cloud is a model in which resources are generally available to everyone or anywhere.
- **Private Model:** This model is developed for the private organizations like one house and an organization and they can use it for their own purpose. This kind of a service is not accessed by everyone.
- **Hybrid Model:** Hybrid Clouds are combination of public and private cloud in a same network. This can be done if private cloud need some important services from the public cloud like Private cloud can store some information on their private cloud and we can use that information on public cloud.

BENEFIT OF CLOUD COMPUTING

[1,2,3]

- **Increase Throughput** – Cloud computing get more work done in less time with less people.
- **Reduce Costs** – In cloud computing, user shares computer hardware, software and data so there‘s no need to spend money on hardware or software.
- **Improve Accessibility** – In cloud computing user can access data, files anytime from anywhere via internet.
- **Requires Less Training** – Cloud computing takes fewer people to do more work. So there is requirement of minimum training of hardware, software problems to user.

2. FAULT TOLERANCE

The purpose of fault tolerance in cloud systems is that in case of occurrence of error, the system to have the ability of tolerating to the happened occurrence and can continue its process. In this type of systems, definitions of error, fault and failure are presented to associate the difference between them in the mind of cloud user. Failure- whenever a system doesn‘t perform its expected job correctly, a failure has been occurred. Error the reason of fault is existence of an error in the system. Fault the reason of failure occurrence is existence of an error in the system[6,7].

FAULT AND ITS TYPES

The reason of failure occurrence is existence of an error in the system. It is classified basis on the resources and time. It can be Permanent, Transient and Intermittent [7,8,9].

Types of Fault

- Network Fault- due to the network partition, Packet loss, corruption, destination and link failure.
- Physical Fault- occurs in Hardware like fault in CPU, Memory and Storage.
- Processor Fault- due to operating system crashes.
- Process Fault- due to the shortage of resource, software bugs.

- Service Expiry Fault- service time to a resource is expiring while application is using it.
- Media Fault- due to the media head crashes.

FAULT TOLERANCE AND ITS POLICIES

When the system continuous to function correctly without any data interruption even if some components of system have failed to perform correctly .it is very difficult to achieve 100% tolerant but fault can be tolerant up to some extent. Fault tolerance is one of the most advantages of the Cloud. There are many methods are used for fault tolerance to the reliability and scalability feature it provide fault tolerance mechanism for ability of a system to perform its function correctly even in the presence of fault[7,8,9,10].

FAULT POLICIES

- **Proactive: -** To predict the fault and avoid recovery from fault, error & failure proactively replace the suspected component detect the problem before it actually come. Preemptive Migration, Software Rejuvenation.
- **Reactive: -** Reduce the effort failures when the failure occurs. It an on demand faults. Checkpoint replication task resubmission
- **Adaptive:-**Automatically according to the situations. Fault needs of an application change depending on its current position its state space and range of control input that can be applied.

EXISTING FOR TECHNIQUES FAULT TOLERANCE

There are various Reactive and Proactive based techniques are used for tolerance the Fault in Cloud Computing [7,8,9,10]

REACTIVE FAULT TOLERANCE

Reactive fault tolerance policies reduce the effect of failures on application execution when the failure effectively occurs.

- **Check pointing/Restart-** it is a task level fault tolerance technique for long running and big applications. After doing every change in system checkpoint is done. When a task fails, it is allowed to be restarted from the recently checked pointed state rather than from the beginning.
- **Replication-** means copy, various task replicas are run on different resources, for the execution to succeed till the entire replicated task is not crashed. It can be implemented using tools like HA Proxy, Hadoop and AmazonEC2 etc.
- **Job migration-** During failure of any task, it can be migrated to another machine. This technique can be implemented by using HA-proxy.
- **S-Guard-** It is less disruptive to normal stream processing and makes more resources available S- Guard is based on rollback recovery and be implemented in HADOOP, Amazon EC2.
- **Retry-** It is the simplest task level technique that retries the failed task on the same cloud resources.
- **Task Resubmission- It** is the most widely used fault tolerance technique in current scientific workflow system. Whenever a failed task is detected, it is resubmitted either to the same or to different resource at runtime.
- **User defined exception handling-** In this user specific the particular treatment of a task failure for workflow.
- **Rescue workflow-** This technique allows the workflow to continue even if the task fails until it become impossible to move forward without catering the failed task.

PROACTIVE FAULT TOLERANCE

Software rejuvenation- It is a technique that designs the system for periodic reboots. It restarts the system with clean state

- **Self Healing-** When multiple instances of an application are running on multiple virtual machines, it automatically handles failure of application instances.
- **Preemptive Migration-** it is based on a feedback-

loop control mechanism where application is constantly and analyzed

FAULT TOLERANCE MODELS IN CLOUD COMPUTING

There are various Models are based on the existing Fault Tolerance techniques in Cloud Computing [8,9,10,11].

AFTRC (Adaptive Fault Tolerance Model in Real time Cloud Computing) –

it is based on the fact that a real time system can take advantage the computing capacity, and scalable virtualized environment of cloud computing for better implement of real time application. Its make the decision basis on reliability of processing Nodes.

LLFT (Low Latency Fault Tolerance)-

It is a propose model which contains a low latency fault tolerance middleware for providing fault-tolerance for distributed applications. Middleware Replicate application by using semi active and semi passive replication process to protect the application against fault.

FTWS (Fault Tolerance Workflow Scheduling)-

it is proposed model which contains a fault tolerant work flow scheduling algorithms for providing distributed fault-tolerance by using replication and resubmission of tasks based on priority of the tasks in a heuristic matric.

FTM(Fault Tolerance Model)-

it is proposed model to overcome limitation of existing methodologies of the on- demand service. To achieve the reliability and resilience they propose an innovative perspective on creating and managing fault-tolerance.

CANDY-

it is a component base availability modeling frame work, which constructs a comprehensive availability model semi automatically from system specification describe by systems modeling language.

Vega-warden-

it is a uniform user management system which supplies a global user space for a different virtual infrastructure and application services in cloud computing environment.

FT-cloud-

it is a component ranking based framework and its architecture for building cloud application. its algorithm automatically determine fault tolerance stately.

MAGI-CUBE- it is high reliable and low redundancy storage architecture for cloud computing. The build the system on top of HDFS and use its storage system for file read/write and Meta data management. This model based on the fact that high reliability and performance and low cost (space) are the three conflict component of storage system.

Metrics for Fault Tolerance in Cloud Computing

The existing fault tolerance technique in cloud computing considers various parameters: throughput, response-time, scalability, performance, availability, usability, reliability, security and associated over-head. [8,9,10,11]

- **Throughput**–It defines the number of tasks whose execution has been completed. Throughput of a system should be high.
- **Response Time-** Time taken by an algorithm to respond and its value should be made minimized.
- **Cost effectiveness**: Here the cost is only defined as a monitorial cost.
- **Scalability**– Number of nodes in a system does not affect the fault tolerance capacity of the algorithm.
- **Performance**– This parameter checks the effectiveness of the system. Performance of the system has to be enhanced at a sensible cost e.g. by allowing acceptable delays the response time can be reduced.
- **Availability**: Availability of a system is directly proportional to its reliability. It is the possibility that an item is functioning at a given

instance of time under defined circumstances.

- **Usability**: The extent to which a product can be used by a user to achieve goals with effectiveness, efficiency, and satisfaction.
- **Reliability**: This aspect aims to give correct or acceptable result within a time bounded environment.
- **Overhead Associated**: It is the overhead associated while implementing an algorithm. Overheads can be imposed because of task movements, inter process or inter-processor communication. For the efficiency of fault tolerance technique the overheads should be minimized.

Related Work

CONCLUSION

Fault tolerance is a major issue in cloud computing. It relates to all techniques essential to enable a system to tolerance software flaws remaining in the system after its development. This paper identified the some fault tolerance techniques, models, mechanism. In future need to work on different check pointing and replication techniques to achieve maximum utilization of resources, minimize response time, maximize throughput and avoid overload.

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A Review Paper on ETL process based on Meta Data

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Abstract

Extraction-transformation loading (ETL) tools are code parts that are responsible for extracting data from multiple sources, purging it, customizing it and incorporating it into an information distribution center. Such procedures need to be performed more often than not in a certain time window; therefore, upgrading their execution time is necessary. We're moving into the ETL in this review paper.

Keyword: ETL, ETL Service Framework, Meta Data, Data ware house

1. **Introduction:** ETL(Extract Transform Load which means the deduction, adjustment and stacking of data. It is not only a significant piece of information storage space but also the most critical and intricate errors during the time spent in the information storage space. A metadata board system with a great plan will improve the ETL ability ETL is not just the base.
2. **Why Do We Need ETL?** Compared to normal moving data approaches that include traditional PC applications, ETL is much easier and faster to use. ETL tools provide graphical interfaces to map tables and parts between the source and the target databases.. ETL tools can capture, interpret and transfer information from different knowledge structures.

