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Case Studies for Research in Computer Science and Engineering

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A Double - Blind, Peer-reviewed, Quarterly,
Multidisciplinary and Multilingual Research Journal

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P.E.S. College of Engineering
Aurangabad

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Editor

Dr. Abhijeet Wadekar (Principal)

Dr. S. D. Kurmude (Head CSE)

P.E.S. College of Engineering

Aurangabad Maharashtra

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From Principal's Desk

Dr. A.P. Wadekar
Principal P.E.S. College of Engineering

The P.E.S. College of Engineering, as an Institute, we do have a great focus on research and development and always encourage students to forge their way to the best utilization of their abilities and talents. We're not only focus on the absolute excellence in academics but also individual growth of our learners. Which brings me to the part to present you the 'Journal of Computer Science and Engineering' which is our pride to present as a part of research work done by students in the academic year 2020-2021?

Being the Editor of 'The Journal of Computer science and Engineering 'gives me immense pleasure to bring to you this issue. This Journal is designed to present to its readers the Research work Our students had managed to get done so far. With a sense of pride and satisfaction I would like to say that with the active support of the management, faculty and students, 'The Journal of Computer science and Engineering 'has come alive. With all the efforts and contributions put in by the students, I truly hope that the pages that follow will make some interesting reading.

Plutarch Once said "The mind is not a vessel to be filled, but a fire to be kindled."

This peace of Excellence and persistence Desire to gain and Share knowledge kindles the imagination of our learners. Cradled in the lap of nature on the one hand and on the other, archaeological edifice of the modern world filled with technology growing with each breath we take. Swaying from Study of Some serious issues in today's technology to the most absolute advances that could take the existing world of knowledge and technology even further.
I congratulate My fellow journal team and all of the students and faculties who used various mediums of expression to help us present this journal. As long as our ideas are expressed and thoughts kindled, we can be sure of learning, as everything begins with an idea, and as we grow, by sharing.

I appreciate every student who shared the joy of participation in this journey of research with their commitment to curriculum. That little extra we do, is the icing on the cake, A step Ahead of the rest. As you might have heard of 'Do more than dream – work.' This Journal in your hand right now is the absolute evidence of hard work our Learners did. Just as mother earth gives us more and more, this will enable our learners to give and get a little more of learning.

We're not only hoping this will be interesting for you, but also are open to Suggestion and feedbacks of our readers.

Happy Reading!

HOD Message

Dr. S. D. Kurmude
(Kakarwal)
Head CSE Department

It is with great pride, enthusiasm, and anticipation that I invite you to read the inaugural issue of the Journal of Computer Science and Engineering — “a proud Moment.”

An enormous amount of work has gone into the development of this journal and I believe you will see that effort reflected in this edition and in the impact, it will have on the field. It has been an interesting journey.

As we look at PES College of Engineering, it is important to keep in mind that it represents the collective thinking of a group of innovative individuals with whom I am privileged to work being the Editor for this Journal.

This Journal intends to be a leader in facilitating a new kind of discussion about Research work done by our Third Year Computer Science and Engineering Students.

Transformation and change. These words cause uneasiness. Our endeavor will be no different. As we dare to be one step ahead, by not just exiling our academic practices but also shape minds just not to get knowledge but also to give, to share it. I am extremely proud of our board members and participating students, and fortunate to be able to draw upon their individual and collective knowledge, talent, judgment, and disciplinary backgrounds to put this journal together and make it come Alive.

Finally, I want to thank our students and Faculty members, those we teach and those who teach us. They make reciprocity a reality. They allow us into their lives giving us their precious and in so doing they teach and transform us and vice versa. I look forward to our journey together as we develop into our fullest potential.

We plan for more supplements on important Technical topics and academic activities as we grow, we hope that this particular journal continues to provide valuable and high-quality material on research in our area and beyond.

Wish you Happy reading!

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About the Journal

This Journal encompasses the topics of knowledge, intelligence, innovation, and sustainability. It aims to make available a platform for the publication of papers on all aspects of single and multi-disciplinary research on these themes to make the latest results available in a readily-accessible form. Volumes on interdisciplinary research combining two or more of these areas are particularly sought.

The Journal covers systems and paradigms that employ knowledge and intelligence in a broad sense. Its scope is systems having embedded knowledge and intelligence which may be applied to the solution of world problems in the industry, the environment, and the community. It also focuses on the knowledge-transfer methodologies and innovation strategies employed to make this happen effectively. The combination of intelligent systems tools and a broad range of applications introduces a need for a synergy of disciplines from science, technology, business, and the humanities.

Preface

This volume contains the research papers presented at the Research Presentation 2020 by Third Year students of Department of Computer Science and Engineering of PES College of Engineering, Aurangabad. The presentation was held from November 28 to December 14, 2020, in Aurangabad, Maharashtra India. It was organized by the Computer Science Department of PES College of Engineering.

It will target state-of-the-art as well as emerging topics about effective strategies for its implementation in engineering and intelligent applications. The objective of this presentation was to provide opportunities for the students to interact and exchange ideas, experience, and expertise in the current trend and strategies for new technologies.

Besides this, participants will also be enlightened about the vast avenues and current and emerging technological developments in the field of computer science in this era, and its applications will be thoroughly explored and discussed. The presentation is anticipated to attract a large number of quality submissions and stimulate the cutting-edge research discussions among many academic pioneering students from the CSE department and provide a forum to students; propose new technologies, share their experiences, and discuss future solutions for design infrastructure for IT industry; provide a common platform for academic pioneering students to share their views and achievements; enrich technocrats and academicians by presenting their innovative and constructive ideas. Research submissions in various advanced technology areas were received, and after a rigorous peer-review process with the help of the program committee members and external reviewers, 28 papers were accepted. The presentation featured distinguished personalities like Dr. S. D. Kurmude (Kakarwal), Head of the Department, Computer Science and Engineering at PES College of Engineering.

A total of 10 sessions were organized as a part of the presentation. A total of 28 papers were presented in the sessions with high discussion insights.

Aurangabad, India — Sayyed Mustakim
Aurangabad, India — Nabeela Tanzeel
Aurangabad, India — Qureshi Mahek Fatima
December 2020 – January 2021

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An Introduction to Computer Viruses and Different Types

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Abstract

The purpose of this paper is to discuss about computer viruses, and their Different Types along with their characteristics, working, effects on computer systems, and to suggest measures for detecting viral infection during a computing system, and to elaborate on means of prevention. In the early years, the detection of computer infection has become commonplace.

There are various types of viruses these days that improve every day. However, there's much software released a day to detect and avoid these viruses. Although the wild spread of the latest and powerful viruses, it still infects and spreads only with the user's permission.

These threats are often minimized using security tools and antivirus software, but all aren't equally compatible for every sort of attack hence the study is undertaken. It runs random access to the memory of a computer. This research paper highlights the phases of bug, History of bug, working of anti-virus software, and performance of antivirus software.

Key-Words: Computer Virus, Antivirus, Security threats, Net Protector Boot sector

Total Security, System scan, Kasper sky Antivirus, Trojan, Worms.

1. Introduction: Computer Viruses

A bug maybe a program that spreads between computers by hiding itself within a – seemingly innocent – document or application. A worm on the opposite hand may be a program that replicates and travels without "infecting" anything on a system.

A computer Virus may be a program that copies itself, a bug can infect your computer and slowing down your computer. And virus also can spread computer to computer. The one that sends out the pc virus may use networking of the web. The computer virus also can be spread via disk, CD, DVD or flash drive, or other devices.

Usually, a virus is written to target a network file system or shared files to spread from computer to computer using a network. Worm or Trojan is nearly different from another virus it appears harmless, this is often the sort of virus which enters the programs exploits security hothatmay have spread through other networks or Internet users. Computer viruses are usually small, which are design to spread from one computer to another computer and to enter and interfere in machine operation. The virus might corrupt your windows or might delete the important data on your computer; normally viruses are often spread through e-mails program to another computer which may even delete everything on the hard disk.

Often Computer viruses are spread by attachments by e-mail messages or maybe are often instant massaging that is why must not ever one an email which we don't know where it came from and who send it we may never realize it might be a virus.

A virus is often as attachments of funny images or video or files it can spread when u download to your computer from the web.

2. History: Computer Viruses

Computer viruses are around for a little bit and nearly all of them are spread through the web or its predecessors. Most viruses are designed to steal users' information, processing power, and/or disable the system all at once. The first virus, called the "Creeper system", was f self-replicating virus released in 1971. It was filling up the disk drive until a computer couldn't operate any longer. This virus was invented by BBN technologies within the US.

The first bug for MS-DOS was “Brain” and was released in 1986. It would overwrite the boot sector on the diskette and stop the pc from booting. It was printed by two brothers from Pakistan and was originally designed as replica protection. Morris was the primary bug that spread widely in 1988. It was written by Morris, a grad student from Cornell University who wanted to use it to work out the dimensions of the web. His approach used security holes in send mail and other UNIX applications also as weak passwords, but thanks to a programming mistake it spread too fast and began to interfere with the normal operation of the computers. It infected around 15,000 computers in 15 hours, which some time past was most of the web.

Since then, many new viruses are introduced and therefore the trend is growing exponentially per annum.

Following are a number of the foremost well-known or significant viruses that have grown in step with the role of data technology in society:

In 1991, the "Michelangelo" virus was first found in Australia. It would lay dormant until 6th March per annum then overwrites the primary 100 sectors on the storage devices with zeros, preventing the pc from booting. Only 20,000 computers were reported infected.

In 1998, CIH was released. It affected around 60 million computers and caused significant damages by overwriting important system files. It was written by a Taiwanese student.

In 1999, "Melissa" was released. This one was the primary widespread Word Macro Virus. It was distributed via email and would automatically send itself to the primary 50 people within the Outlook address book. It didn't harm the pc because it was sending out passwords for a few erotic websites which required membership. It caused such a lot of email traffic leading to email servers to crash.

2000 was the year of "I love you". Again, it came via email however it sent itself to all or any contacts. It also overwrote office, image, and audio files. The virus came from the Philippines and infected over 50 million computers in but 10 days. Most companies some time past decided to show off their email servers to prevent spreading the virus. Since 2000, numerous new viruses are unleashed to wreak havoc on the planet at large that it's difficult to list the foremost infamous. Nimba, Beast, SQL Slammer, Stuxnet, Blaster, Sobig, Code Red, Sober, MyDoom, Netsky, Conficker, Crypto Locker, Locky, Mirai, and WannaCry, are a couple of examples that come to mind.In 2013 the new sort of ransom ware started with the Crypto Locker virus. There are many new versions of this virus including Locky and WannaCry, also as Petya (not the newest version). The original Crypto Locker virus infected about half 1,000,000 computers in its original version. Some of these clones, like Torrent Locker or Crypto Wall, were specifically designed to focus on computers in Australia.

3. How Can Viruses Affect Your Computer?

Computer; being a device, tends to function with an outlined set of rules, codes, and language. A specific pattern and schedule are followed in a chronological order to take care of its efficiency for availing streamlined performance. The virus once gets intruded within the

desktop or laptop device (irrespective of OS), affects the performance of the device. The display, and keyboard functionalities & drive operations, get badly hammered in the initial stage of virus Affect.

People using their PC, are the last word sufferers as they face inconvenience to an enormous extent while performing any important tasks like download and installation of software directly linked with the right functioning of drivers, which isn't possible thanks to the ill-effects of the virus. Some users are unknown about the virus files that are previously hidden in their System device and starts It Process its impact such loss of Data, shrink up memory space, slow operations also as corrupt OS files that make problems during boot-up of the device

As users generally search for security software that will keep their device secure, they typically choose free antivirus software and download an equivalent from third-party websites. Experts, always say about using paid versions of antivirus products with advanced features. Using a generic or crack version of security software can't be as helpful in flushing out virus files from the PC. Different brands like Symantec, Intel Security Corporation, and Kasper sky Labs, never compromise with the standard and devote the resources available for developing an antivirus program that provides security from malware, Trojan-horse, adware, ransom ware, spyware, and root kits to form an entry within the System through the access of Fake website also as from external disk drive.

Browser applications want to access the web to have internal scripts that function and deliver results to the users, which they expect. These are quite complex and highly susceptible to virus attacks. To protect surfers from navigating to perfidious WebPages, additional features are required to be available for shielding you from unknowingly making how for virus files to urge intruded in the device for making it vulnerable. Millions of suspicious and untrusted websites are developed by cyberpunks with an effort to affect the PC device through online media like watching videos, glaring at the pictures seen on the websites, and downloading an equivalent for wallpaper. Internet users must be completely aware to avoid Bad shopping websites (without HTTP ://) that contain malicious scripts that Get all the banking detail, eventually making users financially ruin.

Email messages are one of the most gateways through which, virus files can enter the PC device easily. People access their mail account daily and are habitual to download files as seen in attachments. As spam messages keep flooding the inbox of internet users daily; .exe, .js also as other unknown files show their impact once downloaded on the desktop or laptop device and reduce its performance to an enormous Extent.

As major antivirus sites have scripts encrypted within the webmail accounts, it scans each and each file before it gets downloaded to the PC and shows an alert if any suspicious file is identified.

There are various other ill-effects of the virus once it makes way within the System device through any medium. Precautionary steps need to be taken recently by users to avoid the peculiar condition. It’s always advised to urge the PC scanned on regular basis, avoid entering your financial details like debit or MasterCard details on the insecure website also as keep yourself faraway from third-party websites providing offers to download premium software for free of charge. In case, you got prey to adverse impacts of the infection, let your PC be scrutinized by the certified expert online or by visiting the authorized service center setup by a brand. Diagnostic tools are going to be installed on your desktop or laptop device to trace the virus file and its impact within the disk drive. Once experts go through the automatically - report, they will take authorization from you to perform certain activities at the earliest to remove malware or Trojan horse files and their adverse impact on the OS files.

An antivirus product of a Good brand is installed by them to get solved the traces of virus files and protect the device from future vulnerabilities.

4. Types: Computer Viruses

Following are the major types of computer virus

Worms

This is a computer program that replicates itself at a swift pace. Unlike a computer virus, it is self-contained and hence does not need to be part of another program to propagate itself.