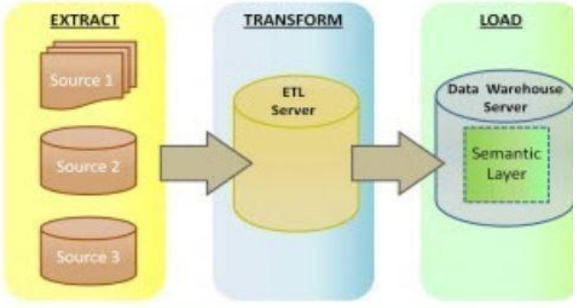

Figure 2. ETL Process

1. **ETL AND METADATA:** Metadata means knowledge about information by the conventional definition. In the Data ware system, Meta data will assist data ware heads and engineers in helpfully finding their information. It is a kind of information to depict the knowledge configuration and set up technique in Data ware. ETL procedures include three parts: Extraction, Transformation and loading, each has its own metadata.
1. **Extraction:** Data extraction is the method of data source capture, i.e. reading the data from all sorts of original operating systems or cleaning up the data, which is the basis of all the work. If there are no related rules and metadata is for mapping.
2. **Transformation:** Data change is the procedure of modifying the beyond data by some pre-arranged guidelines, and handling some superfluous deceptive, inadequate or enemy guideline information to understand information granularity and information development solidarity. If we are unlikely to complete the switch from the configuration of the source information to the objective information
3. **Loading:** Data loading is the method of importing all or scheduled increments of the above data into the Data ware system. We also need metadata about mapping rules to load transformed data to the Data ware program.
4. **ETL Framework Design:** We select flat files as the interfaces for each process during the 3 ETL processes — extraction, transformation, and loading.

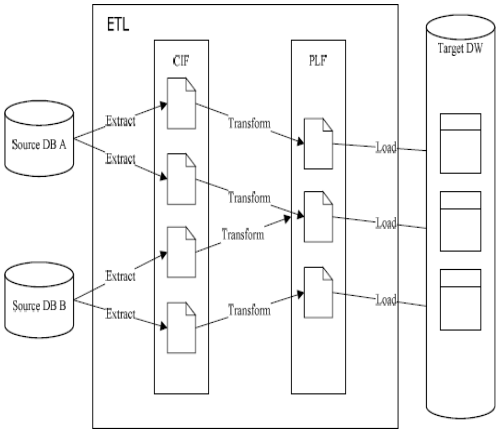

Figure 3(1). ETL logical

2. architecture is shown as Fig. 1[2]. Extracting, transforming and charging phases were done in one cycle. Under traditional ETL, the ETL method is defined as: create and compile software or script for different data sources; retrieve records from databases; exchange data according to user requirements after extraction; load data into target data warehouse; and process records piece by piece until the end of the source database. The ETL framework is simple and would be easily implemented under conventional architecture, but the weakness is evident: load efficiency and reliability is lame. The development is weak repeatedly and software maintenance is difficult to maintain software.

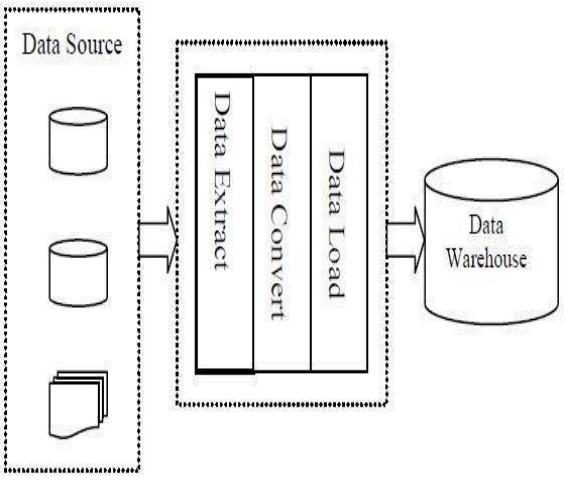

Figure 4(1). The modern ETL architecture

3. **ETL's three-layer architecture based on metadata**: Metadata is the information that is essential to ETL. The main difference in structure between standard ETL and one focused on metadata is:

Framework

4. **STUDY AND ETL ANALYSIS:** Warehouse data comes from a variety of business systems. Initially, they should be extracted from raw data from different system data sources, then after a series of filtering and converting, and finally loaded into data warehouse. This form of system is known as the method of ETL.

1. **The modern ETL architecture:** The modern ETL

1. Between the source data layer and the target data layer, a middle layer is inserted. And each ETL phase is divided into 3 single parts; in addition, metadata controls the entire convert process.

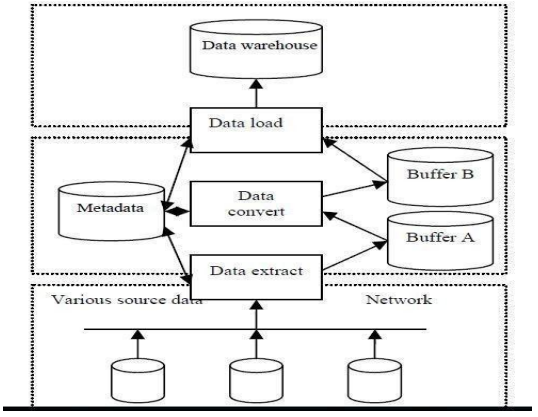

Figure 4(2). ETL's three-layer architecture based on metadata

2. A data buffer (file preparation region) is added during the data conversion process. Initially, the derived information will be processed by data append models in Information-Buffer-A. Then data transfer allows specific operations to be exploited directly by adding information from Data-Buffer-A that does not need access to the source server. And the Data-Buffer-A becomes the real source of data. The transformed data would therefore be written into Data-Buffer-A and wait for the data append models to load into the target data warehouse.

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Role of Technology in Indian Banking Industry: Special reference to Bank frauds

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Abstract:

The Indian banking industry has experienced significant growth and changes since liberalisation of economy in 1991. Though the banking sector is generally well regulated and supervised, the sector suffers from its own set of challenges when it comes to ethical practices, financial distress and corporate governance. The study tries to find out the various reasons responsible for the happening of frauds in the Indian Banking System. The study highlights the different causes responsible for fraud event in banks. The report touches upon the various areas of frauds in the past few years across different banks. The study finally proposes some techniques to reduce future incidences of frauds in Indian banking sector.

Key Words: Banking Frauds, Scams, Causes of Frauds, Role of technology.

INTRODUCTION:

It is universally accepted that for the economic growth of a country, an efficient and good banking system is a must. Banking sector in India has traversed a long-way to assume its present stature in the 21st century. The phenomenal spread of branches, growth and diversification in business, large-scale computerization and networking, have conjointly increased manifold the operational risks faced by the banks. Banking sector frauds have been in existence for centuries, with the earliest known frauds pertaining to insider trading, stock manipulation, accounting irregularity/ inflated assists etc. Unfortunately, it is also true banking industry has to face varieties of frauds and scams. The Reserve Bank of India (RBI) is the central policy making and national level regulatory body by keeping a watch over the entire banking sector. As KPMG's 'India Fraud Survey 2012' states, "Despite having a robust regulator, the financial services sector has emerged as the most susceptible sector to frauds." Deceitful activities cause losses to banks and their customers, and also reduce money available for the development of economy.

Over the years, frauds in the banking sector have become a lot of subtle and have extended to technology based services offered to customers. The Indian banking sector too is experiencing the pain because of increase in fraud incidents. Whereas most of the banks have indicated an overall increase in frauds incidents across all banking segments, it comes as no surprise that retail banking has been identified as the major contributor to fraud, followed by corporate banking.

Fraud is a social evil, it affect whole of the economy which banking system is inclusive. Fraud in banking sector is generally looked at as acts that involve the loss of asset a through deceitful and dishonest means. It definitely constitutes one of the most serious threats to the practice and spread of banking in India. The delays in legal procedures for reporting, and numerous loopholes in system have been considered some of the key reasons of frauds and non-performing assets.

Objectives of study:

1. To understand the concept of fraud and scam in banking sector.
2. To know about various major bank frauds in last two financial years in Indian

Banking Industry.

3. To find out various causes of banking frauds.
4. To explore the preventive measures using advanced technology.

RESEARCH METHODOLOGY:

The research paper is an attempt of exploratory research which is based on the secondary data collected from different journals, magazines, articles and media reports. To fulfill the objectives of the study, the research design of the study is opted of descriptive form. Various news articles, books and websites were considered for the study.