Trojan Horse

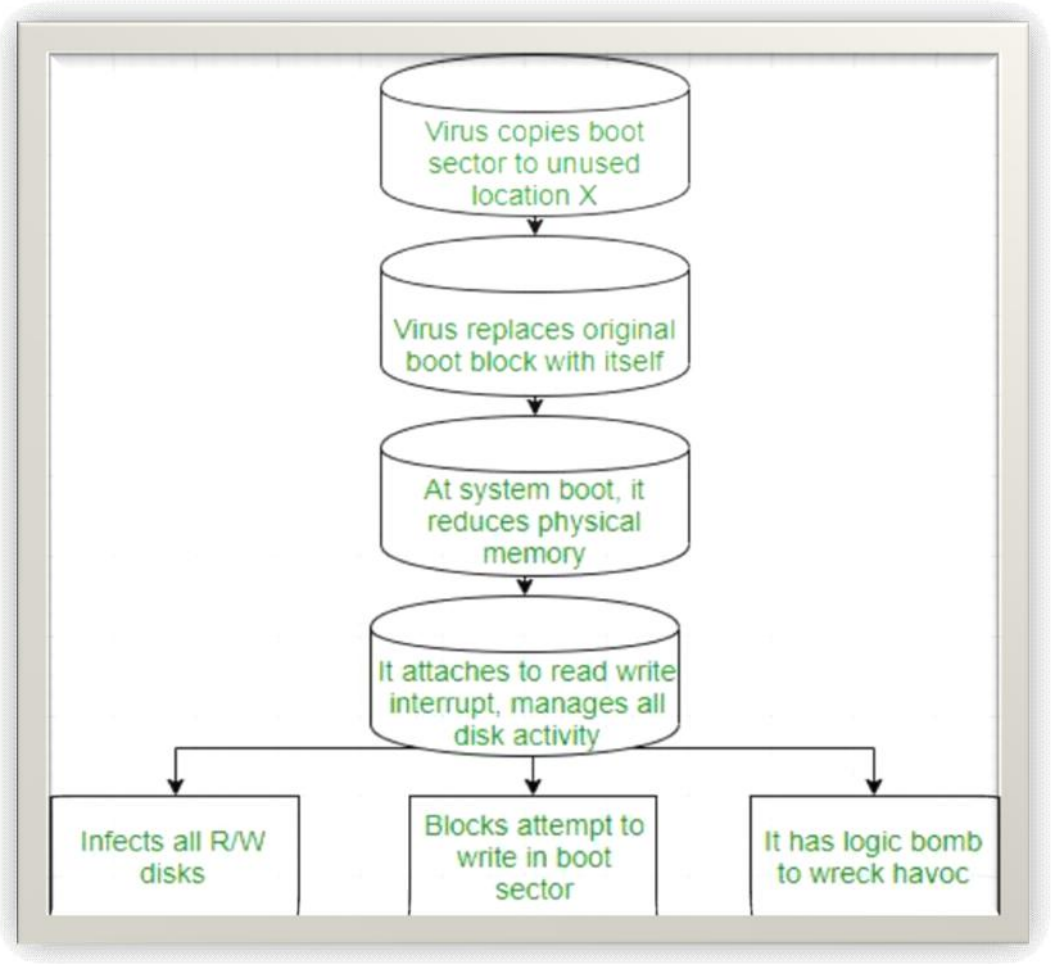
A Trojan Horse is also a sort of destructive program that remains disguised in a normal software program. It is not exactly a virus, as it cannot replicate itself. However, there is the possibility that the virus program may remain concealed in the Trojan Horse.

Bombs

It is similar to Trojan Horse, but Logic bombs have some specialty; these include a timing device and hence it will go off only at a particular date and time.

5. Various types of virus

- **File Virus:** This type of virus infects the system by appending itself to the end of a file. It changes the start of a program so that the control jumps to its code. After the execution of its code, the control returns to the main program. Its execution is not even noticed. It is also called a parasitic virus because it leaves no file intact but also leaves the host functional.
- **Boot sector Virus:** It infects the boot sector of the system, executing every time system is booted and before the operating system is loaded. It infects other bootable media like floppy disks. These are also known as memory virus as they do not infect the file system.
- **Macro Virus:** Unlike most viruses which are written in a low-level language (like C or assembly language), these are written in a high-level language like Visual Basic. These viruses are triggered when a program capable of executing a macro is run. For example, the macro virus can be contained in spreadsheet files.
- **Source code Virus:** It looks for source code and modifies it to include viruses and to help spread it.
- **Polymorphic Virus:** A virus signature is a pattern that can identify a virus (a series of bytes that make up virus code). So to avoid detection by antivirus a polymorphic virus changes each time it is installed. The functionality of the virus remains the same but its signature is changed.
- **Encrypted Virus:** To avoid detection by antivirus, this type of virus exists in encrypted form. It carries a decryption algorithm along with it. So the virus first decrypts and then executes.
- **Stealth Virus:** It is a very tricky virus as it changes the code that can be used to detect it. Hence, the detection of the virus becomes very difficult. For example, it can change the read system call such that whenever the user asks to read a code modified by a virus, the original form of code is shown rather than infected code.
- **Tunneling Virus:** This virus attempts to bypass detection by antivirus scanner by installing itself in the interrupt handler chain. Interception programs, which remain in the background of an operating system and catch viruses, become disabled during a tunneling virus. Similar viruses install themselves in device drivers.



- **Multipartite Virus:** This type of virus can infect multiple parts of a system including the boot sector, memory, and files. This makes it difficult to detect and contain.
- **Armored Virus:** An armored virus is coded to make it difficult for antivirus to unravel and understand. It uses a variety of techniques to do so like fooling antivirus to believe that it lies somewhere else than its real location or using compression to complicate its code.

6. What are the signs of a computer virus?

A computer virus attack can produce a variety of symptoms.
Here are some of them:

- **Frequent pop-up windows**: Pop-ups might encourage you to visit unusual sites. Or they might prod you to download antivirus or other software programs.
- **Changes to your homepage**: Your usual homepage may change to another website, for instance. Plus, you may be unable to reset it.
- **Mass emails being sent from your email account**: A criminal may take control of your account or send emails in your name from another infected computer.
- **Frequent crashes**: A virus can inflict major damage on your hard drive. This may cause your device to freeze or crash. It may also prevent your device from coming back on.
- **Unusually slow computer performance**: A sudden change in processing speed could signal that your computer has a virus.

- **Unknown programs that startup when you turn on your computer**: You may become aware of the unfamiliar program when you start your computer. Or you might notice it by checking your computer's list of active applications.
- **Unusual activities like password changes**: This could prevent you from logging into your computer.

7. Tips to Prevent Computer from Virus Attack

Tip 1: Use Computers and Mobile Devices with Modern Operating Systems

Apple, Google, and Microsoft have all been modified the security of their operating systems throughout their existence. These improvements are a mix of fixing recognized vulnerabilities and trying to observe for threats and affect them proactively. As a result, all these iterations of the foremost operating systems have some kind of inbuilt security app. Apple Owns "XProtect" (for both macOS and iOS), Google has Google Play Protect and Microsoft has Windows Defender. it'd be highly unwise to believe these systems on their own but they're an honest place to start.

For in a study in what can haa once you use an out-of-date OS, do an internet search on "Wannacry virus 2017" and skim up about the Ruin it caused. ThenI want to Cry virus exploited in Windows XP, which had been discontinued in 2008. In other words, the computers it infected were running an OS that was nearly a decade out of date

Tip 2: Apply All Updates Promptly

Updates are often a pain, especially OS updates which can take an extended time to place in and almost invariably involve a minimum of 1 restart. They are, however, vital. While some updates are getting to be about improving the functionality and, in some cases, this might involve adding features which you're feeling you neither need nor want, many upgrades involve some quite security improvement, perhaps patching a vulnerability that has been identified or adding a feature to detect a replacement threat.

Tip 3: Invest Some Good Money for Anti-Virus

Neither Apple nor Google nor Microsoft could also be a security company and thus the inbuilt protection offered by their default security apps is nowhere near as robust because of the protection offered by-products from companies that do consider security. Similarly, the free programs offered by these companies don't offer the same level of security as their paid options (otherwise there would be no incentive to upgrade). Given the sort of Ruin, viruses can cause, it makes plenty of sense to require an edge during a solid antivirus program for both your desktop/laptop and any mobile devices you own.

Tip 4: lookout for Physical Security

Kindly Remember that good digital security is identified with good physical security. If your physical device falls into the wrong hands, they could work thereon at their leisure and will be able to break through even the foremost sophisticated kinds of protective software. Thanks to this contemporary anti-virus programs often have a feature that allows users to wipe devices remotely. This has obvious relevance to mobile devices, however, it's also an honest idea to use it on laptops and it could even be worth using on desktops.

Speaking of laptops and desktops, consider the usefulness of simple, old-fashion locks. Many laptops have a slot that allows you to use a special lock, often mentioned as a Kensington lock, to secure them to an object which could be hard to maneuver (like a desk). Desktops typically don't but there are special kits you'll use to secure a desktop to a desk (or, in principle) anything, otherwise, you'll lock the space they're in (or both).

Tip 5: lookout About Physical Media Use

These days most software is probably either utilized within the cloud or downloaded from the online, but it's still fairly common for people to use physical media to send files from one person to a special or to repeat their computer or mobile device. Ideally, the only portable media you'd ever put into your computer or mobile device would be media you've just away from its original packaging, but within the planet, this is often not always possible. It is, however, always possible to run a plague scan thereon before you play anything from it and positively before you set in anything thereon. Once media has been away from its secure packaging, confirm that you simply keep it in a secure place to prevent malicious actors from tampering with it.

8. Conclusion:

Viruses are very destructive programs that can be devastating to companies and individuals. Upon completion of this project, we should be able to have an understanding of the following: what viruses are, how they get into a computer, how viruses can be avoided, how you get rid of viruses, and the best type of software used to prevent viruses.

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A study on virtual lab in E-learning with effectiveness

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Abstract

Research means identifying the impact of the laboratory on the E-e reading system. This study aims to examine increased learning experience and strategic comprehension through the implementation of student's graduation skills. This study also focuses on finding out if color libraries can help students directly improve their learning skills. The survey method adopted will be distributed by Expert. According to research, most students are aware of the perfection of the lab and enjoy it very much. For learning purposes, students prefer computer equipment to textbooks. Studies show that color labs need to be hired at school to help students think quickly.

Keywords: e-Learning, Virtual Lab, CBT.

1. Introduction

Education was developed as a conscious effort to developed education among others. Temporarily, the analysis of this effort focused teachers directly on learning. For example, how to create a paradigm shift one no longer realizes that the way education can be developed through direct teaching with teacher learning is now central to creating an effective and productive learning environment without being a teacher-centered environment. The word education occurs when; the word education is associated with joy. Awareness, also known as "e-learning", is a new method and practice that makes learning faster, more efficient and more enjoyable. The idea is to integrate games with learning to use software or interactive courses.

Learning encourages lasting, measurable and specified change in students to form a new mental building or to revise a previous mental building. Learning styles can basically be classified into four modes:

- Listening learning - learning by listening.
- Visual learning - learning by seeing.
- Reading / writing - learning by processing material.
- Kinesthetic learning or practical learning - from experimenting things.

In India, the method of learning to listen is traditionally the most widely used, meaning that students only learn what their teacher has said or heard. In this method of students, knowledge depends more on the teacher's oratory and level of knowledge. Due to distractions and many other problems, students become familiar with the topic. Visual learning is applied in the form of PowerPoint presentations, spreadsheets, or illustrations of tables. This type of teaching has led students to learn what the system looks like. The problem here is that even though they could imagine the system, the students were unaware of how the real system worked.

They are limited to the words of the teacher and the textbook. In the next stage, the training was conducted using Visual and Auditory. In this sense, viewing means not only images, but

also 3D and 2D videos. Multimedia demonstrations of classroom lessons were available for students. This method of computer-assisted learning is called “Computer-Based Training” abbreviated as CBT. Now the student knows how the system works, but the student could not experiment with the system. Therefore, students lacked cognitive knowledge. Through CBT, the student learns what the system looks like and how it works. CBT raised the level of education, but there was also a downside.

The fourth teaching method is kinesthetic learning. So we learn. This teaching method helps to develop logical thinking in students. Some simple experiments can also be performed as laboratory exercises, but if there are few complex experiments that cannot be performed in laboratories. Virtual labs help in such situations.

Virtual labs have significant educational potential because they give the opportunity to “learn by working”. They also provide access to other systems is unavailable for reasons such as security, cost and size. Users can do various things if the scenarios change the input and monitor the impact on the result.

Therefore, a virtual laboratory has many advantages. The purpose of this study was to identify the performance of these visual laboratories in the E-series this study aimed at analyzing the increase in cognitive skills and cognitive levels through visual laboratories among student’s school in Chennai. The study aims to identify whether visual laboratories help students expand their learning, requesting the required information.

Systematic interviews are easy to plan and analyze. But informal interviews do not fit in or extend the limit. The unstructured species, on the other hand, are more detailed. But it takes a lot of time to get scores and analysis. In this study, informal interviews were conducted with expert Mr. Suresh Kumar, CEO of Cyber School Technology Solutions Adair, Chennai. He has extensive experience in multimedia production, especially in CBT production. Non-Certified Lab and Mr. Jeachachran, MCA, CCNA Senior System Executive et al, NIIT Technologies, Chennai.

2. Research Methods

Research methods for the study are surveys and interviews of experts. Social research is most important area for measurement which is applied for the survey. The scope of the survey research includes any measurement procedures involving questioning of respondents. A study can be anything from a short form of paper and feedback pencil to an in-depth one-on-one interview.

In the study, the samples are students studying in eleven standards. The questionnaire method will be used to collect data from the samples. The study sample size is fifty students aged 16 to 17 years. Samples were taken in grade XI at a school in Chennai that exposed the student to computer instruction. Of the 50 students in a class, 35 were boys and the rest were girls, who will sample their studies. Interviews are designed to explore one’s point of view in detail.

The main things that distinguish the interview from the questionnaire are the flexibility of the researcher to explore interesting things. Qualitative interviews begin with interview schedules that list the most important topics to cover. It is the most flexible means of obtaining information because face-to-face situations easily give itself the question of greater depth and detail.

There are two basic types of structured and unstructured interviews. In a structured interview, standardized questions are asked in a predetermined order, and interviewers are given relatively little freedom. In an unstructured interview, a wide range of questions are asked, which allows the interviewers to freely determine which other questions to ask.

3. Research Analysis

The study showed that 35 percent of students surf the Internet for games, while only 25 percent surf to increase their knowledge. The remaining 40 percent of the samples used on the Internet for both education and entertainment.

Practically all students with knowledge of virtual labs are interested in experimenting. They think they do not have to worry about the damage caused by the wrong results and can work in the laboratory at any time. There are no restrictions on laboratory time.

Nearly 90 percent of students recommend using a computer-based book with built-in virtual labs instead of a book. About 62 percent of them think they always need a teacher for leadership, and 22 percent think they do not need any instruction, and 16 percent of students think they need instruction in some area.

All samples responded that they would use CBTs with virtual labs in the future for the current topic. It reflects the desire of students to use virtual laboratories. They feel like they are using these virtual labs, learning in a fun way.

According to Mr. Suresh Kumar, image (visual) has a profound effect on the minds of students, even if they are not aware of the technology behind it. He went on to say that virtual labs are a mix that engages students with a sense of concept. He noted that future students will use computer instruction with virtual reality experiments and that a percentage of readers will disagree. It is thought that multimedia devices will bring to each other more media.

Self-experts believe that without a virtual test center, CBT / WBT could not have achieved so much. Virtual Lab was constructed with commercial products such as Adobe Flash, 3D computer graphics, Graphic design. Many foreign companies have their own software and equipment for the development of CBT / WBT.

He suggested that more young people in multimedia should help schools and colleges set up virtual labs so that all materials can be reproduced in this format without interruption.

These multimedia products not only help students to increase their knowledge, but also help teachers to easily understand concepts. He said that quality is today's conversation. The future will be entirely digital and computer based, and textbooks will disappear, and digital glory will interfere with the present day of educational flow.

The expert concluded that the costs are worth it and that this technology will survive and thrive in this industry. These virtual labs will help students in remote areas. They can learn concepts independently, thus increasing their performance and efficiency in their area of interest. It will be effective for students. They can practice at home or in schools or wherever they want. The main problem in rural areas is the lack of facilities to provide students with a laboratory that uses these virtual laboratories.

Mr. Jeyachandran says: "It is not possible to build a complete infrastructure in a training center while teaching online. Installing complete equipment will be very expensive. Thus, the only solution to these problems is Virtual Laboratories. NIIT has simulation software and a virtual lab available for online teaching.

The main advantage of students using this software is that students can practice network architecture without difficulty and without fear of incorrect connection of equipment. Another great advantage of using virtual labs and simulation programs is that students can work from home. In addition, until now most subjects in the field of networking were deals with in theory, but now students have the advantage of learning, what a real network structure is like?

4. Research Finding

The concept of virtual laboratory is familiar to most students and is highly valued by students and teachers. All multimedia components, such as images, graphics, animations, and sound, play an equally important role in these multimedia components. Virtual Labs is an interactive product that helps students step-by-step, provide appropriate guidance, and expand their limitations. Virtual labs include entertainments information enrichment, and enrichment activities. No prerequisites are required and the basic information on computer access is extensive enough to use CBT with Virtual Lab.

5. Suggestions

The suggestions are below.

- The government can help expand CBs with virtual labs to make rural schools free.
- Multimedia production companies, instead of developing only computer training programs, can add visual labs where possible.

6. Conclusion

Computers and the Internet have extended the way information is communicated to today's students. Today's technology offers a valuable opportunity to practice new learning techniques. Teachers should be created to use virtual labs to facilitate learning. Educators need to adopt current teaching methods to incorporate these new media into their classrooms, as they have proven effective.

Computers have a fundamental impact in most industries and offer the competitive advantage that is essential for many companies. Therefore, schools and colleges in India should also use virtual labs to improve their education standards.

Virtual Labs is more than just a "real" textbook. The "Classroom of the Future" may include several types of simulators and virtual labs, in addition to text and visual learning tools.

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Smart Healthcare Monitoring System Using IOT

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Abstract

Healthcare is given extreme importance now a- days by each country with the occurrence of the new corona virus so during this aspect, an IoT based health monitoring system is that the simplest solution for such an epidemic within this world, IoT is changing the infrastructure of technologies.[1] IoT is based on patient health monitoring system during which a patient isusually monitored 24 hours. the foremost aim of this 'Patient Monitoring System' is to create up a system for observing vital blood heart, pulse oximetry a far-off health monitoring system using IoT is proposed where the authorized personal can access these data stored using any IoT platform and supported these values received, the diseases are diagnosed by the doctors from a distance.

Keywords: Internet of Things, Health Monitoring System.

1. Introduction

Health is typically a significant concern in every growth the humanity is advancing in terms of technology. a bit like the recent corona virus attack that has ruined the economy of China to an extent is an example how health care has become of major importance. In such areas where the pandemic is spread, it is often a much better idea to observe these patients using remote health monitoring technology So Internet of Things (IoT) based health monitoring system is that the present solution for it. the foremost objective of this project is that the planning and implementation of a wise patient health tracking system that uses Sensors to trace patient health and uses internet to inform their loved ones just in case of any issues. The target of developing monitoring systems is to reduce health care costs by reducing SMS based patient developing viewing and IOT based patient checking framework. Once the health issue has been increased to a critical stage and thus the lifetime of the person is endangered, then they take medical assistance, which can cause an unnecessary waste of their earnings. This also comes into account especially when certain epidemic is spread during a neighborhood where the reach of doctors is impossible. So, to avoid the spread of disease, if a wise sensor is given to patients, who are often monitored from a distance would be a practical solution many to save lots of lots of many controller-based health monitoring systems lives [2].

2. Literature on Developing Health Monitoring System

Now a day, many health monitoring systems are developed to watch the health condition of patients. We are reviewing some recent works developed during this field during this review, all the systems are classified supported the priority of hardware components, that is, which components are used quite the others. Therefore, all the systems are categorized into three different categories as follows [3].

- Sensor-based health monitoring systems,
- Smartphone-based health monitoring systems,

- Microcontroller-based health monitoring systems.

3. Sensor-Based Health Monitoring System

It collects the information about the patient's health condition through an electronic data signal and notifies the patient via an audio alarm. Among the varied sorts of sensors, ECG, temperature and pulse sensors are widely used. Most of the health monitoring devices used blood heat sensors (Max 30205), pulse sensor, temperature sensor (BME 680) Wu et al. [4] suggest a wrist wearable body area network (WBAN) architecture for the healthcare system using cloud computing. The system works in both industrial and residential environments. However, the developed system is wire connected. Making the device wireless would increase the pliability of the system.

4. Smartphone-Based Health Monitoring System

Smartphones are one among the foremost useful resources within the world. a number of the sensors that are included during a smartphone are the wireless sensor, Bluetooth module, Accelerometer, Fingerprint sensor, Magnetometer, Barometer, Proximity, GPS tracker, Camera, NFC-near field sensor which are generally utilized in developing health monitoring systems. Another important advantage of a smartphone is that the mass storage facility of a smartphone. Modern smartphones can easily store the patient's data in primary storage [5]

5. Microcontroller-Based Health Monitoring System

Microcontrollers are the foremost frequently used devices in health monitoring systems throughout the planet, it's very useful for the fast processing of raw sensor data. [6] Trivedi and Cheeran suggested an Arduino based health parameter monitoring system controlled by a smartphone application. All the info obtained from sensors are in analog form. the info is shipped to the Arduino Uno board. The collected analog values are converted into digital by built-in analog to digital converter. The digital signals are transferred to a smartphone through Bluetooth. The system used a Bluetooth module which doesn't cover an outsized area.

6. Conclusion

In this review paper, an IOT based health monitoring system was developed. The system monitored blood heat, pulse and room humidity and temperature using sensors, which also are displayed on a LCD. These sensor values are then sent to a medical server using broadcast communication.

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Research Paper on Inventory Management System

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Abstract

Inventory Management System could even be a windows application developed for Windows operating systems that focused on the planet of control and generates the various required reports. This project eliminates the paperwork, human faults, manual delay, and speed up the tactic [1]. Inventory Management System is software which is useful for the businesses to figure hardware stores, where storeowner keeps the records of sales and buy [2]. Mismanaged inventory means disappointed customers, an excessive amount of cash engaged in warehouses, and slower sales [3].

Key-Words: Inventory Management System, Furniture sales, PDF, update, time-saving, tracking inventory.

1. Introduction

Inventory management uses a variety of knowledge to stay track of the products as they move through the tactic, including lot numbers, serial numbers, cost of products, the number of products, and thus the dates once they move through the tactic [4]. The products are then pulled from the stock areas and moved to production facilities where they're made into finished goods [5]. Stock Management is essentially the procedure by which an association is given the products and enterprises that it must accomplish its goals of buying, stockpiling, and development of materials [6]. Stock administration frameworks are key to how organizations track and control inventories [7]. Stock could even be a rundown for products and materials, or those merchandise and materials themselves held accessible available by a business [8]. Materials Management is identified with arranging, securing, putting away, and giving the acceptable material of right [9].

1.1 Problem: Generating backup data could even be a critical process during a project for our shopkeeper [10]. This work is often categorized as a time-consuming job and needs high accuracy when placing the proper materials with its quantity [11]. Since this is often the first time we create the automation, there are numerous requirements which cannot be defined properly [12]. Thus this paper aims to review and redefine the automation's

Requirements from basic like:

- What are their requirements? [13].
- How can we fulfill the Shopkeeper's requirements? [14].

1.2 Solution: The requirements from the shopkeeper to make backup inventory within a limited time and in high accuracy makes us return up with an automation solution by employing a desktop [15]. At now we expect that this is often the based solution.

2. Invoice Generator

We'll continue the subtle elements of invoice administration, with the goal that we'll organize information in one table arrangement [16].

2.1 Print Invoice: The printing module can print out the planning of the invoice. It's often changed over into a PDF design and produced the invoice for the client [17].

3. Objectives

- To hunt out the optimum level of inventory to be ordered to some extent of a fast time [18].
- To review the inventory management system in construction industries supported the size of the project, quite the structure, existing management principles [19].

4. Methodology

Safety stock inventory management could also be an extra inventory being ordered beyond expected demand [20]. This system is employed to stop stock outs typically caused by incorrect forecasting or unforeseen changes in customer demand. Specifically, looks into were directed to the tiny degree to research about stock administration in development ventures. This causes an impression on the execution of the stock administration. To yield a coveted execution, it's vital to form sure the task work successfully. Demand forecasting should become a documented inventory management technique for retailers. Demand forecasting is predicated on historical sales data to formulate an estimate of the expected forecast of customer demand. Essentially, it's an estimate of the products and services a corporation expects customers to urge within absolutely the better of the day.

5. Scope of Project

The scope of inventory management concerns the balance between replenishment interval, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space, quality management, replenishment, returns, and defective goods, and demand forecasting. Inventory management involves a retailer seeking to accumulate and maintain an accurate merchandise assortment while ordering, shipping, handling, and related costs are kept in restraint. This is often able to include the monitoring of fabric moved into and out of stockroom locations and thus the reconciling of the inventory balances.

6. Application

The procedure of stock proportionality is most fitting for inventories that stay inconspicuous by the purchaser, instead of "keep full" frameworks where a retail customer might want to work out full retires of the item they're purchasing so on not think they're purchasing something old, undesirable or stale; and separated from the "trigger point" frameworks where the item is reordered when it hits a selected level; stock proportionality is employed viably by without a flash to spare assembling procedures and retail applications where the item is escaped see.

7. Conclusion

This paper presents an alarm about the knowledge section within the bill which insight of desktop application. It's an easy desktop application during which the network to the immediate distribution center with the goal that information must be refreshed future for the confirmation.

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Review Paper on Cloud Computing

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Abstract

Cloud computing is the computing technology which provides resources like software, hardware, services over the internet. Cloud computing provides computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services. Cloud Computing is a popular phrase that is shorthand for applications that were developed to be rich Internet applications that run on the Internet (or "Cloud"). Cloud computing enables tasks to be assigned to a combination of software and services over a network. This network of servers is the cloud. Cloud computing can help businesses transform their existing server infrastructures into dynamic environments, expanding and reducing server capacity depending on their requirements.

1. Introduction

Cloud computing is a model for enabling convenient, on-demand network access to shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction". Cloud computing is the most demanding an emerging technology throughout the world. Cloud computing is an Internet based computer technology. Cloud computing is a promising computing model that enables convenient and on-demand network access to a shared pool of computing resources. Some of the major firms like Amazon, Microsoft and Google have implemented the "CLOUD" and have been using it to speed up their business. In computer networking, cloud computing is computing that involves a large number of computers connected through a communication network such as the Internet. In science, cloud computing is a synonym for distributed computing over a network, and means the ability to run a program or application on many connected computers at the same time. Cloud computing can be the ability to use applications on the Internet that store and protect data while providing a service anything including email, sales. It can be using a storage cloud to hold application, business, and personal data.

Cloud computing is the most demanding an emerging technology throughout the world. Cloud computing is an Internet based computer technology. Cloud computing is a promising computing model that enables convenient and on-demand network access to a shared pool of computing resources. Some of the major firms like Amazon, Microsoft and Google have implemented the "CLOUD" and have been using it to speed up their business. In computer networking, cloud computing is computing that involves a large number of computers connected through a communication network such as the Internet.

Here are 10 example of cloud computing:

- **Nerds Support Cloud:** Nerd Support Cloud Computing Miami Services has a variety of services included within its cloud system. The Nerd Support cloud assists medium and small sized businesses with all IT based services by providing software (SaaS), hardware upgrades and maintenance as well as security so they may operate at maximum efficiency. Nerds Support is a managed service provider as well. The company uses cloud technology to augment or replace a business's IT.
- **Salesforce:** Salesforce has a cloud based software-as-a-service (SaaS). It is both a business-tobusiness and business to consumer commerce solution.
- **Creatio:** Creatio formerly BPM online, is a cloud service specifically for marketing, sales and servicers to manage business processes and assist companies to facilitate consumer experience and customer journey
- **Slack:** Slack is an American based cloud service designed to facilitate internal team collaboration through its tools and services?
- **Google Cloud**: Google Cloud Platform, a cloud service offered by Google, runs on the same infrastructure that Google uses internally for its end-user products like Google and YouTube. Cloud computing security for data storage
- **Microsoft 365:** Office 365 is a product line of subscription-based services such as Outlook, PowerPoint, and Excel.
- **Workplace by OS33**: Workplace is a software-as-a-service platform for compliance and productivity for wealth management firms.
- **Adobe Creative Cloud:** Adobe Creative Cloud is a set of applications and services from Adobe Systems that gives subscribers access to various software used for graphic design, video editing, web design, photography and more
- **Microsoft Power BI:** Microsoft Power BI provides cloud-based business analytics services by Microsoft. It offers data services that provide interactive visualizations and business intelligence capabilities with an interface that allows end users to create their own reports.
- **Box**: Box is a cloud content management and file sharing services provided to businesses. It is a service available for Windows and IOS as well as some mobile platforms.

2. Cloud Computing Basics

The approach of cloud computing is in every aspect these days. Either small-scale, midscale or large-scale, every organization is implementing cloud computing methodologies for data storage, disaster recovery, software development, testing, big data analytics, virtual desktops, software deliveries, and web applications. Streamlining many approaches, this computing has modernized the approaches of: 0

- **Maintaining Huge Servers**: With the methodologies of cloud computing, there is no need to maintain huge servers in large equipment rooms.
- **Data Storage**: People can skip the approach of manually storing their information in hard discs, pen drives or any other external devices. Restricted Geographic Accessibility. This technology offers the feature of gaining accessibility for processes and data at every location. So, this flexibility enhances the operation and performance of the next step.
- **Loss of Data**: One might be worried about their data loss because of rapid enhancements in the hacking technology and it becomes so easy to steal the data. But the computing has shown a complete advancement in data protection where information is stored in cloud ad has numerous safeguards

3. What is Cloud architecture?

Cloud computing architecture is used to connect a user with the server through the internet. It is the combination of a front end platform (Mobile phone or Pc with an internet connection), back end platforms (Cloud servers, storage), a cloud-based delivery, and a network (Internet, Intranet, Intercloud). Cloud architecture is mainly divided into two parts.

- Front End
- Back End

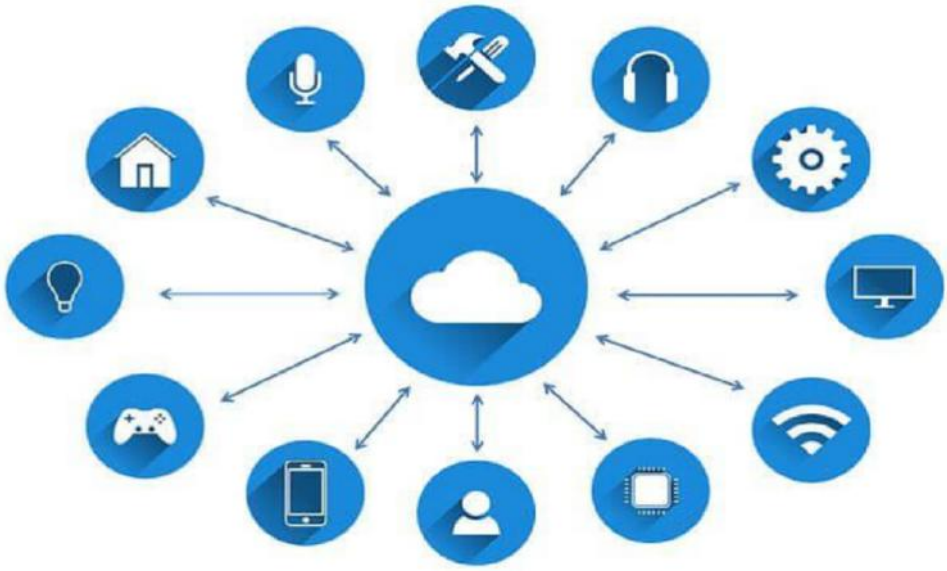
3.3. Cloud architecture Front End: The front end of cloud architecture is a web browser on a mobile phone or computer. The front end is used by the end-user to access the service from the server. Usually, it is a web application or a web browser that uses the internet to access the server by cloud clients. The front end in cloud architecture is GUI for clients. Different Service providers may have different interfaces.