The term _Fraud_:

Fraud is an overall marvel that influences the entire economy including all segments of the economy. Fraud envelops an extensive variety of unlawful practices and illicit acts including purposeful misleading or deception. The Institute of Internal Auditors –International Professional Practices Framework‖ (2009) defines fraud as, ―Any illegal act characterized by deceit, concealment, or violation of trust. Frauds are perpetuated by parties to obtain money, property or services; to avoid payment, or loss of services; or to secure personal or business advantage.‖ It should be noted that frauds generally impacts a bank by causing financial, operational or psychological loss.

Types of fraud:

As per RBI, fraud can be ―loosely‖ described as ―any behavior by which one person intends to achieve a dishonest advantage over another.‖ In order to own uniformity in reporting cases of fraud, the question of classification of bank frauds on the premise of Indian Penal Code has been considered and frauds have been classified as under:

- Misappropriation and criminal breach of trust
- Fraudulent encashment through forged instruments, manipulation of books of accounts or through fictitious accounts and conversion of property
- Unauthorized credit facilities extended for rewardorfor illegal gratification
- Negligence and cash shortages
- Cheating and forgery
- Irregularities in foreign exchange transactions
- Any other type of fraud not coming under the specificheads as above.

The term _Scam_:

Basically, the term _scam_ is of very recent originated somewhere in the years between 1968 and 1970. But in Indian context, it became popular since the Harshad Mehta case, which had come into light in 1992.

However, scam has not been defined anywhere in the world in legal terms. Still its meaning can be explained as a fraud happening at several places simultaneously on a big scale involving a large number of perpetrators as also the victims.

So, a fraud is basically an illegal act perpetrated by a single person or group of people. Whereas, a scam is not an illegal act but is a subversion and exploitation of the loopholes in the existing legal system.

Recent Bank Scams:

1. Punjab National Bank (PNB)
2. Punjab and Maharashtra Cooperative (PMC) Bank
3. Laxmi Vilas Bank

RECENT BANK FRAUDS ANALYSIS:

Bank fraud is a big business in today's world. Banks recently are being duped of millions of Rupees, thus destabilizing investor_s confidence. The financial year 2018-19 witnessed the wiping of Rs. 715,429.3 million from the banking industry in India due to bank frauds, which was nearly 2 times the amount lost in the previous year.

The number of cases of frauds reported by banks increased by 15 per cent in 2018-19 on a year-on-year basis (Table 1), with the amount involved rising by 73.8 per cent, though mostly related to occurrences in earlier years. The average lag between the date of incidence and its detection by banks was 22 months. The average lag

Table 1: Fraud Cases – Area of Operations				
Area of operation	2017-18		2018-19	
	Number of frauds	Amount Involved (Rs. millions)	Number of frauds	Amount Involved (Rs. millions)
1	2	3	4	5
Advances	2,525	225,583.2	3,806	645,481.7
	(42.7	(54.8	(53.0	(90.2
Off-balance Sheet	20	162,876.7	33	55,375.2
	(0.3	(39.6	(0.5	(7.7
Foreign Exchange Transactions	9	14,258.0	13	6,953.8
	(0.2	(3.5	(0.2	(1.0
Card/Internet	2,059	1,095.6	1,866	713.8
	(34.8	(0.3	(27.4	(0.1
Deposits	697	4,622.7	596	1,483.1
	(11.8	(1.1	(8.8	(0.2
Inter-Branch Accounts	6	119	3	1.1
	(0.1	(0.0	(0.0	(0.0
Cash	218	403.4	274	555.4
	(3.7	(0.1	(4.0	(0.1
Cheques/Demand	207	341.2	189	336.6
Drafts, etc.	(3.5	(0.1	(2.8	(0.0
Cleaning Accounts, etc	37	56.2	24	2,088.1
	(0.6	(0.0	(0.4	(0.3
Others	138	2,421.5	197	2,440.5
	(2.3	(0.6	(2.9	(0.3
Total	5,916	411,670.4	6,801	715,429.3
	(100.0	(100.0	(100.0	(100.0

Note: 1. Figures in parentheses represent the percentage share of the total.

2. The above data is in respect of frauds of Rs. 0.1 million and above reported during the period.

Source: RBI Supervisory Returns.

for large frauds, i.e. ₹ 1 billion and above, amounting to ₹ 522 billion reported during 2018-19, was 55 months. Among bank groups, PSBs, which constitute largest market share in bank lending, have accounted for the bulk of frauds reported in 2018-19. It was followed by private sector banks and foreign banks.

In terms of area of operations, frauds related to advances constituted the preponderant share of the total amount involved in frauds in 2018-19, while the share of frauds in off-balance sheet items declined from a year ago (Table 1). In terms of the number of frauds too, those related to advances were predominant followed by card/internet related frauds and deposits related frauds. Frauds relating to card/internet and deposits constituted only 0.3 per cent of the total value of frauds in 2018-19.

Cheating and forgery was the major component, followed by misappropriation and criminal breach of trust. Fraud cases involving an amount of less than ₹ 0.10 million (i.e., small value frauds) were only per cent of the total amount involved in 2018-19.

CAUSES FOR BANK FRAUDS:

These reasons behind these frauds are work pressure on staff, insufficient trainings, industry competitiveness, family pressure and low degree of compliance followed as issued by RBI time to time. The credibility of third parties such as auditing firms and credit rating agencies is also under the question and is believed to be a considerable contributor amongst different causes, such as oversight by banks and inadequate diligence. The frauds may be primarily because of lack of adequate supervision of top management, faulty incentive mechanism in place for staff; collusion between the employees, corporate borrowers and third party agencies; weak regulatory system; lack of suitable tools and technologies in place to detect early warning signals of a fraud; lack of awareness of bank employees and customers; and lack of coordination among different banks across India and abroad. The delays in legal procedures for coverage, and various loopholes in system have been considered some of the key reasons of frauds. In brief, some of the major reasons for frauds in India are as under:

- Low risk – high yield,
- Extremely profitable to offender,
- Very less possibility of getting caught red handed,
- No deterrent action possible immediately,
- Police not interested to take up cases,
- Long drawn cases in courts.

COMBATING BANK FRAUDS: WHAT IS THE ROLE OF TECHNOLOGY?

Technology is like a double-edged sword. One side, culprits are using it to further fraudulent schemes; on the other side, we are making some of our best progress using the same technology. Undoubtedly, technology can be helpful in detection and prevention of frauds in banks. As technology becomes more and more advanced, fraudulent schemes will also become more complex, while more sophisticated fraud solutions will be developed to control hackers_ efforts. As the landscape of frauds continues to shift, businessmen must be aware of trends and predictions which will allow them to implement internal-external controls and systems to help minimise the risk of fraud. Instead of relying on reactive methods like whistle blowing, banks can and must take a more hands-on approach to fraud detection. Therefore most banks are, thesedays, insisting on cashless and paperless transactions. The substantially larger protion of technology related frauds in the Indian banks by number is only expected as there has been a remarkable shift in the service delivery model with more technology integration in the banking industry. Even though the number of cyber frauds is extremely high, the actual amount involved is generally very low. The advanced technologies adopted by banks are making them increasingly vulnerable to various risks, such as, phishing, identity theft, card skimming, vishing (voicemail), SMSishing (text messages), Whaling (targeted phising on high net worth individuals), viruses and Trojans, spyware and adware, social engineering. While some of the risks in the banking industry have always been there, they are changing with the constantly evolving technology standards and regulatory framework. For instance, cheque fraud is declining while electronic fraud is rising, and the latter tends to be perpetrated by more sophisticated criminals. Cheque fraud has been around the world since the old times, but the pace of changing schemes has been very slow for banks to react with very good procedures—many of them still _manual_. Some of the technological innovations which may be already in use in some banks, are, briefly summarized as: (a) Two-dimensional Bar

Codes, (b) Data Glyphs, (c) Biometrics, (d) Cheque Image Processing, (e) Data Mining (f) Data Analytics, etc. Banks have more technology and more incentive than ever to control fraud in electronic banking transactions. But whether they have enough technology and incentive to protect consumers from the headaches of a compromised account, payment card or identity is doubtful. There is no ―one silver bullet‖ to stop all fraud forever. That suggests consumers should expect to see, and might want to welcome, an ongoing stream of new solutions that banks will employ to stay a step ahead of electronic banking fraudsters. It is most unfortunate that the current system of usernames and passwords, with which consumers are familiar, is basically broken. Consequently, banks also have begun to deploy an array of other technologies, some of which are so exotic and sophisticated they might seem like science fiction. Here, is a summary of some of the technology that is on tap:

- **Device fingerprinting** tracks a series of identifiable hardware and software attributes to recognize a user_s (or fraudster_s) device.
- **Behavioral analytics** monitor navigation techniques and other aspects of a user_s online behavior to search for anomalies or suspicious activity.
- **Malware detection** searches for potentially fraudulent changes to a user_s Web browser to assess whether it's been compromised.
- **Knowledge-based authentication** presents a series of static or dynamic and supposedly secret questions to establish a user_s identity.
- **Password tokens** give a user a one-time-only password that must be entered before it expires.
- **Out-of-band authentication** challenges a user to access a one-time-only password or code that is sent to another device, such as a mobile phone or land line.
- **Transaction signing** requires a user to digitally sign each transaction.
- **Endpoint protection** requires a user to download a one-time-only, secure browser to access a website.
- **Voice printing** records attributes of a caller_s speech over time and matches those attributes against subsequent calls. Voice printing is an example of biometrics, which use unique physical traits, or characteristics to identify individuals.

However, as technology advances, we are seeing a distinct proliferation of more complex fraud schemes. At the same time, we are seeing more breakthroughs in the use of technology to detect fraud. To minimize the potential damage of fraud, companies need to invest not just in more advanced technology but in people and policies for detecting attacks as quickly as possible.

CONCLUSION:

Fraud is a worldwide phenomenon which affects all continents of the earth and all sectors of the economy. With the rapid growth of banking industry in India, frauds are increasing very fast, and offenders have started using innovative methods. Shockingly, the Indian banking industry dubs rising fraud as an inevitable cost of business. In India, one of the most challenging aspects in the banking industry is to make banking transactions free from electronic crime. By strengthening the data analysis software, banks can detect fraud in a short time and reduce the negative consequences of fraud.

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Role of E-Content in Education

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ABSTRACT:

Today's Era is of Information Technology. And the internet is the foremost driver of innovation, Research and growth. The Internet has brought major changes in every field of life, even in the education sector. E-Content is becoming the most popular concept of digitization. These days, with the help of internet e-content generation and adoption is proposed for making teaching and learning more effective. This trend over the whole world is becoming a more personalized and more flexible form of learning with the focus on individualized learning. TheNational Education Policy, 2020 which was approved on 29th july2020. It replaced the previous NPE, 1986 which focused on applying technology to improve the education quality at all the levels. The content and the quality of e- content is the major issue in the education sector. E-Content comprises all types of content produced and provided. The e- content is divided into multiple modules. This module consists of PPT and animations, notes, audio visual lectures. All these modules consist of addition, interfaces and smooth and rational running. This paper explains the role of e-content in the education system.

1. INTRODUCTION

Recent developments in technology have reshaped the education sector. Millions of learners can be found who used to learn from e-content using the internet [3]. So, e-learning is becoming a very popular concept these days. But it is the time to switch to e-Learning properly. Many Institutions face barriers when they plan to adapt e-learning systems because it requires a lot of hardware and software [1]. For e- Learning there is e-content required [2]. There are all kinds of study matter created and delivered to the learners with the help of electronic media tools with a mixture of text, pictures and sounds. It requires a great amount of creativity at both information and technical level.

Because teaching remotely, where face to face interactions are not there, is very complex and highly specialised skills and knowledge required. If it is seen from the side of a student, there must be efficient teaching methods to understand each concept of the subject. These days, the people who are working and trying to continue their education do not have enough time to attend classes as in jobs, paid academic leave is not available everywhere. For these types of learners, e-learning is the best method to learn something new. But e-Learning is different and difficult as compared to traditional classroom learning. E-learning needs commitment to learn with the flow of procedure and to complete within the time bound [5]. The primary goal of e-learning is to provide effective and efficient learning on demand and good learning experience for a student [3].

I. IMPORTANCE AND MEANING OF E-CONTENT

E-Content is a product of e-learning processes. This method of teaching can become a solution to the complex modern, social and economic conditions. A package of e-content can be used for teaching in virtual classrooms and can facilitate personalized instructions [4]. In technical terms, e-content is digital content and can be transferred over the internet. It consists of pictures, text, graphics, animations, audios, videos and simulations. Sometimes it can be a single element of the above mentioned or a mix of these elements which can be displayed on online web pages or offline and can be transferred from one computer to another and internet also. As it is the digitized content, so it cannot

be viewed on paper. There must be some screen available like computer, laptop, television or smartphone to view the content. Content is produced and stored electronically [4].

II. CHARACTERISTICS OF E-CONTENT

- E-Content is learner friendly as he/she can download the text or other type of information and can use it on any computer or screen independently for learning purposes.
- As it can be used as a self-instructional model so it is learner centric.
- Due to easy navigation, it is also learner friendly.
- It is also teacher friendly as it can be used in different teaching learning methods like classrooms are teaching to a group or in lab sessions [4].

III. ADVANTAGES OF E-CONTENT

The e-content is student centric. Due to this, there are many advantages of e-content for learners or students [5][6].

- Material and activities in e-content are prepared as per the requirements and interests of the students.
- E-Content is more interactive as compared to simple notes.
- E-Content can be read at anytime and anywhere as it can be used at one‘s own pace.
- E-Content is available for everyone without the discrimination of Race, sex, country, community and religion.
- E-Content can be used for a long time without any damage or changes on devices with memory safely.
- E-Content can be provided through smart phones also.
- Each and every topic can be watched many times inside or outside classrooms until not well understood.
- E-Content can be easily ported with the help of CD, DVD, pen drive, memory card or even Google Drive.
- The task of a teacher can be reduced with the help of e-content which is burdened due to repetitions.
- The learners need not to carry heavy conventional books because e-content is weightless.

IV. DEVELOPMENT OF E-CONTENT

E-content cannot be automatically transferred from existing materials. While developing e-content, there are several aspects that need to be met. In order to develop high quality content, an organised and technical approach is required. There should be some instructional design methodology to achieve the learning objectives and expected results. The most of the efforts which are spent once in the development of e-content should be reusable across multiple learning management systems(LMS). All the material of e-content should be focused on [2][7]:

a. Cognitive perspective: It focuses on intellectual processes comprising learning as relating to the part of mental functions that deals with logic.
b. Emotional perspective: It focuses on the emotional aspects like engagement, fun and motivation of learning.
c. Behavioural perspective: It emphasizes on the skills, behavioural outcomes of learning, role playing and job settings.
d. Contextual perspective: This perspective concentrates on the social and environmental aspects which can motivate learning.

Basically development of e-content consists of six phases.

1. Analysis
2. Design
3. Development
4. Testing
5. Implementation
6. Evaluation

Here, all the six phases are explained below what activities are performed in each phase [2][7]:

1. The analysis phase: As it is the first stage in the

e-content development, it is also the most important stage. It recognises the current state comprising views of subject experts, target audience, their skills and goals, budget, delivery dates and the constraints related to due dates of e- content.

2. The design phase: It is the second stage. This stage comprises a comprehensive design of learning solutions. It is helpful in the preparation of e-content. The concerns related to the use of relevant software, required skills, productive and inspiring collaborations of subject contents such as texts, images, audios, videos and suitable animations are resolved in this phase.
3. The development phase: This stage is concerned with the actual production of the e-content. It is helpful in the preparation of e-content by mixing the text, audios, videos, animations, blogs, links, references and multiple choice questions (MCQs) with some programming language specifications like buttons and menus such as home, announcements, progress, course outline exit, next etc.
4. The testing phase: This stage or phase is helpful in administration of e-content in the actual education field. In this phase, the testing of spelling mistakes, any error in the content, picture clarity, elements of videos, appropriate and proper audios, animation timings and hyperlinks is done.
5. The implementation phase: This phase is helpful for the administration of e-content to the target audience. This phase gives an explanation of how to install, how to use it and the difficulties faced when using e-content. It verifies the accuracy of the product and the maintenance quality.
6. The evaluation phase: This phase is helpful for satisfaction and effectiveness of e-content. In this phase, acknowledgement and feedback from both the learners as well as instructors is considered. After the reactions of feedback and acknowledgements, in the post production time, the e-content is redesigned for effective delivery of e- content.