Main components of Front end in cloud Architecture are:

- Cloud client
- Mobile or PC
- Web browser
- Internet connection

3.4 Cloud architecture Back End: The back end is the part that is not visible for cloud clients. Because it is server-side in a cloud architecture that is control and maintained by Cloud service providers. It is the responsibility of back end to provide security mechanisms. As it is made of computers, servers and storage media to provide services.

Fig.



Cloud computing Architecture

Main components of Back end in cloud Architecture are:

- Cloud Application
- Cloud Services
- Cloud Storage
- Cloud Management
- Cloud Security
- Cloud infrastructure

4. Cloud Computing Deployment Models

The cloud services can be deployed in different methods. The deployment model is based on the service model, organizational structure, location, user base, and so on. The four most commonly used deployment models are as follows:

4.1 Public Cloud: In this model, the infrastructure is accessible to the public and it is owned by a vendor, who offers the services of the cloud to the users. The cloud vendor shares the cloud resources with the end users. The resource pool is huge and the services are shared by lots of users. The services of this cloud model can be free or available for nominal charges. Google uses a public cloud deployment model. With this model, users need not purchase any infrastructure but can use that of the vendor. A drawback of the public cloud model is that it poses a security threat. If you have very confidential data running in your network, it is not safe to use the public cloud model.

The cloud services are easier to install and less expensive or even charge free, the applications, hardware and bandwidth are provided by the service provider, and are scalable, the user avail can only those services that they are interested.

4.2 Private Cloud: As the name suggests, this would be a privately owned cloud. Here, the user or organization owns the cloud and only the user or employees of the company have access to the cloud, thereby making data and transactions secure. There is more control over resources when compared to the Public Cloud model. The Private cloud model uses the Virtualization solution and the data centers belong to the company. The major advantage of this model is the security and the control that the users have over the resources and application. However, the drawback is that more financial investment is required and the offering is not as big scale as that of a public cloud model.

The services are made available on proper authentication; priority is being given towards

4.3 Community Cloud: In the Community Cloud model, the infrastructure is owned jointly by different organizations. The organizations may have a similar set of requirements, policies, and customer base. So, they can combine the offerings and make the customer base even bigger. Duplication of same or similar applications and resources are avoided. This model helps reduce the costs, which would otherwise be higher if the organization deploys the Private Cloud model. This is again a classification of the Private Cloud, as it is available to only a certain group of users.

4.4 Hybrid Cloud: The Hybrid Cloud deployment model comprises of two or more clouds. This can be a combination of the other three cloud types – public, private, or community. The hybrid deployment is compared to the other three owing to the execution and management tasks involved. An example scenario of this model can be where an organization is on the private cloud but there are load spikes which the private cloud cannot handle. For this the organization depends on the public cloud to support the load. The shift from the private to the public cloud and back will be seamless to the end user. It is a combination of two or more cloud deployment models like (public, private, community) it enables cloud application portability, multi-tenant, resource sharing.

5. CLOUD COMPUTING MODEL

5.1. Cloud Software as a Service (SaaS): It is a software distribution model where a third-party provider hosts applications and makes them available to customers over the high-speed internet connection.

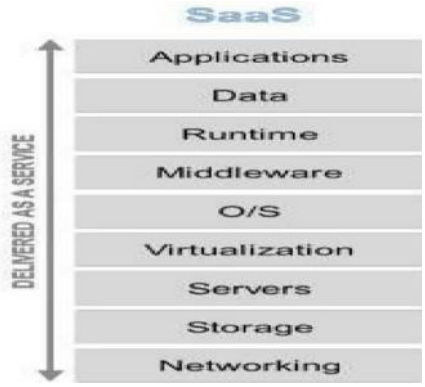


Fig. Software as a Service (SAAS)

5.2 Platform as a Service (PaaS): It is a middle layer which gives the organizations, institutions or companies a freedom and framework for developers to develop their own applications and deploy them and make customers within their company to access the resources

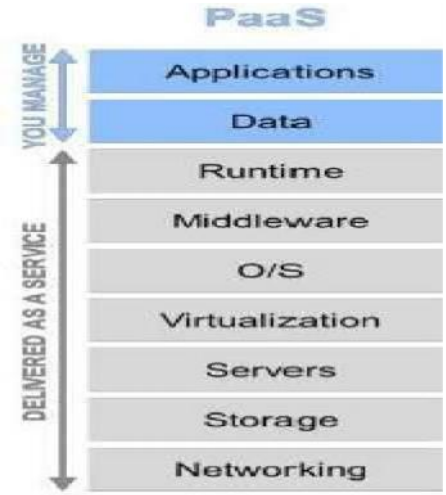


Fig. Platform as a Service (PaaS)

5.3 Cloud Infrastructure as a Service (IaaS) : Infrastructure is most vital among the three service models because it is the basic need to launch the organization's services over the internet in a cloud platform, to make their services available to clients and applications to run them smoothly

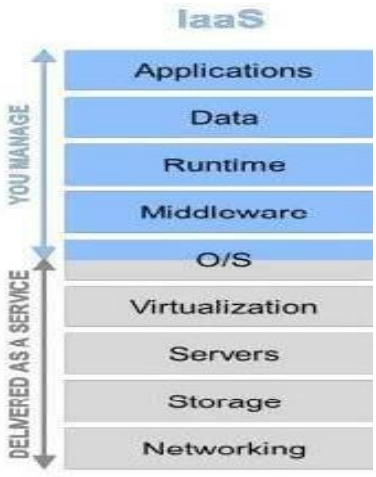


Fig. Infrastructure as a Service (IaaS)

I think the concept of hardware-as-a-service, let's call it HaaS, and may at last be ready for prime time." This model is advantageous to the enterprise users, since they do not need to

invest in building and managing data centers. In the future days HaaS has to be available on pre and postpaid payment basis.

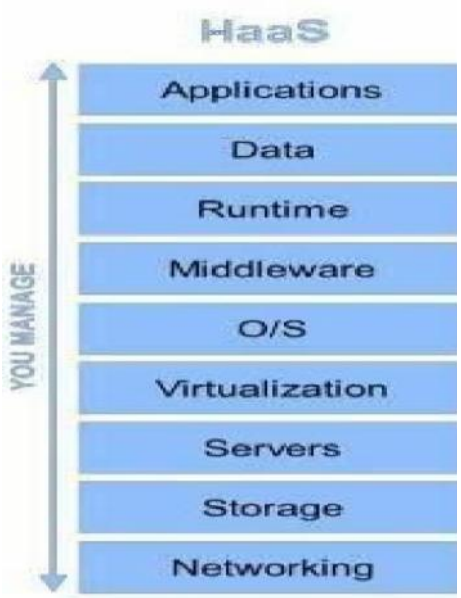


Fig. Hardware as a Service

6. Characteristics of cloud computing:

- On-demand self- service.
- Broad network access.
- Resource pooling.
- Rapid elasticity.
- Measured Service.

7. Cloud Computing Attacks:

7.1 Security: It is clear that the security issue has played the most important role in hindering Cloud computing. Without doubt putting your data, running your software at someone else hard disk using someone else CPU appears daunting to many. Well-known security issues such as data loss, phishing, botnet (running remotely on a collection of machines) pose serious threats to organization's data and software Security measures assumed in the cloud must be made available to the customers to gain their trust. There is always a possibility that the cloud infrastructure is secured with respect to some requirements and the customers are looking for a different set of security. In order to have a secured Cloud computing deployment, we must consider the following areas, the cloud computing architecture, Governance, portability and interoperability, traditional security, business continuity and disaster recovery, data center operations, incident response, notification and remediation, Application Security, Encryption and Key management, identity and access management.

7.2 Authentication: Authentication is the process of verifying a user or other entity's identity. This is typically done to permit someone or something to perform a task. There is variety of authentication system, some are stronger than others**.**

7.3 Authorization: Authorization is when the system decides whether or not a certain entity be allowed to perform a requested task. This decision is made after authenticating the identity in question. When considering an authentication system for a particular application, it is crucial to understand the type of identifier required to provide a certain level of authorization.

7.4 Confidentiality: Confidentiality is needed when the message sent contains sensitive material that should not be read by others and therefore must not be sent in a comprehensible format. A loss of confidentiality is the unauthorized disclosure of information. Confidentiality, as it relates to security and encryption techniques can be obtained by encrypting messages such that only intended recipient are able to read them

7.5 **Integrity:** Integrity is ensuring that the data presented are true and valid master source of the data and includes guarding against improper information modification or destruction to ensure information non-repudiation and authenticity. A loss of integrity is the unauthorized modification, insertion, or destruction of information.

8. Conclusion

Understanding a technical area as complex as cloud computing is not easy and require side ntifying its fundamental characteristics. Clear concepts and terminology into cloud computing help but do not entirely solve the problem of how to design, develop and adopt a cloud computing system This poses new challenges in creating secure and reliable data storage and access facilities over remote service providers in the cloud. The security of data storage is one of the necessary tasks to be addressed before the blueprint for cloud computing is accepted. In this paper we discussed the security requirements of cloud computing data storage security and the solutions for the security problems. As a part of the future work, first, we'd like to get detail of each characteristic especially the inner technologies .Second, we have more than ten years' experience in HPC area and wish to syncretize the HPC into cloud computing. Third, the evaluation of cloud services is an interesting and valuable research subject.

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Security Issues and Challenges in E-Banking

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Abstract

E-Banking i.e. electronic banking becomes extremely popular with the introduction of data technology. Today's online banking could be a convenient mode of finance management. With the in depth use of technology notably net by users, banking is changing into additional addicted to technology. Unfortunately, with this the numerous problems additionally the challenges associated with banks area unit also increasing stupendously. It provides huge advantages to shoppers in terms of the benefit, simplicity and value of transactions. E-banking will improve bank's potency and aggressiveness, therefore existing and potential customers will get pleasure from a larger degree of convenience in effecting transactions. however the adaptation of E-banking by business banks will increase security, challenges and differing types of risks. The objectives of this paper is to check totally different security problems and challenges in E-banking. There are several security challenges and problems in E-banking like security problems, privacy risk, trust issues, customer awareness, cyber squatting, fraud by human resources of the bank.

Keywords: E-banking, E-banking issues and challenges.

1.Introduction

Today technology is used in every field especially the business and banking sector.The use of technology is so much that, the banking sector cannot be imagine without the technology.[1]The E-banking provides many services to customers within the conventional ways like account details making payments, payment bill details, finance handling.[2] E-banking provides faster way to deliver the banking services to customer by sitting at home they can access their account through internet. E-banking paying major role in the economy. Still many issues and challenges security is most vital issue in E-banking. Online banking brings lots of transformation between bank and customer. Still many issues and challenges become challenging in online banking.[3,4]

2. Objective of E-banking

The objective of this research paper is to study about the security issues and challenges in E-banking.

3. What is E-Banking?

The definition of E-banking is varying from the researchers. E-banking belongs to several type of services through which bank customers can request information and carry out by banking services through computer, television or mobile phone.[5] By the Basel committee report which defined E-banking is the provision of retail and small value banking products and services through electronic channels as well as a large value electronic payment and other wholesale banking services which are delivered electronically. Such products and services can include deposit taking, lending, account management, the supply of monetary device,

electronic bill payment, and therefore the provision for other products and services like electronic money .[6]

4. Why E-banking?

E-banking services have benefit to customer as well as banks. It help customers to increase their market shares and to achieve competitive advantage. For the traditional banking services using electronic services can save the cost of resources .[7] From customers point of view E-banking is easier, faster and more reliable services to customers.[8] However customers still not concerned with E-banking services, because they fear with security issues, and they not have ability to deal with the applications of E-banking.[9]

5. Challenges and Issues in E-Banking

- **Security Risk:** It is a enormous challenge in E-banking, because of security issues .There are more issues like various internet frauds, fishing acts, password hacks etc.
- **Privacy Risk:** Peoples have fear of identity theft and disclosing private information in E-banking . They feel very much irritated when they receive calls for credit cards or insurance etc.
- **Trust Factor:** Trust is the biggest thing once you need to do anything, specially once you do a financial transaction you have to full faith on the medium you are using, the connection you are using etc. Several questions arising in user's mind: Did transaction go through? Is my ID and Password is secured? Trust is extremely important factor which influence the customers.
- **Customer Awareness:** Villages are backbone of India and when we talk about peoples of villages, found that they are still not conscious of banks, so in India there is a long way for E-banking. So we first need to educate peoples about the banks system and then slowly need to educate them.
- **Holes**: The network tolls which can be suffering from holes are routers, server software, operating system, firewalls and clients. Any use of E-banking in open networks or unsecure networks allows hackers to have unauthorized access.
- **Money Laundering Risk:** Since internet banking can be done remotely, banks may find difficulties to use traditional methods for preventing and detecting undesirable criminal activities like money laundering. Applications of cash laundering rules might not be adequate for some forms of E-payments.
- **Cyber Squatting:** Cyber squatters register provider's domains so on attract their users and enjoy it. This is often a problem that has not been covered within the IT Act, 2000. It's the act of registering a famous domain name and then selling it for a fortune.
- **Languages and Literacy Barriers:** Unfamiliar languages and illiteracy are barriers, In E-banking service English is usually used language. It is difficult in country like India with 1.252 Billion populations only about 79% of literate peoples & most of them in regional language it is also very big barrier.
- **Fraud By Human Resource Of The Bank:** Once you have got the access more information and therefore the information is in hands of an individual we will trust anyone. There are several peoples who use their own way and may cause loss to the customer as well as bank.

6. Literature Review

E-banking is new information technologies merge into traditional banking services. E-banking is a self –service basically by customers , thus far banks, it required less resources and low transaction and production cost.[10,11] Daniel defines that by using various

terminals like mobile , personal computer with browser or digital television we have delivery of bank's information and services to customers.[12]Barron's Dictionary electronic banking is a type of banking by which funds are transferred from one to another by exchanging of electronic channel between financial institution rather than cheque and cash.[13] Rao et.al. had done theoretical analysis of internet banking in India and also compared to abroad bank and found that there is still have a long way to go for the Indian bank for offering online services. [14]

7. Conclusion

We can conclude that in 21st century, life of people has become very fast and banking system being the vital part of economy. Now people don't need to stand in queue in banks, they like doing electronic transactions. E-banking is useful in controlling corruption within the country. Banks are providing E-banking services to customers it should create awareness among people and also made literate to the people about use of E-banking products and services. As we have discussed above our Indian banking system is facing many security issues and challenges. There is also need to aware people about the risk involved in financial transaction through E-banking. People are having unnecessary insecurity in their mind while doing transaction using ATM, internet banking and mobile banking. Steps are being taken by RBI and government but they are not sufficient, we need more improvement. Younger generation is starting to optically the convenience and benefits of E-banking. In years to come, E- banking will not only be customary mode of banking but will be chosen mode of banking.

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Research analysis of social media usage: Assessment of issues pertaining to youth social networking usage and the consequent impact on their social interactions and social behavior

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Abstract

In the era of technology, social networking is at its peak. With emergence of various social networking platforms, addiction has become the main issue of mental health in society. The purpose of the paper is to explore the imposition of the virtual life over the reality. In effect to its users being rendered to extreme level of dependency and obsession over social media. The study mainly researches on the ongoing scenario of the present day involvement in social media world. The notion presented in the paper is based on the comprehensive research and literature review. The aim of the study is to create awareness of illeffects to health because excessive use & to monitor the usage pattern of media to its best possible advantage

Key-Words: Social media, depression, mental health.

1. Introduction

Expanded exponentially. It was predicated by the experts that by 2020 information will be doubled every seventy-three days. Number of platforms have emerged for exchange & sharing of this information known as social media networks. Social media is a common virtual platform for people to interact & build relations across the globe. Social media has played a core role in transforming the lifestyle of people. It has found its way in every aspect by providing an interface for exchange and sharing of the information, ideas, and strategies and much more regardless of age, gender or region. The different networking sites have given a new dimension in the standard of living. While, it cannot be denied that it has provided greater benefits and a wide platform for communication, recent studies have shown that the over-involvement of these social media has caused a severe adverse effect on the mental health & overall personality of the young generation especially teens.

In principle studies showing how youth has engaged these social media sites in their day to day life. Extensive literature available, research & surveys studies the impact of social media on people, especially younger generations. Research shows that the excessive use can lead to dysfunctional motor senses, inability to perform well in academics, poor job performance, and lack of stability in relationships, deprivation & loss of self-worth. The resultant is the withdrawal symptoms, depression and compulsive online addiction (Van den Eijnden et al. 2016). Several surveys were conducted which concluded that social media has greatly overpowered the ability to rule the human daily life. This in short is known as Social media addiction (SMA) which involves the use of media to such extent that there is inability to conduct the daily routine tasks without the interference of social media. Various surveys has been carried out to support the theory of SMA. Like the study of survey among 3000 US students from which 37% twitter 93% used facebook (Dahlstrom, de Boor, Grunwaald, & Vokley, 2011). As of current one third of the world population is involved excessively in social media.

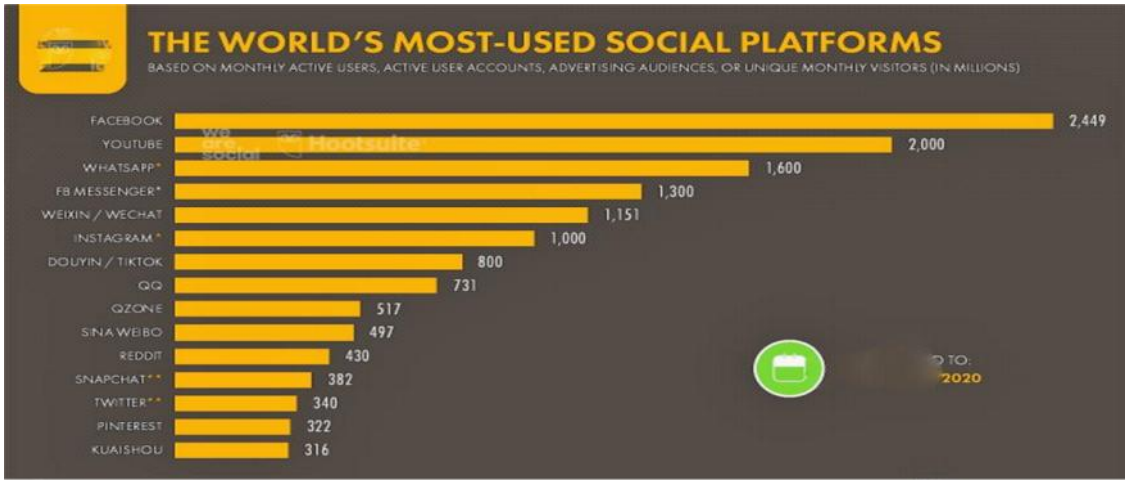
2. Literature

Studies on media activity & its related effect on youth is continuously going but still is less in supply. The present study summarizes the research study to date. Despite of some differences most personality traits. Most of these studies are based on self-reported data and cross-sectional related data sources. The findings, result & discussion are based in on secondary research collected[3] studies show a negative correlation between the time spend on social media and the daily.

Different SM platforms & general statistics of their usage:

- Facebook:2.271 billion users
- Instagram: 1 billion users
- Youtube:1.8 billion users
- WhatsApp:900 million users
- LinkedIn: 562 million users
- Reddit: 542 million users
- Twitter: 326 million users
- Pinterest:200 million users
- Snapchat: 186 million daily users
- Airbnb:150 million users
- Google+:111 million users
- Flickr: 90 million users
- 4Chan: 22 million

Social media usage trend in India:			
Social Networking Sites	Monthly Visits	Mobile Traffic Share	Desktop Traffic share
Facebook	1.6 billion	99.2%	0.75%
Youtube	1.2 billion	59.96%	40.04%
Quora	215.8 million	98.89%	1.11%
Instagram	191.1 million	99.02%	0.98%
Twitter	125.2 million	97.81%	2.19%
Pinterest	49.8 million	98.40%	1.60%
LinkedIn	29.9 million	90.97%	9.03%



3. Toll on mental health due to SM

When the consumption of media exceeds its limit, its results in negative outcomes and addictive behavior. (Griffiths et al. 2016) especially in youth and adolescents. (World Health Organization 2011). Some scholars claimed that communication through these virtual media has become easier for the youth nd individual to engage in unhealthy dysfunctional and addictive social behavior (Kuss and Griffiths 2017). These activities have become excessive resulting delirious behavior. [1]Every year the percentage of SM increases than the year before. As of study in 2017, there is an average increase of 9% use of SM from previous year (from 126 min/day to 135 min /day) (Statista 2017). [2]

Enlisted below are some types of psychological effects due to SM:

- FOMO effect: Also known as fear of missing out is another mental health effect due to social media. Psychology experts explain FOMO effect as a larger issue of inclusion and social standing. The current research shows that 67% have reported their inability to cope up with the society issues. [4]
- Depression because of addiction: Many of us use media platforms like Facebook, Snapchat, Instagram, YouTube to find and connect each other. While it has its benefits it can't replace the real world relationships. The need for approval in society causes constant integrates a different identity than the original one. This has caused as much as 78% depression due to SM. Research on statistics the addiction of depression not only remains till comparison but also leads to ending of life. It requires in person contact to relieve the stress and release hormones which elevate the mood and brings positivity. As these are decrease due to the virtual media world, it has ultimately led to extreme levels of depression. The ability of what to post and not to share has opened gates to create online personas which are nothing like original identity, which ultimately leads to depression. The comparative study of depression in youth within the decade has been found to increase exponentially. [3]
- Frustration and agitation: The need to check every buzz has created a feeling of being constantly agitated, angry and annoyed.
- Decreased learning and research ability: Although online materials gives an ease in knowledge its has greatly decreased the thinking and understanding power .it has greatly reduced the uniqueness and creativity of youth due to over dependence on online information.

- Cyber-bullying: A major subject of issues of online media is cyber bullying. As much as 72% of adolescents have been reported to be cyber-bullied at some point in their life. This is more related to suicide attempts than face to face bullying. As it is online bullying rather than in person the person can't escape the situation. Moreover, it cannot be controlled by the teachers or parents. Ultimately it creates helplessness in victims which more or less lead to suicide. [5]
- Obsession and disconnect from real relations: The researches in the study have observed that the people who are more connected to the online media are less sensitive toward the feelings of the other people around them. Such people are usually self-absorbed which we usually call as Narcissm (JeanM. Twenge, 2013).
- Narcissism usually leads to decreased empathy and concerns among the youth and teenagers. The youths more connected to online share unrequired excessive information which then results in negative outcomes. These often results in disruption in their personnel relationships. The need to connect with the virtual media overcomes with that of real relationships and results in obsessive behavioral patterns. [6]

4. Research analysis on Social Media Addiction

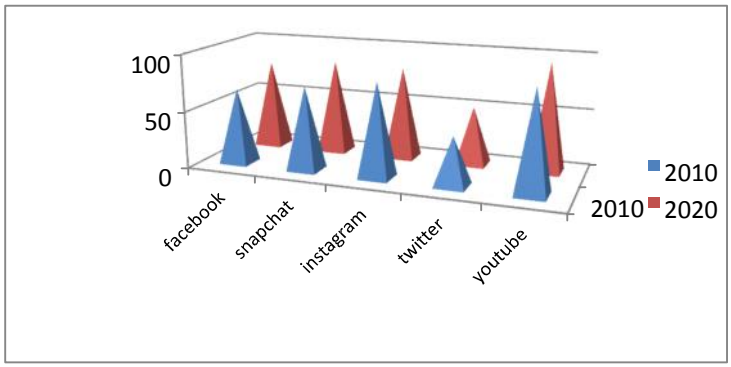
The following analysis was done based on the data collected & evaluated from the different studies, articles, experimental models & research. The different study methods were adapted for understanding the extent of addiction in the society. The prevalence was then suggested at the end of each study or research depending upon the analysis and evaluation of the data collected from theses sample sets.[8]

Research	Study aim	Sample / Set	Design/Method	Addiction Measures	Pervasiveness
Effects of attachment styles, dark triad rejection, sensitivity and relationship satisfaction on social media addiction	To test the direct link of adult insecurity attachment in relationship, rejection sensitivity& dark triad personality with SMA	The data was collected from 237 university students (76 males, 161 female)	Social media addiction scale, relationship assessment scale	Relationship assessment ($r=.13$, $p<.05$). Personality assessment ($r=.23$, $p<.01$)	Preoccupied & fearful attachment was negatively associated
Overall effects on mental health	Positive and negative effects of social media on mental health	Data collected from 350 youths aged between 12-24	Survey method	Self reported questionnaires assessment	87% addicted Inability to focus on academis

Neurological effects of media addiction	Neuroticism and Facebook Addiction:	Original sample of 856 participants (534 females, 322 males)	Demographic questionaire	Pearson's bivariate correlations of the variables and controls	The study concludes that Facebook addiction acts as a significant mediator in the association between neuroticism and negative affect.
Effect on Academic performance	Engagement and Addiction as Predictors of Academic Performance	Total sample =1327 students	Social Media Addiction Scale (SMAS)	Social Media Engagement Questionnaire (SMEQ) with varimax rotation	Results show that the amount of time one spends using social media affects academic performance in a negative way.
Liberatore et al. (2011)	study of prevalence of Internet addiction in adolescents receiving treatment for a diagnosed psychiatric illness	N = 71 adolescent outpatients in Puerto Rico, Latin America (age range = 1317 years)	Cross-sectional pen-and-paper questionnaire	Internet Addiction Test (Young, 1998), scores ≥80/100 indicates addiction	11.6% addicted

Statistical analysis of % addiction

Social Media Platform	% addiction found between 13-24 years old	
	2010	2020
Facebook	66	78
Snapchat	73	83
Instagram	82	81
Twitter	42	51
Youtube	88	95



5. Conclusion

It cannot be denied that social networking sites have provided immense benefits in information sharing and learning. While access to different perspectives and diverse source of information is paramount to any independent democratic society, it cannot help people in grasping & understanding the knowledge. The challenge of the current digital media is not how to create the information but how-to sort, manage, enhance & use in proper way. The study mainly focuses on social media usage and its effects on behavior on social life. The data collected & evaluated, the result concludes that their direct relationship between the usage of the social media and development of addiction. The social media addiction has a significant effect on the personality of the individual and greatly interferes with the day to day tasks involved. The objective of the study is to understand and help in further expanding and enhancing the ongoing research studies on the effects on mental health due to social media.

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AI With and Without Implementation of Theory of Mind: Overview, Need, Vice and Virtues

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Abstract

Quoting the honorable 17th-century German mathematician and philosopher Gottfried Wilhelm Leibniz who wrote, "If you could blow the brain up to the size of a mill and walk about inside, you would not find consciousness." Which actually reflect the fact of nature that consciousness lacks the clarity which makes it even tougher of a task to implement it to AI.

Being able to detect others' minds is a very critical attribute to human cognition and social interaction; perhaps it allows us as humans to build and maintain relationships with others, communicate efficiently and effectively, and work cooperatively as a team to achieve common desired goals. In fact, several researches suggest possessing a sophisticated theory of mind might be a major reason for humans to have cognitive skills that appears to be infinitely moreover powerful than those of our genetically similar species and our primate relatives.

Key-Words: AI (Artificial Intelligence), Theory of mind, consciousness, True AI, Cognitive AI, Narrow AI, Catastrophic forgetting, Catastrophic Failure, Synaptic consolidation, Elastic weight consolidation, Humanoids.

1. Introduction

The term theory of mind refers to the ability to attribute mental states such as beliefs, desires, goals, and intentions to others, and it helps to understand that all these states are different from one's own. An AI equipped with a theory of mind would recognize itself as a conscious agent with a mental world within and recognize you the very same with a mental world of your own, rather than just something completely mechanistic and inanimate.

Being able to detect others' minds is a very critical attribute to human cognition and social interaction; perhaps it allows us as humans to build and maintain relationships with others, communicate efficiently and effectively, and work cooperatively as a team to achieve common desired goals. In fact, several researches suggest possessing a sophisticated theory of mind might be a major reason for humans to have cognitive skills that appears to be infinitely moreover powerful than those of our genetically similar species and our primate relatives. Theory of mind is so far important that if it is disrupted, as we witness in some cases of autism, it cost abilities covering essential mental functioning such as language learning and imagination and more.

2. AI with and without implementation of Theory of Mind: overview, need, vice and virtues

Theory of mind is the ability of living entities that produce attribute mental states such as beliefs, intents, desires, emotions to oneself and others and knowledge among other's goals and intentions to others, and to understand that these states are different from one's own. consciousness to oneself and to others.

A theory of mind makes it possible to understand emotions, infer intentions, and predict behavior.

It is referred as theory due to the absence of solid evidence About a person going through the process of thinking. there's nothing about a person that shows they're thinking, thoughts are hidden, we cannot see it. Being able to be aware of minds around us comes so effortlessly for humans as natural phenomenon, but it is not so an easy task to implement for a computer as human mind could not be observed directly and we could say, objectively, it's invisible. There's only a way to explain the phenomenon of thinking and it is that we can imagine the very same implications are applying to others who have very same attribute which we refer to as a term thinking which therefore produces state of mind in different spectrums known to be thoughts. Henceforth for other individuals, their thoughts cause behavior as very similar to ones themselves.

Perhaps as the implementation of imagination that people have thoughts that make them do what they do, cannot be trade for substantiation, hence theory of mind is still a theory as this moment in the wide spectrum of time realm.

In terms of support to the existence of theory of mind what stands is the fact insofar that the output such as thoughts and feelings of the mind is only can be directly observed and so the existence of a mind is inferred.

The presumption that others have a mind along with the all attributes, state of mind one beholds is termed a theory of mind because each human can only intuit the existence of their own mind through introspection and self-consciousness, and no individual can possess the direct access to the mind of another individual so its existence and how it works can only be inferred from observations of others with the insight of one's own blueprint of the whole idea. It is very assumed that others have minds analogous to one's own, and this assumption is very much based on the reciprocal social interaction, as observed in joint attention and the functional use of language, and the understanding of others' emotions and actions via certain ways.

Having theory of mind allows intent certainty and understand one's intentions to others and very much same those of other's .and to predict or explain their own actions and those of others, and to posit their intentions. And as so far originally defined, it enables one to understand that mental states can\could be the cause of — and thus can also be used to explain and make prediction of — the behaviour of others.

Therefore, the implementation of theory of mind could be the greatest evaluation in AI for all possible times. As it could enable the consciousness in the AI and would make the AI to reach whole another level of self-learning phenomenon. As forth theory of mind is not something, we Humans are born with in us but in fact it has to be learned over time. And this is the sole hope that started the journey of its implementation in today's AI.

It is firmly believed that of the existence of mainly two types of AI which is termed as below.

- Cognitive AI.
- Narrow AI.

Narrow AI refers the kind of idea behind the AI we have in these present days. While as the cognitive AI is the next believed advancement in AI. Which believed to be possessing the thought processing phenomenon and understanding of emotions, infer intentions, and behavior prediction along with the consciousness, very similar to the humans.