V. RULES FOR DESIGNING INNOVATIVE E- CONTENT

Interactivity is the primary concern of any content. The basic rules required to design an attractive e-content are listed below:

1. Platform independent: The e-content should be platform independent. The learner should not feel any kind of limitation on devices or platform that he or she is operating whether it is any operating system or it is any internet browser [8].
2. Interactive interface: The interface for using e-content must be interactive. It should give the learner a complete experience of a classroom. The learner should have a better experience than a classroom with many features such as he or she can scroll back as many slides or lectures and can revise many times whenever he or she wants to [5][8].
3. Simple design and easy handling: The design of e-content should be simple enough so that a learner never feels any problem in understanding how to use the system. And a learner should be able to handle this e-content very easily so that he or she can search for the content of his or her choice [8].
4. Cost: Like other products, the primary focus must be always on the cost of development and the maintenance of the system. Serving more people with better quality and at less cost is always compromised [8].
5. More learning features: The design of e-content should integrate every possible learning feature. Providing reading material is not sufficient for a learner to take full benefits of the e-content.

Extra features like online test, quiz, assignments, practical, tutorials, live sessions for doubt clearing must be there to make it more functional [8].

6. Modifications: The system of e-content must be always open for modifications and up gradation. It should be flexible for addition of new features and removal of old features [8].

VI. FORMATS OF E-CONTENT

There are many formats available to develop e-content. Details are given below:

a) Text: The primary and most important element and popular format is text. Text files can be generated at any computer, laptop or smart phones by using Word pad, MS WORD, LibreOffice writer and WPS writer etc. One can save these text files in any text format such as:
.txt, .doc, .odt, .pdf, .htm, etc [4].

b) Images or Pictures: These can be generated and stored in different formats like.bmp, .png, .jpeg,.gif, .jpg etc. Images/Pictures can be used to supplement the material wherever required [4][8].

c) Audio: E-content is complemented by audio and sound. The presence of audio is necessary because a learner is more responsive towards the knowledge employing audio. Voice can communicate in more efficient way rather than only text [4][8].

d) Videos: Videos are the most important part of the e- content as these provide the real feel of the classroom and visually a learner can understand the lecture more efficiently and effectively [4][8].

e) Simulation: Thevirtual labs which arereal time interactive e-content can work greatest for teaching Computer Science, Physics, Mathematics, Chemistry and other technical and engineering subjects for practical [4].

f) Animations: Animations with two-dimensions and three-dimensions are an influential part of e-content as these help in making the content more attractive and understandable [4].

g) Presentations: Electronic presentation is also a very good tool for teaching and learning. These presentations can be prepared in Microsoft PowerPoint, LibreOffice impress and WPS Presentation software. LibreOffice is an open source software i.e. it can be downloaded free of cost [4].

VII. CONCLUSION

E-content is the core of the teaching learning process due to the technological era. Sharing of knowledge digitally with the help of technology is the best way of effective teaching. Effective teachings are the basic requirement to understand the subject. The e- content comprises of text, images, PowerPoint presentations, audios, videos, animations, tutorials, multiple choice questions and simulations. All these increase the interest in a subject. Content development plays a primary role and is not an easy process. It requires expertise in subject and a lot of patience to create quality content and sequencing the topics. All the content has to be saved in some database and linked to each module with others. The e-content must be platform independent so that maximum users can connect and use the e-courses across the whole world.

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SECURITY ISSUES IN WIRELESS SENSOR NETWORKS

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Abstract-

Wireless Sensor Networks have attracted attention of researchers due to the vast number of applications provided by them. However, two biggest issues faced during use of such type of networks are: Low power capacity and limited computational ability. Due to the rapid advancement in technology, more secure communication channels have been discovered. So, it is essential to make WSN more secure in the era of growing competition in the field of technology. In this paper, security aspects and various types of attacks in WSNs have beenstudied. Also, the limitations of Wireless Sensor Networks and the security goals they are required to achieve have been discussed. Keywords: WSN, Wireless Sensor Network, Security issues

INTRODUCTION

Wireless sensor network is a network consisting of small size and low complexity components called nodes that can sense the environment around them and transmit the collected information. The collected information can be communicated in two ways either directly or via multi hops to sink that may utilize it locally or transmit it to another networks using gateway nodes[1].

WSN is generally made up of single or multiple base stations and a large number of low-cost small nodes with low power requirements. The nodes comprise of microprocessors, radio transceivers and sensors which not only help them in sensing the environment but also in transmitting and processing the gathered data. The nodes can transmit data wirelessly within short distances and are integrated together for a specific purpose. These battery-powered nodes are installed in adhoc manner. The nodes are expected to work for a long span of time without attendance and it is generally difficult to recharge and replace their battery as they mostly they operate in harsh environments i.e. battlefields. Hence they are prone to security breaches and physical damage so making them unreliable. As WSN is a distributed network, its security is very crucial. It has to be assured that unauthorized users cannot access the data. Data integrity, confidentiality and availability need to be maintained in sensor networks in order to make these networks secure. Sensor networks are prone to security lapses due to issues like deployment in hostile areas and computing and communication limitations. The applications of WSN in crucial fields like buildings, battlefields, bridges, habitat monitoring etc make its use avoidable in today's world. Such networks become prone to different security threats as they have physical interaction with external environment. Moreover, being installed in unattended sites, sensor networks become more vulnerable to security attacks as attackers can control a node easily and make the network accept the attacking nodes as a valid one. Hence a variety of attacks can be applied on the network once it is captured by the attacker [2].

LIMITATIONS IN SENSOR NETWORKS

The limitations of wireless sensor can be divided into three types: Network limitations, physical limitations and node limitations. Generally a sensor node consists of 4-8 MHz processor, 4 KB RAM, 12 KB flash and radio frequency of 916 MHz [4]. To minimize the cost and to have more applications, a reduction in the size of the node is required. Size reduction further leads to energy reduction that imposes restrictions on processing and storage which makes the design of these nodes a cumbersome task [6]. Heterogeneous nature of sensor nodes is another bigger limitation of sensor network thus

one security solution cannot be implemented on every node. Along with having node limitations, WSNs also hold the drawback of adhoc and mobile networks due to lack of physical infrastructure and heavy reliance on insecure wireless channels [3]. Applying security mechanisms in WSNs increases the cost of the node. Also, conventional security techniques cannot be always implemented in sensor networks because of energy limitations and other restrictions such as deployment in hostile environments [5].

SECURITY GOALS

While handling WSNs, our main focus is on achieving the following security features:

1. Confidentiality: Confidentiality means secrecy. Sensor network should resist revealing information to unauthorised users [9],[10].
2. Availability: Availability means providing uninterrupted services to authorized users even in case of DoS (Denial of Service) attack[9].
3. Authentication: Authentication means a sender node should be able to verify the identity of the receiver node. [9],[10]
4. Integrity: By integrity we mean that information in transmission should not get altered by an attacker [9],[10].
5. Authorization: Authorization makes sure that network resources and services can be accessed by authorized nodes only.
6. Non repudiation: Non repudiation means a node cannot refuse to resend a previously sent message.
7. Forward secrecy: If a sensor node leaves a network, it should not have access to future messages.
8. Freshness: Freshness is of two types: Key freshness and data freshness. Data freshness ensures that no message has been sent by an adversary and all messages are recent.
9. Secrecy: WSNs experience frequent addition and removal of sensor nodes thus forward and backward secrecy becomes vital for network security. Forward secrecy ensures that if a sensor node leaves a network, it should not have access to future messages. Backward secrecy means a sensor node which has joined the network late should not access to messages sent in the past.

SECURITY ASPECTS OF WSN

The wide range of applications like environmental monitoring, home automation, traffic monitoring etc have made WSNs tremendously popular but managing a sensor network is a cumbersome job as well[7]. Being deployed in sensitive and unattended areas, it is crucial to ensure confidentiality and authenticity of data in sensor networks. In absence of effective security mechanism, confidential information can be accessed by an adversary or a malicious node may transmit false messages through the network. Thus, WSNs are vulnerable to various types of security attacks which have been presented briefly in this section [8]:

1. Denial of Service (DoS) attack: In DoS attack, the attacker floods the network with unnecessary packets in order to exhaust the resources thus preventing the authorized users from acquiring required resources or services [8]. DoS attack not only refers to an attacker's intent to disturb, destroy and destabilize a network but also to any event which limits a network's capacity to provide service. Thus, it refers to malicious actions as well as an unintentional failure of nodes. Various kinds of DoS (Denial of Service) attacks are performed in different layers of WSNs.
2. The Wormhole attack: In this type of attack, a message is sent by one sensor node to the another across the network. The node at receiving end tries to pass the received packet to its neighbour. The neighbour node tries to send that message to the sender node which is out of range. Thus, this message never reaches the destination. Such types of attacks are malicious as they do not require to capture a sensor node in the WSN, they begin to attack as soon as the sensor starts detecting neighbouring information.
3. The Sybil attack: In Sybil attack, the attacking nodes presents itself as a bunch of nodes and starts sending misleading or wrong information to another nodes in

WSN. The techniques to counter a sybil attack on the network are Encryption and Authentication. But these techniques are effective only to the outsider sources whereas an insider node cannot be denied participation in the network. So sybil attack is performed by utilizing the identities of victim nodes. Some techniques i.e. Public key encryption can be successful to an extent to counter an insider attack but resource limitation of sensor network prevents its utilisation.

4. Selective Forwarding attack: In such type of attack, most of the received messages are not forwarded further by a specific node. The efficient working of WSN is directly dependent upon repeated forwarding as the message is passed or propagated through several nodes to reach the destination.
5. Sinkhole attack: In a sinkhole attack, the attacker creates a sinkhole having the malicious node at the centre thus diverting all the traffic in that specific area through the adversary node. This attack works on the principle of making the attacking node attractive to neighbouring nodes with respect to the routing algorithm. It is very difficult to handle sinkhole attack as it is hard to verify routing data provided by a sensor node.
6. Passive information gathering: In passive information gathering attack, the attacker possesses a well-designed antenna and an accurately powerful receiver to capture the information travelling through the network. By encrypting the messages, the physical location of the nodes is detected thus allowing the assault to track down the location of nodes and attack them.
7. Node capturing: In this type of attack, the adversary captures a specific node and thus obtains the information stored in it.
8. False or malicious node: In this kind of attack, false or misleading information is inserted in the sensor network under attack by the attacker thus transmitting false information through the network.
9. Hello flood attack: In a hello flood attack, a high-poweredHello message is broadcasted throughout the network in such a way that a large number of nodes accept the transmitting node as their parent node. Now all the traffic flows through this parent node which causes delay in receiving the packets.

CONCLUSION

The major aspects of WSNsecurity namelylimitations, attacks and requirementshave been discussed in this chapter. The aim of this chapter is to provide a general overview of the existing WSN security aspects and issues. However, a few security issues in WSN still remain untouched. This chapter will serve as a base to carry out research activities in the field of Wireless Sensor Networks.

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Book Chapter: A Revisit to IOT and its Applications

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Abstract: Automation has become the primary concern in each and every sector whether Industry, Business, Home etc. Internet of Things (IoT) has become the backbone of automation. This chapter includes an overview of IoT. Several issues and challenges for the implementation of IOT are also covered in the chapter.

Keywords: IoT, Issues of IoT, IoT and Automation

1. **Introduction:** Internet of Things (IoT) refers to the interconnection (using internet) of enormous physical devices and people around the world for sharing and transferring data. [1,2] The interconnected devices can range from very small home device such as water geyser to as big as self driven car. The objective is to automate their functioning, enable them remotely controlled and enable them collect and pass on the data through attached sensors. IoT enabled devices are said o be digitally intelligent. IoT relieves the human efforts for communication due to the imbibed self intelligence in the connected devices. In the beginning IOT application were widely accepted in business activities such as manufacturing industry for machine to machine communication. Process automation in the business applications has been entirely transformed through IoT. IoT in industry is given the name fourth industrial revolution or Industry 4.0. Nowadays every industry in the world either has adopted Industry 4.0 or is moving towards industry 4.0.

IOT works on the principal of data sharing and integration. The sensors installed on the devices collect data which is integrated at the connected IoT platform and analyzed for useful purposes. An IoT scenario is shown in figure 1. For example the collected data can be used for decision making, identifying some pattern, future forecasting, event recording etc. The primary components of the IOT on the devices, network components for interconnecting the devices, Internet platform, clouds for data storage and software tools for data processing and analysis. IoT has wide scope and applications in almost all the fields starting from commerce, engineering, medical, household, automobile, education, industry etc. Home automation has strong applications of IoT ranging from security, entertainment, voltage conservation, appliance control etc. [3]

In today‘s world IoT has been so widely accepted around the world that the number of devices connected to IoT has surpassed the people on earth. IDC which is a technological analysis firm predicts

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are devices to be connected, digital sensors installed

intelligence are two different domains although

41.6 billion connected IoT devices by the year 2025. Although industrial and automotive equipment has the maximum share connected devices but IDC senses wide adoption of IoT connected smart home in the near future. Gartner also predicts 5.8 billion connected devices in the automotive sector.

Figure 1. IoT scenario (Source: blogs.sap.com/2016/10/02/)

2. Applications and Issues of IoT

IoT and Intelligent Devices: IoT and device intelligence are two different domains although are devices to be connected, digital sensors installed

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integrated and supplemented together to achieve the ultimate objective of consumer benefit. IoT enables the devices to transfer and share the information mutually or at the consumer end. At the same time the intelligent devices are able to make the decisions using the collected data from the connected devices. Thus, benefitting the consumers in making wise, analytical, advanced and quick decisions. Device intelligence is implemented through the applications of Artificial Intelligence algorithms and techniques. The data collection using IoT is stored and processed though AI algorithms in the real time so as to reach to the instant conclusions as the human being can in IoT. For example, IoT connected room lighting system can optimize the amount of lighting in the room sensing the activities of sitting person. Thus, light saving can be achieved. Similarly sensors can be applied to know the pollution level in our surroundingso that precautionary measures can be taken accordingly. IoT aims at making our homes, offices and vehicles smarter.

IoT and Smart Homes: Smart home is one of highly fascinating application of IoT. People around the world are excited about the concept of smart home. Many companies are providing the smart home solutions around the world. Smart home concept not only guarantees the comfort and ease in the household activities but results in cost saving also. The IoT connected mood-sensing music systems, lighting, air conditioning, automated locking of doors and windows, kitchen appliance controlling, smart washing and many more are the applications of IoT to perform the house operations in a smart way [4,6]. Following are the benefits of smart homes.

- The house appliances can be controlled and monitored through mobile phones or through web applications. For example we can control or check the room temperature at home before reaching. Similarly we can set the temperature of refrigerator depending upon our expected reaching home.
- Using the application of IoT it is possible to optimize the spending at home. We can identify the wastage and go for auto control for net saving. For example the lights and fans of the rooms can be automated in the way that they are switched off when nobody is sitting in the room. Similarly Ac can be regulated depending on the number of persons present in the room.
- By regulating the appropriate use if home appliances, the ultimate wastage of power, generation of heat and other gases, waste of water etc will be reduces. Thus the positive environmental impact will be there.
- IoT blended with intelligent devices will automate certain household operations sensing the house holders moods and activities. For example doors may be

opened automatically sensing the presence of owner at the outside. TV channel may be tuned to the preferred channel etc. Thus IoT brings comfort to the householders.

- House security can be strengthened using IoT. Surveillance cameras can be deployed. Automated siren system can be installed at homes, suspicious activity monitoring may be recorded in the surrounding etc. Further house activities can be monitored remotely on the mobile phones or web browser.
- Today, monitoring systems for households are able to detect power surges, recognize leakages using water or gas sensors, warn about dangerous air pollution and send timely notifications to prevent complications or even a catastrophe.

Security vulnerability of IoT: Although, there are numerous benefits of IOT in the modern world, but many challenges and issues [7] are to be addressed to reap the its full benefits. Security vulnerability is one the primary issue of IoT [8]. Very large amount of data is transferred in IoT. Sometimes the data which sensitive or private to a person is transferred which need a robust security infrastructure to be applied. But security infrastructure of IoT is still in infancy, which is a great concern. Hackers and intruders remain active to target the IoT communication channels or data collection nodes. Web cams can be hacked easily. Strong security protocols are needed to put in place for the foolproof security in IoT.

IoT and Privacy: Since the scope of data collection is quite wide in IoT which is placed on large data centers for further processing and analyzing, data privacy again becomes a primary concern. Sometimesthe customized devices which are otherwise configured for individuals private activities may be exposed to their party, thus the data privacy comes at risk. For example many business organizations recorddata about their transactions or product delivery/selling etc. such data may not be revealed over Internet.

Data Volume and Storage Infrastructure: The concept of IoT is entirely based on the data collectionand sharing. As per IDC, data created by IoT deviceswill grow rapidly future. Almost within five years, IoT will create 79.4 zettabytes of data. A big amount of data is being created through surveillance. The retaining of the collected data becomes necessary forreal time analysis as well as to draw long term estimations and forecasts. Therefore, large capacity storage is the necessity to store the large scale data. Although, the option available is cloud storage but that brings in the issues of data privacy and security. **AI and IoT**

IoT devices are generating vast data which is collected, stored and analyzed to draw the useful information for use in home, business, profession etc. AI has been used to

draw the conclusions and predictions from the stored data. Without applying the AI algorithms the final objective of IoT may not be realized. Only one part of the system will be fulfilled without applying the AI techniques on the stored data and that is the data collection. After that manual procedures will be applied to reach to some conclusions. This is almost impossible because of a large amount of data collection in IoT.