It can be also referred as True AI or general AI.

Cognitive AI is supposed to stand Around the pillar of How human mind actually works and so far, as for the narrow AI, it is almost completely built around the goal how to build the better data processing. This implements human Mind vs pattern recognition idea-based AI, in which self-learning is based on machine learning principals, seek to complete task by pattern recognition and filtering and simplification of complex problems.

But human mind does not filter out element out of an object to be processed in order to do a certain task. We as humans do not filter objects layer by layer in order to recognize it.

Human minds are not classifiers; they are indeed simulators and experiences whereas modern-day AI is quite vice versa.

AI are meant to evolve around a specific pre provided goal but human mind is Not just goal directed systems but also goal findings systems itself. Stimulus to a human mind is in form of pain and pleasure, where pain is considered to be the negative response to stop the current task and Pleasure is supposed to be the positive response to keep doing the current task, we humans indeed do have more complicated stimuli system than just of two variables of responses. AI is as its name suggest artificial whereas pain and pleasure are real valued feelings in context, of which to be aware of it takes theory of mind which further includes consciousness.

By defining true AI it's meant the goal to build a system that can have many sub systems units communicating with each other with Synchronized units of all the sub-systems without any explicit instructor, similar to the inter communication of human neurons. To collect experiences and integrate the outcomes of those experiences in order to predict behaviour of oneself and others. Which is firmest only possible with the theory of mind.

Humans apply high level concepts which are usually learn or gain from the day-to-day life to understand certain stuff or tackle a particular problem. Whereas the AI is bounded to learn via machine learning experiences that enable it to learn concepts within the range of the recent previous experience it had in a limited environment that was meant for that particular conceptual task only. As for AI is reduces the learning spectrum for AI which is a huge fallback.

In either words AI yet cannot generalize the knowledge out of the real time environment as it has no life which leads to no life experiences. Or we can say it lacks what we call as Common sense.

Another major drawback is in the process of learning to manage a task by its own the neural network insides of the AI get saturated with the knowledge of managing that one very particular part getting better. in maximizing the reward output in time via multiple over and over trials. But the same AI Agent shows difficulties to solve other problems after learning to manage the particular task with the saturated neuron system. While a human being has limitless capacity of leaning new concepts without the removal of older ones. This phenomenon of over writing the new learning over the older one is now coined as Catastrophic forgetting of AI neural network. which leads to Catastrophic failure resulting in losing all the learned knowledge ultimately. But this can be overcome by implementing the equivalent phenomenon as per Synaptic consolidation for human mind, which meant the protection of neural connection that forms over the learning of a skill known as Elastic weight consolidations in AI. And provides Persist memory over time.

AI does not have a concept of things for what they actually are. instead, it considers things\entities to be just a collection of lines, points, texture, bytes or other form of digital data.

AI does what we ask it to do but might not be able to do what we wanted it to do exactly. Which means that AI could not figure out the intention behind the given task so might not be able to provide the desired outputs or ideal solutions.

In other words, AI could misinterpret the instruction and/or take instructions too seriously or too literally, leading to failure. As it implies AI have no Common sense.

AI don't have concepts neither the idea of consequences of the actions.

Simply AI does not understand it obeys.

3. Conclusion

Implementation of theory of mind is the firmest only way to create true AI. Unless the theory of mind is implemented AI would no be able to gain consciousness. the current challenges under Catastrophic forgetting could be overcome by implementation of Elastic weight consolidations and the present goal in advancement of AI is to make system that might be humanoids which are complex robots possessing AI nearest to the intuit human mind. Which means to create an AI that only take a real-life problem as its input and figure out the goal by itself and also the way how to reach that goal via trial and error resulting in success.

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Automated Robotic Hand with Memory

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Abstract

Today, technology is developing in the same direction in line with rapidly increasing human needs. The work done to meet these needs makes life easier every day, and these studies are concentrated in automated hand with memory studies. Automated hand with memory work with an outside user or by performing predetermined commands. Nowadays, the most developed field of automated hand with memory in every field is the industry and medicine sector.

Key-Words: Automated hand with memory, IOT

1. Introduction

In the project, researchers have been done and implemented in order to have knowledge about mechanics and software during the operations carried out by the automated hand with memory which is designed to fulfill the tasks determined in accordance with predetermined commands. First, it was determined what function the automated hand with memory would be and what movements it could make. Automated hand with memory made of predetermined commands; it can carry the desired material, mix it up and perform the commands previously determined by a user.

2. The problem

In previous days, Congestion is one of the most prevalent transport problems in large urban agglomerations, usually above a threshold of about 1 million inhabitants. By the 21st century, drivers would spend about 3 times more time in congestion as they did in the later part of the 20th century. Congestion is particularly linked with motorization and the diffusion of the automobile, which has increased the demand for transport infrastructures. However, the supply of infrastructures has often not been able to keep up with the growth of mobility. Since vehicles spend the majority of the time parked, motorization has expanded the demand for parking space, which has created space consumption problems particularly in central areas; the spatial imprint of parked vehicles is significant. Identifying the true cause of congestion is a strategic issue for urban planning since congestion is commonly the outcome of specific circumstances such as the lack of parking or poorly synchronized traffic signals.

3. Solution to the problem

The garbage management in cities has to be effectively and efficiently implemented. The various proposals were put forward and some of them already implemented. But it cannot be considered as an effective one. So, a survey was done among different proposals and this survey paper includes survey among different methods for smart garbage management in cities using IoT. That is, we can solve this problem by using automated hand with memory.

4. Invoice generator

We'll continue the subtle elements of invoice administration, with the goal that we'll organize information in one table arrangement.

4.1 Print invoice- The printing module can print out the planning of the invoice. It's often changed over into a PDF design and produced the invoice for the client.

5. Objectives

- To Developing and implementing automated traffic data collection methodologies,
- To Developing a national STS data archive,
- To Developing models and algorithms suitable for STS implementations

6. Methodology

Safety stock inventory management could also be an extra inventory being ordered beyond expected demand [20]. This system is employed to stop stock outs typically caused by incorrect forecasting or unforeseen changes in customer demand. Specifically, looks into were directed to the tiny degree to research about stock administration in development ventures. This causes an impression on the execution of the stock administration. To yield a coveted execution, it's vital to form sure the task work successfully. Demand forecasting should become a documented inventory management technique for retailers. Demand forecasting is predicated on historical sales data to formulate an estimate of the expected forecast of customer demand. Essentially, it's an estimate of the products and services a corporation expects customers to urge within absolutely the better of the day.

7. Scope of the Project

The scope of inventory management concerns the balance between replenishment interval, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space, quality management, replenishment, returns, and defective goods, and demand forecasting. Inventory management involves a retailer seeking to accumulate and maintain an accurate merchandise assortment while ordering, shipping, handling, and related costs are kept in restraint. This is often able to include the monitoring of fabric moved into and out of stockroom locations and thus the reconciling of the inventory balances.

8. Application

The procedure of stock proportionality is most fitting for inventories that stay inconspicuous by the purchaser, instead of "keep full" frameworks where a retail customer might want to work out full retires of the item they're purchasing so on not think they're purchasing something old, undesirable or stale; and separated from the "trigger point" frameworks where the item is reordered when it hits a selected level; stock proportionality is employed viably by without a flash to spare assembling procedures and retail applications where the item is escaped see.

9. Conclusion

Robotic arms, many areas are developable. Thanks to the robotic arms, many tasks are made easier and the resulting error level has been reduced to a minimum. For example; some pharmacy-based drug-giving robots and a projected robot arm have been developed. In addition to this, the ability to move the robot arm is further increased, and when the camera is placed in the finger area and the sensitivity is increased, it can be used in a wide range of applications from the medical sector to the automation systems. Despite the fact that the robotic arm made by this project is of prototype quality, it has a quality that can be improved

for more robotic systems. Besides these, robotic arm sector, which is open to development, will keep its importance in the future. The purpose of the project is to provide control of 4 axes moving robot arm design and this robot arm with a suitable microcontroller and Bluetooth module with android application. The necessary theoretical and practical information for this purpose has been obtained and the necessary infrastructure has been established for the project. During the process of making and developing the project, a lot of theoretical knowledge has been transferred to the practice and it has been ensured that it is suitable for the purpose of the project.

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A voice-based prescription generating system

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Abstract

In this paper, we propose a system that automates the way of prescribing, the utilization of such a system would eliminate the event of prescription errors since the handwritten work is removed from the prescription process. This will change the medical care system as it allows storing and processing medical records digitally. There won't be any need to convey paper prescriptions on returning to doctors. The system will allow a patient to share previous prescription records with other physicians. Patient's personal medical records will be stored in consideration with HIPAA laws. There is no need for proper infrastructure, a smartphone is sufficient for working the entire system. The proposed system is centered around those little clinics that are yet using manually written prescriptions. The system comprises multiple technologies working together i.e., Django framework, Vue.js, and leading speech-to-text APIs like Google speech-to-text, Dragon Natural Speaking, Sphinx4, and Kaldi to get accurate voice input from the doctor Comprises.

2. Keywords: Drugs, Electronic prescription, Machine Learning, Natural Language Processing, Prescription errors, Speech to text.

3. Introduction

A significant problem in India is that generally prescriptions are still written by hand and the clarity of such handwritten prescriptions is extremely limited. Misinterpretation of prescription has caused an alarming number of deaths. For example, "3\5" in a doctor's handwriting may be interpreted as "8" at the chemist's end.

Smartphones have decently infiltrated the Indian market, so smartphone-based electronic prescription utilizing Speech to Text will be available and savvy for each doctor as voice is as yet the most helpful and regular method of conveying between human to human to PC. With versatile voice advances clinical professionals can in a flash refresh and recover quiet records inside the system. This guarantees that the patient's clinical records are consistently current. Doctors with exceptional data are probably going to settle on better medicine choices. Aside from improving the nature of patient consideration, the appropriation of voice-based applications could dispense with excess desk work, and furthermore, encourage the more productive and successful conveyance of patient consideration. A voice-based application could plan the usefulness that naturally alarms, the doctor if the drug recommended will respond unfavorably with other medications.

The goal of this paper is to build up a voice-based prescription application that offers an elective e-health platform to supplement the current portable medical services conveyance system.

4. Literature Survey

There are a couple of systems in the Indian market that offers an approach to digitize the prescriptions. Some of them are described in this section.

Prescript is an application that keeps up understanding records and lets doctors print the prescription in short order [1]. The application will automatically generate the prescription, and it shows signs of improvement with use. It predicts the drugs based on finding by the doctor. The application permits doctors to make prescriptions easily, they simply need to include the diagnosis.

IRX Clinics a clinic management suite created by Trata E Systems. It incorporates a smart pen, prescription pad, and a tablet [2]. The smart pen and prescription pad work in a joint effort to spare the information carefully. The tablet is preloaded with the clinic management suite which can be utilized to oversee prescription, arrangements, and analysis. The framework permits doctors to keep writing prescriptions by hand and consequently catch the information out of sight.

SlashDr a virtual doctor aide [3], allows doctors to choose the symptoms diagnosed and the system will automatically produce the prescription. The system produces the Medical Council of India Compliant prescription.

Prescription pad is generally utilized for writing medical applications [4]. It's a Safe, first-rate, idiot-proof prescription writing, and also gives a relative investigation of a patient's clinical history.

5. Proposed Solution

As mentioned earlier misinterpretation in prescriptions due to unintelligible handwriting causing an alarming number of deaths and fatal injuries. The proposed system eliminates these issues, a doctor would be able to dictate the prescription to the patient while talking to the phone or PC.

Patient's detail: When the patient shows up the receptionist will book a consultation for the patient and gather the details (as he/she can also access the system) i.e., name, age, and number to let the patient in as soon as the doctor rang the bell. After having sufficient face time and diagnosing the health issues/disease the doctor will invoke the program on a single click/voice command. Once the program is invoked it will start listening so the doctor can dictate the prescription i.e., symptoms, drugs, notes, etc.

Yet, imagine a scenario where the receptionist is off the clock. Who will gather the subtleties? Try not to stress the authors have planned to overcome this problem as well! Just on the off chance that the doctor should provide the details all by himself as he can access the system entirely.

Focused learning: In India, there are plenty of languages spoken in different regions, as language varies so the names. When it comes to recognizing Indian names, it is not an easy task, the proposed system is capable of recognizing Indian names with ease. The program will use speech-to-text APIs trained over Indian names (example: Dragon Natural Speaking). Even if the model is below some threshold surety on a particular word, it will highlight that word so the user can validate it. The most common examples are names having similar pronunciation, for example, ‘Siddhant’ may be recognized as Siddharth’ as shown in figure 2. Compatible with medicine names as the program will use leading speech-to-text APIs for medical domains like Sphinx4. The program will consist of the most accurate database related to medicines as it directly accesses the “National List of Essential Medicines” which is provided by the government itself.

Privacy and Security: Privacy refers to the right of an individual to keep a patient’s health information private. The duty of anyone entrusted in the health information to keep that information private is confidentiality. Health issues are the confidential type of data that must not be disclosed. The program will store the medical records i.e. Electronic Health Record

(EHR) into consideration with HIPAA (Health Insurance Portability and Accountability Act) laws.

Permission: The doctor and patient can create, read, write, and update the prescription. Only owner patients of the prescription are allowed the read and update operation.

The doctor can allow several other physicians' prescription privileges to avoid the adverse effect, this functionality automatically alerts the physician if the medication prescribed, will react adversely with other medications. For example, if a patient is consulting a dermatologist and a gynecologist their medications should not affect the patient, unfortunately. Also, the other doctor can update the prescription if necessary.

Prescription generation: After the doctor's validation, one last click/voice command will allow the doctor to send the prescription and the patient will be provided by an SMS/WhatsApp/Email link to access the prescription (.pdf file) along with the chemist, the prescription will be automatically signed by the doctor via a digital signature. For patients who do not have a smartphone, the program will generate a printout as an alternative solution.

Medicine provider: The pharmacist will enter the patient ID provided by the program and give medicines as stated in the prescription that appeared in figure 5. Also, the pharmacist can directly provide the medicine by just viewing the prescription in the patient's smartphone/generated printout in case of any emergency as he can update the record afterward. The chemist can transmit the prescription back to the doctor for confirmation or review.

6. System Architecture

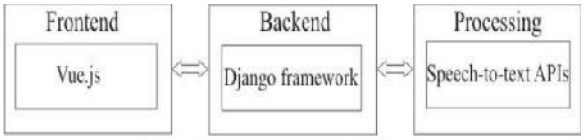

Fig (1) System architecture

Backend: The system uses Django at the backend, the most popular Python Web framework that encourages rapid development and clean pragmatic design. Python works on any platform and is also open source and remains scalable for further development. As it consists of a set of components, it provides a standard way to develop websites fast and easily. Also, Django offers extraordinary compared to other security levels of the as of now accessible frameworks, guaranteeing that your project remains careful.

Processing: The system is composed of multiple speech-to-text engines i.e., Google speech-to-text API, Dragon Natural Speaking, Sphinx4, and, Kaldi. A speech recognition software is a program that is trained to take input of human speech, interpret it, and transcribe it into text. Speech recognition software works by breaking down the audio of a speech recording into individual sounds, analysing each sound, using algorithms to find the most probable word fit in that language, and transcribing those sounds into text. Speech recognition software uses natural language processing (NLP) and deep learning neural networks.