Conclusions: IoT is the Technology of the today. In today‘s world no field can be though off without the application of IoT whether Industry, Commerce, Hospitals, or Houses. On one hand where IoT is revolutionised the world with its great benefits, there are many challenges to realise its ful potential without sacrificing the security, privacy and integrity. This chapter is an effort to introduce the IoT and its uses.

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Enhancing Security for Wireless Sensor Network using Cryptography: A Diffie-Hellman Algorithm Approach

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Abstract:

For a secure and confidential network, wireless sensor There is need to either distribute public keys into nodes through networks need to ensure a dedicated crypt algorithm path to be deployed. Certain metrics ensure that the deployed crypt algorithm are fruitful for sending as well as receiving confidential message packets. Mobile ad-hoc network are wireless networks which leads to on-demand network creation and destruction, when no more in use. This every time new network can lead to malicious traps and loss of message packets. Authors have studied and analysed wireless sensor networks to recover the network from this loop and proposed a new algorithm for the same. Metrics discussed in the paper are deployed over the proposed algorithm to propose an efficient network.

Keywords:

Wireless Sensor Networks (WSN), Diffie-Hellman algorithm, RSA algorithm, Routing Algorithms, Cryptography.

I.INTRODUCTION

Wireless networking is a technology which enables two or more computers to communicate within certain set of proposed protocols. The main feature of wireless network is that there exists no network cabling. Many wireless solutions for business as well as institutions applications are shaped with the emergence of standards such as IEEE 802.11, which is cost effective and easy to install. Wireless networks are helpful in case of handheld devices as well as warehousing, where installation of wired network is near to impossible.

A Wireless Sensor Network (WSN) is a type of wireless ad- hoc network that deploys a large number of low-cost sensor devices distributed over an area of interest. Collaboratively, they report sensor readings to a data collection sink or Base Station (BS), regularly or based on demand. The potential uses of this network range from military to civil applications **(Rahayu, 2015)**.

BENIFITS OF WIRELESS NETWORK

Mobile Ad-Hoc Network due to its infrastructure-less (no definite structure) structure and node mobility possess following advantages:

i. Fast installation
ii. Dynamic topologies
iii. Fault tolerance

iv. Connectivity
v. Mobility
vi. Cost
vii. Spectrum reuse possibility

Sensor networks are being deployed for a wide variety of applications, including military sensing and tracking, environment monitoring, patient monitoring and tracking, smart environments etc. The trusted server scheme depends on a trusted server for key agreement between nodes, e.g., Kerberos. This type of scheme is not suitable for sensor networks because there is usually no trusted infrastructure in sensor networks. the base station online, which may cause high communication overhead or pre distribute public keys into nodes offline, which may need some scheme to improve its efficiency. Such key exchange constraints lead to the loss of security in the network transmissions. So, in order to achieve a secured network, choosing of the appropriate key requires a lot of labor and wise decision. On the type of protocols deployed, the key used may vary according to the need and type of message or documents communicated.

II. LITERATURE SURVEY

In this section, various research works will be studied that have contributed to bring out a new ray of research in Wireless Sensor Networks as well as Cryptography. With the smooth drift in technology from Wired Networks to Wireless Networks, new opportunities and challenges fascinated researchers in this field. Wireless Sensor Networks eased the path of mobility and computation in a network. This section deals with research contributions in Wireless Sensor Networks field.

Akkaya and Younis (2003) presented advances in wireless sensor networks where energy awareness was an essential consideration, that have led to several new protocols exclusively designed for sensor networks. Specific attention has been drawn onto the routing protocols since they might differ depending on the application and network architecture.

Kurmi et al (2017) focussed on WSN which carry maximum number of Sensor Nodes (SNs) that transfers the data from one system to another system without making use of any wires. The Lifetime of this network is Limited because all these SNs in the network are resource constraint. So, various researchers allowed numerous approaches for maximize the lifetime of the WSNs.

Merhi et al (2012) presented paper on security frameworks of wireless sensor network localization application that can no longer be ignored. Wireless sensor network are being deployed in sensitive environment that require high levels of confidentiality, integrity and authenticity.

Lal (2017) focussed on Network security for protecting data and message from

cybercrime. Symmetric encryption is known as the single key encryption. RSA algorithm is a symmetric key encryption that uses public key and private key. Diffie-Hellman (DH) cryptography is where both parties exchange secrets keys to encrypt message. RSA and DH work differently but both are used for communicating between different parties.

Roy (2016) discussed that usage of internet is increasing all over the world. The author of this paper has highlighted the difference between the two encryption algorithms and further concluded that Asymmetric key cipher technique is way more secure compared to that of the symmetric key cipher technique. The author has also compared two prominent public key cryptography algorithms namely RSA algorithm as well as Diffie-Hellman algorithm and concluded that each such algorithm has its importance on particular context that leads to holding of advantage of each one over the other in case of a specific context.

III. PROPOSED FRAMEWORK

The Diffie-Hellman Key Exchange algorithm has been demonstrated here. A tool CrypTool (Bernhard, 2007) has been used as simulator for the purpose. On the left side, the specific stages are given as follows:

a) Setting the public parameters
b) Choosing the secrets
c) Creating the shared keys
d) Exchanging the shared keys
e) Creating the common and secret key (session key)

The solution that propose here is designed to detect the Blackhole nodes in the default operations of either the intermediate nodes or that of the destination nodes. The approach follow, basically modifies the working of the source node and the change of the functioning of route reply using function broadcast the route reply (same like the route request function). In this proposed solution using a method called Prior_ReceiveReply. In this method three things are added, a new table Reply-Table (Request Reply), a timer WT (Waiting Time) and a variable hackerNode (Malicious Node ID) to the data structures in the default AODV Protocol.

Metrics Involved

There are number of qualitative and quantitative metrics that can be used to compare reactive routing protocols. Most of the existing routing protocols ensure the qualitative metrics. The following metrics have been used for the analysis. These performance metrics determines the completeness and correctness of the routing protocol.

Packet Delivery Ratio: PDR is defined as a percentage of data packets delivered at receiver end compared to that of number of data packets sent for that node. It is used to measure the reliability, effectiveness and efficiency of routing protocols. Generally the

reliability, effectiveness and efficiency of routing protocols can be improved by improving the PDR.

PDR = (DataR / DataS) * 100, Where

DataR = Data packets received by the CBR agent at destination node

DataS = Data packets Sent by the CBR agent at source node

a) **Throughput:** It is one of the dimensional parameters of the network which gives the fraction of the channel capacity used for useful transmission selects a destination at the beginning of the simulation i.e., information whether or not data packets correctly delivered to the destinations.

b) **Average end to end delay:** The average end-to-end delay of data packets is the interval between the data packet generation time and the time when the last bit arrives at the destination.

Average End-to-End Delay = (T_DataR – T_DataS), Where

T_DataR = Time data packets received at destination node

T_DataS = Time data packets sent from source node

c) **Control packet overhead:** The control packets are needed to establish route from the source to the destination. The control packets include RREQ, RREP and ERRP.

NRO = (CPSent + CPForw) / DataR, Where CPSent = Control packets sent by all node CPForw = Control packets forwarded by all nodes

DataR = Data packets received at the destination node

IV. CONCLUSION

The effect on working of various mobility models has been investigated in different routing protocol that leads to the choice of mobility model, which is determined to give relatively better performance of different routing protocols. Authors studied various results to consider AODV as one of the best routing protocol for providing secure routing because there are almost best results in every scenario of the simulation as well as introduced a novel secure routing protocol. The proposed protocol is based upon hop count method from sender to target node. The scheme has been illustrated for AODV protocol and could easily be adopted for other on-demand routing protocols for providing stability, integrity and non-repudiation. The proposed algorithm has been evaluated with different network parameters under a simulated environment.

V. FUTURE WORK

The research work consistently requires a lot of hard work in order to maintain consistent energy of the nodes, send packets securely and safely across the network as well as to monitor the overhead packets. More comparisons are required with other schemes like DSR, TORA and other routing protocols. Power feature can also influence the study further as well as cryptography could be deeply analysed to prove a network error-free

and secure.

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भाध्ूमभ सू` क ई बू व्मवग् म्

सस्ूथ् अनन् वफनू`ज हहन्द बाषा

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सचना एव सचाय प्रद्य गगक के भाध्मभ स` हहन्द

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तत्कार न सभम भू` सचन् एव सचाय साधन गरपमतयण आसान, सयर एव सहज

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ज वन का अगबन्न अग फन चुक` हैं। भानव ज वनके

हहन्द शब्दक ष, सभानाथ शब्दक ष, अनवाद, हहन्द

प्रत्मू`क नहरू क सचाय साधन प्रबावत कय यहू` ह तू भू`

ई - भ`र आहद अगू`ज़ू बाष् कू` सभक सू - डक नण

बाषा इन प्रबाव अछ त केस` यह सकत ह। स्थान म द्वाय्

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र ग न` अफ सचाय मत्र ूू के भाध्मभ स` अनन

कयवूामू जा यहू ह। आई. के प्रमास स`

आई. ट . काननय

अग्रे`जू - हहन्द आगू्र बायत भश नू अनवूाद का भहमू कयवूाई जा यहू ह। हहन्द वमानक रचूनू भू सचूाून

ववकास हूुआ ह। सू - ू` द्वायू ववकगसत भश न क बाषू फन यहू ह, वहू ू उसकू प्रचाय - प्रसूाय अतयूाू म

इक नण

अगसस्ट`डटूूू ू’ क भाध्मभ स` स्तय नय ह यहा ह। महॉ कु छ ब्रॉग का जजक्र

सर`शन सयकाय कयना

‘भत्र

कामरम`भें अग्र`ज़ - हहन्द भें नायस्नारयक कामारम न साभग्र का अनवाद सबव ह नामा ह। हहन्द - अग्र`ज़ भश न अनवाद क`ववकास भें प्राइव`ट कनन न` ‘अनवूादक’ भश नू अनवूाद का ववकास हकमा। बायत म बाषूाओ कू` नायस्नारयक अनवूाद क सववधा क`गरए कई सॉफ्टव`मय का ववकास हकमा गमा। कन्नड हहन्द कू` गरए ‘अनसूायक’ सूॉफ्टव`मय कू` अगतरगय आई. आई. ट . काननय एव हदयाफाद ववशूववववदूारम न` हहन्द औय दज□ण बायत म बाषाओ क फ च अनवाद सॉफ्टव`मय ववकगसत हकए। अफ क`प्मटय क भाध्मभ स`गरजखत नाठ क उच्चरयत रूऩ भें औय उच्चरयत रूऩ क र`खन रचूनू भू नरयवतन कयनू फहतूुआसान हू गमू हू। इस सॉफ्टव`मय स` अनवाद कामा सनन्न कयना ओय ब आसान ह गमा ह।

आवश्मक ह`, जस` हहन्द सभम, हहन्द भेंह`लन, याजबाषा हहन्द , बायत ववद्या, हहन्द भहासागय, शब्द का सपय, ववचाय वाहटकू, प्रगतबूास, □ूनवाणू, स य आहद उलखन म हैं। सचाय भाध्मभ स` ववश्व क`हकस ब क नू` भू`ू, हकस बू द`ूश भू` हहन्दू क नस्ूतक, नत्र - नवत्रकाओ क नढ़ा, सनादन औय र`खन हकमा जा सकता ह।

बायत म प्रद`श क बग गरक सयचना गबन्न - गबन्न हूनू` कू` कायण प्रतूमू`क सववधा प्रतूमू`क सूथूान नय एकसभान सबव नहू ू थ। उस असववध क अन्गत सचाय भाध्मभ स` सबव ह नाई ह। सचाय साधन स`गश□ू का प्रसूाय तत्र गगत सू` हू न क सबूावनू ह। दय - दयाज कू` ग्राभू ण □ूेू, महूू मूातामूात क सववधा क अबाव हैं, वहा ववश्वस्तय क गश□ू सचाय साधन स`

हहन्द बाषू भू` अध्ममन धा औय अनस नक

याष्ट म व भातृ बाषा भें उन्रब्ध कयवाई जा यह ह।

गरए कई ब्रॉग उनरब्ध हैं। जहा साहहत्म, याजन गत, बायत म बाषाओ क गशा त प्रदान अथशास्त्र, बगू र, बाषा, सभाजशास्त्र आहद ववषमू ू कू कयवानू कू 'र रा' नाभक वफसाइट सू - डक द्वाया अगतरगय ग्रामू दरब प्राच न साभग्र आसान स ई - इडफाजाय डॉट कॉभ क भदद स उनरब्ध कयवाई गई ह। फकस भाधू्मभ सू हहन्द बाषा भू प्राप्त हू त ह। ऐसू हहन्द बाषा गसखनू गसखरानू कू गरए फहसूु सायू साईट नसू्तक क साभग्रू जजन्हू ू न नय नय एव ऐन सचाय ुमा कयवाए गए प्रकागशत कयनू भू ु साधनू ू सू भह हैं। सभस्मा आत ह उन्हें इन ब्रॉग द्वाया आसान स नाठक तक नहुचामा जा सकता ह। जन साधायण क य जभया

क`ज वन भें मह ब्रॉग फहुत भददगाय गसद्ध हुएहैं।

इज गनमरयग, भ`हडकर औय प्रफधन क गश□ू

अफ हहन्द बाषा भें सबव ह ऩाई हैं। हहन्द साहहत्म

क ववश्व कक न` क न` भें ऩहुचान` भें वफसाईट, ब्रॉग

न` अऩन

फवद्धज व वग, श धाथ छात्र, हकसान आहद स` र`कय उऩमू ग बगभका अदा क ह। इन वफसाईट एव ब्रॉग के

प्रत्मू`क व्मगव सचाय भाध्मभ स` अऩन भाध्मभ स` हहन्द कववता, उऩन्मास, कहान , गनफध, वगा सफध

सभस्माओ का सभाधान गनकार राबाजन्वत हू यहा ह। नाटक, व्मगम, ससभयण, मात्रा, शब्द क श, अनवाद,

इन ब्रॉग आहद के भाध्मभ स` हहन्द क अक त साभग्र आहद ख ज ऩत्र, सभग्र सचमन जानकाय भहत्वऩण

उऩरब्ध कयवाई जा यह ह। जजसस` अध्ममन औय अ धान क नम हदशा औय दशा गभर यह नस ह।

साहहत्म क फहुत साय` अनछ ए ऩहरू अफ भाऩ एक जकूरक सू` ऩाठक क` उजागय ह त` ह ैं। सन्भख

हहन्द क` प्रचाय प्रसाय एव ट . व . भ`दयदशन क

फहूुत साय` चनरू क` भाधम्भ स` अऩनू सशगू बगभका गनबा यहा ह।

चरगचत्र, सभाचाय, सा ूातम्काय, वव ूाऩन, धायावाहहक आहद न` हहन्द क फढ़त र कवप्रमता क ओय फढ़ा हदमा ह। हहन्द क फढ़त र कवप्रमता क्कायण अन्म बाषाओ क` कामक्रभ अफ हहन्द भ`

अनवाद कय हदखाए जा यह` ह ैं। फहुत साय` वव`द`श चनर अऩनप्रसायण हहन्द भ` कय यह` ह। हहन्द बाष दशक सभह क द`खत` हुए वव`द`श ऩगनम न` अऩन` वव ूाऩन हहन्द भ`ं प्रसारयत कयन`

आयम्ब कय हदए ह ैं। सचाय भाध्मभ स`हहन्द य जगाय क बाषा फनत जा यह ह।

सचना एव सचाय प्रद्य गगक भाध्मभ स` हहन्द क वर बायत तक स गभत न यह वव्व स्तय क बाषा ह गई ह। हहन्द अफ क प्मटय, प न, दय दशन औय एव सचाय प्रद्य गगक क मत्र ू क प्रबाव स` त सय सफस`

फड़ बाषा, त`ज एव सकायात्भक ह , र ून स` ऩरयवगधत

ववशार जनसभह क अतयाधनू म सम्ऩका का सा ूात्काय

कयवा यह ह।

हायक ग्रंथ

जनसचाय भाध्मभ क बाषा फन गई ह। अतयाधनू म स्तय ऩय इन भाध्मभ स` हहन्द बाषा क्कामा ूा क ववद्ध हुई औय दगु नमा क प्रत्म`क क न` भ`ं इस तवज्ञ गभरन` रगू। हहन्द बाषा अफ बायत म ह ू नह ू ू अतयाधनू म

जनभानस क जजज्ञासा क ऩगत, ऩरक झऩकत` ह सचाय भाध्मभ स` कयन` रग ह ैं। अफ वव`द`श भ ैं ब

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हहन्द सबाए एव सग गवमा, सम्भ`रन व अन्म सभाय ह आम जजत हकए जा यह` ह ं। वव ान, गचहकत्सा, व्मवस्थाऩन आहद स` ज ड़ हहन्द य जगाय क बाषा फन गई ह। हदन प्रगतहदन हहन्द क ` ान सागय क

ान रूऩ नहदमा सचाय भाध्मभ स` रफारफ बय यह हैं। सचना