Frontend: Frontend plays a major role in engaging the users and encouraging them to take action. If the application frontend works seamlessly, users would love to use it and recommend it to others. The system utilizes Vue.js at the frontend, a JavaScript library for developing distinct web interfaces. Its core library focuses on the view layer only. In this manner, you can helpfully incorporate it with different libraries and devices to accomplish wanted yields. Additionally, it is fit for driving Single Page Applications when you blend it with different apparatuses and libraries. Database: The database utilized is MySQL. MySQL

is a server-side application used for database ready to complete an incredible number of SQL commands [5]. It stores data about patient's details and dictated prescription.

7. Speech Processing

The program will collect a set of strings in the form of speech dictated by the doctor using different speech-to-text APIs, once the strings are collected the next step is to arrange them. Every single string will be compared with the strings already stored in the database, after comparison, the program will categorize those strings and place them in their respective locations in the form of rows and columns which is most often known as tabular form as shown in fig 1.3. Tabular format stores the data entities at the exact location, for example, drug name, strength, instruction, frequency, and its duration will be stored systematically. Voice commands are served from offline and online speech-to-text APIs using random forest model which combines multiple speech-to-text APIs. The last step is to generate the prescription which is done by a single click/voice command. The program is capable of automatically learning and improving from past experiences without being explicitly programmed.

8. Result analysis

The proposed and actualized system has mainly two points of interest over any existing electronic prescription generating system i.e. time and cost. In the proposed system just open-source innovation is used and the interface is accessible as a portable application. In this way, the total system's successful cost is less and the ease of use is more. There is no necessity of a legitimate foundation, a smartphone is adequate for working the entire system. It is focused on those little clinics that are yet utilizing handwritten prescriptions. The proposed system is contrasted with the current EHR frameworks that utilization manual contributions from an individual to make understanding records. This system uses discourse contribution to fill all the fields of a prescription, also it allows the doctor to speak all at once as shown in figure 1. Along these lines, the measure of time expended for making a prescription is less in the proposed system than by utilizing manual information or field by field voice contribution on a portable application utilizing voice input console.

Fig (2) Dictating doctor

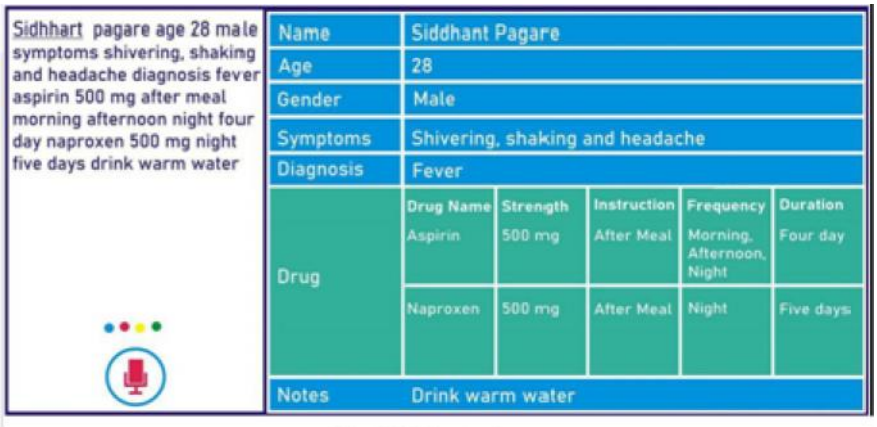

Fig (3) Doctor's screen

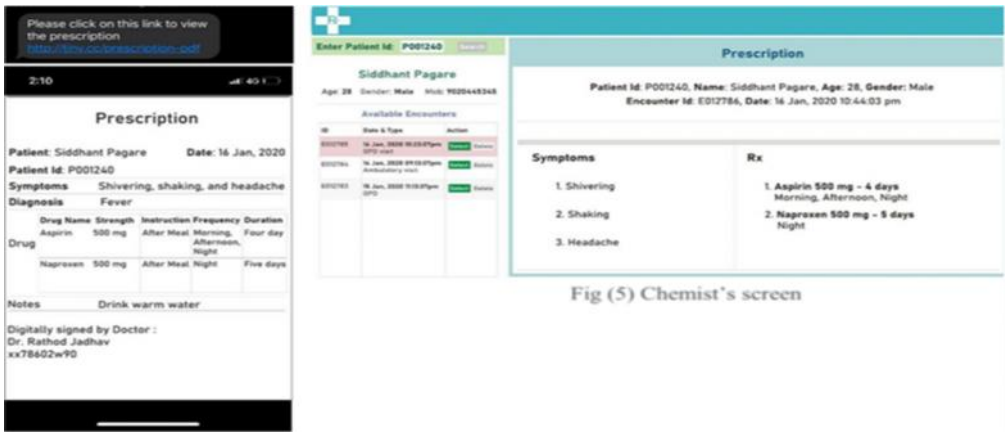

Fig (5) Chemist's screen

9. Conclusion

The proposed and actualized system plans to diminish the measure of time devoured in making and getting to persistent records. It likewise gives the highlights of an EHR in a Mobile Application. Along these lines, making this system accessible to all the doctors of India through their smartphones. Writers actualized an inventive answer to take care of the issue of obscured transcribed prescriptions. Voice-based e-medicine needs an insignificant change in the work process of a specialist yet over the long haul, it will make a tremendous effect in building up an advanced environment for patients. Also, this system helps in overseeing EHR progressively while keeping up the patient's security.

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Autonomous Space Robots

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Abstract

For space exploration, it's difficult for astronauts to carry out tasks that are too dangerous, to difficult, repetitive, time-consuming, or even impossible for astronauts.

Future space research missions require complex vehicles, robotic assistants, and independent spacecraft systems that adapt to complex and rapidly changing environments.

What types are robots needed to a space mission? What are the advantages of sending robots in place of astronauts?

This paper provides an overview of space robotics as a rapidly emerging field, covering basic concepts and evolution.

1. Introduction

Autonomy is the ability to make your own decisions. Autonomous robots are just like humans, they also can make their own decisions and then perform an action accordingly.

An autonomous robot is a robot that performs behaviour or tasks without external influence.

Autonomous robotics is usually considered to be a subfield of artificial intelligence, robotics, and information engineering.

Autonomous robots are particularly desirable in fields such as spaceflight, household maintenance (such as cleaning), wastewater treatment, and delivering goods and services.

One important area of robotics research is to enable the robot to cope with its environment whether this is on land, underwater, in the air, underground, or space.

Autobots are able to Understand human tendency in which they can easily adapt themselves without human assistance.

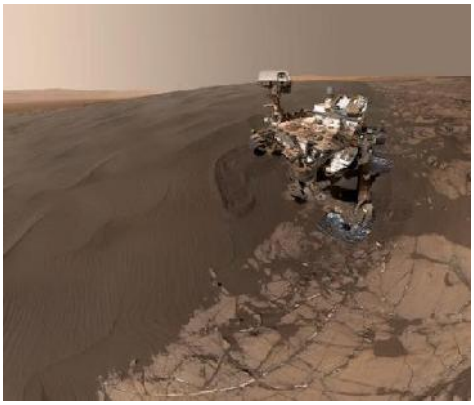
Avoid situations that are harmful to people, property, or itself unless those are part of its design specifications.

It may also learn or gain new knowledge like adjusting for new methods of accomplishing its tasks or adapting to changing surroundings.

Robots and robotic devices used to aid, augment, or substitute for astronauts in order to do difficult or rote tasks such as repairs in dangerous environments (such as those with radiation or micrometeorite risks), routine procedures (video capture), etc.

Space robotics plays a critical role in the current and future space exploration missions, and enables mission-defined machines that are capable of surviving in the space environment, and performing exploration, assembly, construction, maintenance, or servicing tasks. Modern space robotics represents a multi-disciplinary emerging field that builds on as well as contributes to knowledge of the space engineering, terrestrial robotics, and computer science as well as related specialties such as materials and mechanisms.

Space Robotics is important to human's overall ability to explore or operate in space, by providing greater access beyond human spaceflight limitations in the harsh environment of space and by providing greater operational handling that extends astronauts' capabilities. Autonomous systems are capable of reducing the cognitive load on humans given the abundance of information that has to be reasoned upon in a timely fashion, hence are critical for 2 improving human and systems' safety.



The Curiosity rover takes a self-portrait on a Martian sand dune.

We can send robots to explore space without having to worry so much about their safety. Of course, we want these carefully built robots to last. We need them to stick around long enough to investigate and send us information about their destinations. But even if a robotic mission fails, the humans involved with the mission stay safe.

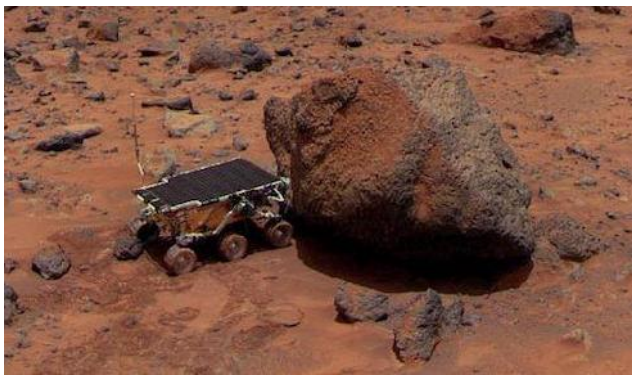
Sending a robot to space is also much cheaper than sending a human. Robots don't need to eat or sleep or go to the bathroom. They can survive in space for many years and can be left out there—no need for a return trip!

Plus, robots can do lots of things that humans can't. Some can withstand harsh conditions, like extreme temperatures or high levels of radiation. Robots can also be built to do things that would be too risky or impossible for astronauts.

NASA Official: Kristen Erickson, Program Manager: Heather Doyle.

2. Some of the experiments by NASA.

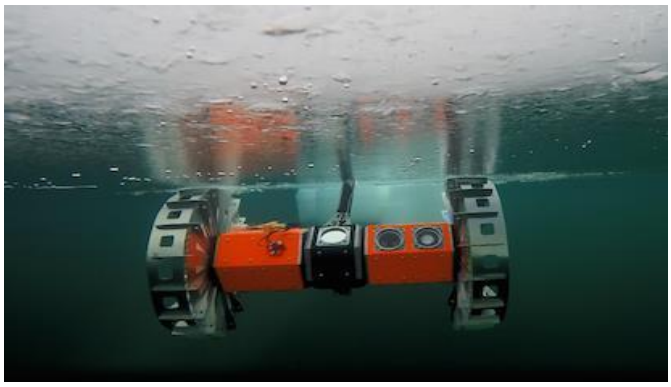
You've probably heard of some of NASA's robots: The Mars rovers like Curiosity and Spirit and Opportunity. But those are just a few of the most famous robots. NASA engineers are working on new robots all the time.



NASA has been investigating Mars with rovers since the Pathfinder mission landed in 1997 and deployed a small rover called Sojourner.

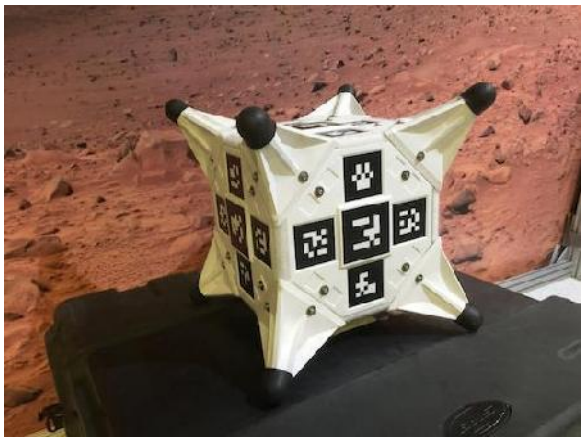
Puffer, short for Pop-Up Flat Folding Explorer Rover. The inspiration for this lightweight, two-wheeled adventurer came from origami designs. The robot can flatten itself out and duck down to investigate tight spots.

Then there's BRUIE, the Buoyant Rover for Under-Ice Exploration. This robot can float in the water and roll its wheels along the underside of an icy surface, all while taking pictures and collecting data. Scientists hope to someday use a robot like this to search for signs of life on icy bodies elsewhere in the solar system. For example, the underground oceans of Jupiter's moon Europa or Saturn's moon Enceladus.



The BRUIE robot rolls its wheels on the underside of an icy surface.

Are all of NASA's robot rovers? Certainly not! Take a look at this robot, called Hedgehog. This spiky cube of a robot is being developed by NASA with Stanford University and MIT. Hedgehog is designed to explore small bodies, such as asteroids or comets. These have very little gravity and extremely rough terrain. Instead of rolling, Hedgehog hops and tumbles. What if it lands upside-down? No big deal. It can operate on any of its sides. It could even get itself out of a deep crater using a tornado-like manoeuvre that launches the robot into the air.



The spiky, cube-like Hedgehog robot.

- NASA Official: Kristen Erickson 2017

3. The Approach

A big advantage of space robots is that they need neither food nor drink and can support very inhospitable conditions. More important still, although expensive to design and produce, their loss is always preferable.

What is a space robot? In the space community, any unmanned spacecraft can be called a robotic spacecraft. "The objective of space robots is basically to act as space such as position an instrument to take a measurement, collect a sample for examination, assemble a structure, or even move around an astronaut."

Types of robots the most conventional robot used in space missions is the rover.

ROVER: This vehicle can move around the surface of another planet transporting scientific instruments. both the vehicle and the instruments are operated autonomously.

ESA, in collaboration with the European industry, has developed the incredibly small micro-rover Nanokhod.it can transport and position 1 kg of instruments within a short radius of a small lander. A larger robot that collects soil samples from other planets. The 12 kg MIRO-2 mini-rover carries a robotic drill that can collect up to 10 samples from a maximum depth of 2 m. It then returns to the lander where the samples can be analysed by the scientific instruments on board.

A third mini-rover being developed by ESA is the fully solar-powered 15 kg Solero mini-rover that uses miniature batteries to store electricity on board.

Another example is the EUROBOT. This robot, which is as large as a human, is designed to carry out astronaut's tasks on the International Space Station. EUROBOT will be able to climb the outside of a space station, attach itself to the handrails just like an astronaut.

"In space, it is even more attractive to use robots," he emphasizes. "They can support or replace people to carry out tasks that are too dangerous, too difficult, repetitive, time consuming or even impossible for astronauts. They can also be faster and more precise than people."

Jokingly he adds, "plus they can operate around the clock and do not need to break for lunch or sleep".

What is a space robot? In the space community, any unmanned spacecraft can be called a robotic spacecraft, but Visentin prefers a more specific description: "a system having mobility and the ability to manipulate objects plus the flexibility to perform any combination of these tasks autonomously or by remote control". "The objective of space robots is basically to perform an action in space such as position an instrument to take a measurement, collect a sample for examination, assemble a structure or even move around an astronaut."

In some ways space robots are no different than their siblings on Earth – they basically replace a human performing an action.

However, those for space do have some special requirements as they have to:

*withstand a launch * operate under difficult environmental conditions often in remote locations * weigh as little as possible as any mass is expensive to launch * use little power and have a long operational life * operate autonomously * be extremely reliable

To respond to these constraints advanced and innovative technologies are needed, as well as very complex systems. Says Visentin, "this sounds like a lot of trouble, but space also provides great opportunities for creating robots that could not be made for use on Earth."

"The most advantageous opportunity is the almost zero gravity in outer space. This means that everything weighs much less than on Earth and even the heaviest object can be moved and raised with little effort, so a small robot can move huge objects."

Types of robots the most conventional robot used in space missions is the rover. This vehicle can move around the surface of another planet transporting scientific instruments. Usually both the vehicle and the instruments are operated autonomously.

ESA, in collaboration with European industry, has developed the incredibly small micro-rover Nanokhod. Although only the size of a large book and weighing just 2 kg it can transport and position 1 kg of instruments within a short radius of a small lander. A larger robot has been developed to collect soil samples from other planets. The 12 kg MIRO-2 mini-

rover carries a robotic drill that can collect up to 10 samples from a maximum depth of 2 m. It then returns to the lander where the samples can be analyzed by the scientific instruments on board.

A third mini-rover being developed by ESA is the fully solar powered 15 kg Solero mini-rover that uses miniature batteries to store electricity on board. This also has an innovative chassis. Its six wheels arranged on the vertices of a hexagon enable it to operate in very rough terrain.

Learning from nature Robot designers often use nature for inspiration. One good example is the impressive Aramies/Scorpion robot under development by ESA. With its eight legs and motion inspired by the animal world it can operate in very rugged terrain and on dunes.

Another example is the EUROBOT. This robot, which is as large as a human, is designed to carry out astronaut's tasks on the International Space Station. EUROBOT will be able to climb the outside of a space station, attach itself to the handrails just like an astronaut and be tele-operated by the crew inside.

Nature also inspired the hopping robot. Even if less than 40 cm high it can leap over obstacles up to a couple of meters high, a feat that is impossible on Earth with its force of gravity but fairly easy to accomplish on the Moon or Mars. Visentin emphasises that ESA's research focuses on space-specific issues that are not interesting or profitable for terrestrial use and does not duplicate what is already available.

"Whenever possible we re-use robotics technology used for applications on Earth, but some of the operations needed for space exploration are of no use on Earth. For instance, nobody would want to make a robotic field biologist to explore the Earth, as even with the most advanced technology the result would always be far inferior to a real biologist, at least today. On Mars, however, a robot is the only option at present."

The constraints of space pose many constraints not faced by robots for use on Earth. The very low-pressure in orbit causes metal parts to cold-weld together, atomic oxygen to react with almost any material and nullifies the cooling benefits of convection for electronics.

Radiation also differs from that encountered on Earth and in space, heavy particles make digital electronics misbehave or even burn. Thermal conditions are also extreme, with external temperatures ranging from plus or minus more than a hundred degrees centigrade.

Another characteristic of space mission is that robots have to operate far away from their home base. Radio signals to control and monitor them have to travel for a long time and this introduces communications delays prohibiting real-time or near-real-time tele-operation, therefore space robots must be able to operate on their own and handle any problems that occur while carrying out their tasks.

All these are problems that ESA's space engineers have learnt to cope with. Qualified design techniques, materials, hardware and electronics components are specifically designed to work reliably despite these effects.

"We are continuing to do research into new types of robots which can cope with the special conditions in space, go where humans cannot and help astronauts manage the huge amount of work on the International Space Station," says Visentin.

Notes for editors:

'ASTRA 2004' – The 8th ESA Workshop on Advanced Space Technologies for Robotics and Automation, was held in ESTEC, the Agency's technology and research Centre in Noordwijk, the Netherlands, 2-4 November 2004. ASTRA 2004 builds on the tradition of the previous

seven ASTRA Workshops. It is a forum for information exchange and discussion of the European Space Automation and Robotics (A&R) community.

This is the first in a series of articles presenting the Agency's and European industry's effort in robotics technology for space programmers.

4. Recent Events

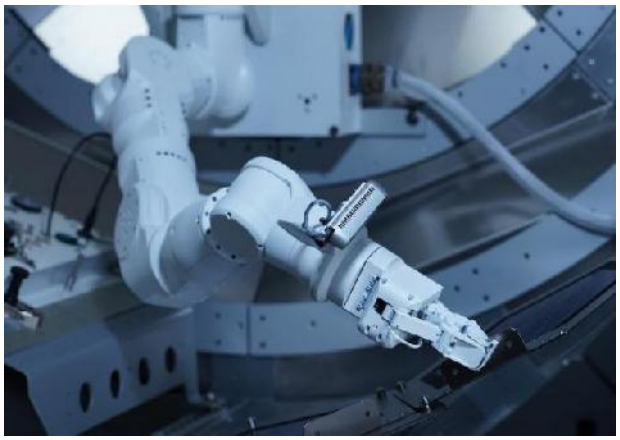
1. GITAI Sending Autonomous Robot to Space Station

The robotics start-up will be launching into space next year an advanced manipulator with integrated sensing and computing

By Evan Ackerman: -

GITAI are now designing robots that can work in space.

GITAI has recently announced the next step in this effort: - The deployment of one of their robots onboard the International Space Station in 2021.



GITAI’s S1 is a task-specific 8-degrees-of-freedom arm with an integrated sensing and computing system and 1-meter reach, which is controlled through an immersive telepresence system will be launching into space next year.

CMU’s Moon Ranger robot rover will be the first to search for water ice on the moon in 2022

Carnegie Mellon University and spin-off space start-up Astrobotic is developing a robotic rover to look for water on the moon, putting it one step closer to its inaugural mission planned for 2022. Moon Ranger is aiming to be the first robotic detective to investigate whether buried ice is present in sufficient quantities to be useful to future lunar explorers.

NASA details Artemis program plan to land on the Moon in 2024

Berlin, 22 September 2020. – NASA has revealed details of its accelerated Artemis mission plan to land humans on the Moon in 2024, more than 50 years after the last Apollo lunar mission in 1972.

NASA aims for a first unmanned mission, Artemis I, in 2021, following the completion of the Orion spacecraft and the final rocket tests. “The first mission – known as Artemis I – is on track for 2021 without astronauts, and Artemis II will fly with the crew in 2023,” NASA said.

Moon Ranger will search for water at moon's south pole

Moon Ranger, a small robotic rover being developed by Carnegie Mellon University and its spinoff Astrobotic, has completed its preliminary design review in preparation for a 2022 mission to search for signs of water at the moon's south pole.

Moon Ranger

6. Conclusion

Robotics has demonstrated novel access capabilities for humans to extend their reach in space. Past robotic missions have enabled unique science increasing our knowledge in a wide range of science disciplines. Future robotics missions will continue to change the way space is explored in even more fundamental ways, enabling exploration more frequently, at reduced cost, and ever more challenging and dynamic environments. These missions will both continue our robotic exploration beyond Earth but also play a key role in furthering human exploration beyond Earth.

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What Is Bioinformatics? An Overview

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Abstract

Bioinformatics may be a modern building field served by conventional building educational programs. Bioinformatics can be characterized in Numerous ways, but the emphasizes continuously on the utilize of computer and measurable strategies to get it natural information, such as the voluminous information created by tall- throughput biological experimentation counting quality sequencing and quality chips. Bioinformatics, the application of computational methods to analyze the data related with bimolecular on a large-scale, has presently immovably set up itself as a teach in atomic science, and includes a wide extend of subject ranges from auxiliary science, genomics to gene expression studies.

1. Introduction

1.1 Definition: Bioinformatics is the application of quantitative and explanatory computational strategies to show natural frameworks. It is the buzz word of the current times. If biotechnology is hot, bioinformatics is its most sultry arm, covered in a lot of build-up, with helpfully concealed ground substances. It is essential that bioinformatics is seen within the legitimate viewpoint in arrange to procure the wealthy benefits that gather out of it. The term 'bioinformatics' is the brief shape of 'biological informatics, fair as biotechnology is the brief shape of 'biological innovation. "Bioinformatics= Biotechnology + Data Technology" Bioinformatics can be characterized as 'any application of computation to the field of science, counting information administration, calculation improvement, and information mining'. A database is implied to store voluminous data in a deliberate mold, to encourage expansion and/or deletion of data and to supply for its recovery in any one or more of a few distinctive stages and co field.... Bioinformatics, its applications and advantages and at long last we conclude that Science is a never-ending story. The arrangement of one puzzle is the seed of many others. Bioinformatics ought to be an imperative component of biotechnology instruction and it ought to be instructed from a wide- based stage. Bioinformatics is a fundamental component of present-day science and not free of it. The full range of science can monstrously advantage from the bioinformatics approach.

1.2 Brief History of Bioinformatics: Bioinformatics has risen out of the inputs of pros from a few distinctive ranges such as science, organic chemistry, biophysics, atomic science, and biostatistics and computer science. Uncommonly planned calculations and organized computer databases are at the center of all bioinformatics operations that are essentially complex, make voluminous information simple to handle for characterized purposes, in an amazingly short time, a handle that is humanly incomprehensible. The necessities of such an action make overwhelming and tall level demands on both the hardware and the computer program capabilities of computers.

1.3 Bioinformatics Comprises of: Bioinformatics encompasses the use of tools and techniques from three separate disciplines; molecular biology (the source of the data to be analyzed), computer science (supplies the hardware for running analysis and the networks to

communicate the results), and the data analysis algorithms which strictly define Bioinformatics.

2. Goal of Bioinformatics and Its Use:

- Normal biological processes
- Malfunctions in these processes which lead to diseases
- Approaches to improving drug discovery.

The utilize of these procedures has developed violently within the past five a long time and appears no sign of abating down. The result of this development is that the number of sources of products, services, and information has expanded to the point that keeping track of (or finding) the various suppliers has gotten to be amazingly time consuming.

3. Why Is Bioinformatics Important?

The most noteworthy challenge confronting the atomic science community today is to create sense of the riches of information that has been created by the genome sequencing ventures. Customarily, atomic science inquire about was carried out entirely at the test research facility seat but the huge increase in the scale of information being delivered in this genomes time has seen a need to consolidate computers into this investigate process. Sequence era, and its ensuing capacity, elucidation and examination are completely computer dependent tasks. However, the molecular biology of a living being may be an exceptionally complex issue with investigate being carried out at different levels including the genome, proteome, transcriptome and metabolome levels. Taking after on from the blast in volume of genomic information, comparable increment in information have been watched within the areas of proteomics, transcriptomic and metabolomics.

The primary challenge confronting the bioinformatics community nowadays is the cleverly and effective putting away of mass of information. It is then their duty to supply simple and solid get to this information. The information itself is insignificant some time recently investigation and the sheer volume display makes it incomprehensible for indeed a prepared scientist to start to decipher it physically. In this manner, sharp computer instruments must be created to permit the extraction of important organic information.

There are three central biological processes around which bioinformatics tools must be developed:

- DNA sequence determines protein sequence
- Protein sequence determines protein structure
- Protein structure determines protein function

The integration of information learned about these key biological processes should allow us to achieve the long-term goal of the Bioinformatics. The method of advancement has delivered DNA groupings that encode proteins with exceptionally particular capacities. It is conceivable to foresee the three-dimensional structure of a protein utilizing calculations. The diagram underneath summarizes the method by which DNA arrangements are utilized to show protein structure. The processes included in this change are point by point within the pages that follow.

3.1 Bioinformatics- The Genomic Revolution

The science of bioinformatics or computational science is progressively being utilized to make strides the quality of life and has created out of the got to get it the code of life, DNA. Massive DNA sequencing ventures have advanced and added within the growth of the science of bioinformatics. DNA the fundamental atom of life straightforwardly controls the

basic science of life. It codes for qualities which code for proteins which decide the organic cosmetics of people or any living life form. It is varieties and mistakes within the genomic DNA which eventually define the probability of creating infections or resistance to these same clutters. It is being used presently and within the predictable future within the zones of atomic pharmaceutical to assist create way better and more customized medications to avoid or remedy diseases, it has natural benefits in, identifying squander clean-up microscopic organisms and in horticulture it can be utilized for creating tall abdicate moo upkeep crops.

3.2 Analyzing genome

A genome is the whole DNA in an organism, including its qualities. DNA, the genetic material of living beings may be a huge helical particle held together by weak bonds between base sets of nucleotides. DNA varieties seem lead to better approaches to analyse and treat illnesses and disorders. A quality could be a grouping of DNA that speaks to an essential unit for heredity. Qualities carry data for making all the proteins required by all life forms. These proteins determine, among other things, how the living being looks, how well its body metabolizes nourishment or battles contamination, and in some cases indeed how it behaves.

DNA is made up of four comparative chemicals (called bases and shortened A, T, C, and G) that are rehashed millions or billions of times all through a genome. The human genome, for illustration, it has 3 billion sets of bases.

The particular order of As, Ts, Cs, and Gs is extremely important. The order under lies all of life's diversity, even dictating whether an organism is human or another species such as yeast, rice, or fruit fly, all of which have their own genomes and are themselves the focus of genome projects. Because all organisms are related through similarities in DNA sequences, insights gained from non-human genomes often lead to new knowledge about human biology.

4. Applications

Bioinformatics is the applications of computer technologies to the biological sciences, particularly genomics, with the object of discovering knowledge. This is often understood to include high-through output screening of genes and proteins, chemical information system, clinical data, the activity of drugs in the body-all of that got lumped in. Bioinformatics is any application of computation to the field of biology, including data management, algorithm development and data mining.

Bioinformatics is the use of computers in assigning function to proteins and in comparing protein- protein interactions in different protein families. Bioinformatics is how their searcher transforms gene data to protein structure and correlates gene and protein functions. Bioinformatics helps the researcher to “mine the data " in the gene sequences that have been discovered. The first application is the use of computers in biological research

The second one is the use of Bioinformatics workstations and provides guidance in setting up a workstation and working with UNIX.

The third application is the overview of the tools used for bioinformatics research, from DNA analysis to proteomics.

The final section describes integrated applications such as automation, building biological databases, and datamining.

The ultimate goal of bioinformatics is to uncover the wealth of biological information hidden in the mass of data and obtain a clearer insight into the fundamental biology of organisms. This new knowledge could have profound impacts on fields as varied as human health, agriculture, the environment, energy and biotechnology.

4.1 Applications in Engineering Field: Within the bioinformatics field essential center is on utilize of the data, as well as on securing, Arrangement, and storage. Which all should be considered inside the system of data for Procurement of data and documents, including creation of meta-data, accommodation of electronic media, and communication interfacesPlanning of data and archives, counting assess on my classification, categorization, workflow forms, change, change, and ordering for look and retrieval. Storing authentic of information, information and record groups for procurement, dispersal, unwavering quality, practicality, accessibility, and calamity recuperation; quality of benefit; preservation, including: precision, recall, efficiency, and effectiveness of retrieval; search input methods, including multi-media index and search techniques; presentation and visualization of results; browse technologies.

4.2 Real World Applications of Bioinformatics

- **Molecular medicine:**Human genome will have significant impacts on the areas of biomedical inquire about and clinical medication. Each infection incorporates a hereditary component and acquired body's response to a natural push which causes changes within the genome (e.g. cancers, to heart malady, diabetes...).
- **Agriculture:** The sequencing of the genomes of plants and animals should have enormous benefits for the agricultural community and can be used to search for the genes within these genomes and their functions, making them healthier, more disease resistant and more productive.
- **Comparative studies:** Analyzing and comparing the hereditary fabric of diverse species is an critical strategy for examining the capacities of genes, the components of acquired infections and species evolution.

4.3 Commercial Application of Bioinformatics:

- Definition of Bioinformatics Company.
- Genomics in medicine, diseases monitoring, profiles for therapeutic molecular targeting.
- Diagnostics drug discovery, Pharmacogenomics and its applications.
- Proteomics in medicine and therapeutic target identification.

5. Genomics

Genomics is an imperative range of present-day science, where the nucleotide groupings of all the chromosomes of a living being are mapped and there by the location of distinctive qualities and their Groupings are decided. It includes broad examination of nucleic acids through molecular natural techniques, before the information are prepared for handling by computers. prevalent grouping of databases, such as Quality bank and EMBL have been developing at exponential rates and has required the cautious capacity, organization and ordering of arrangement data and connected science to deliver the field called Bioinformatics.

5.1 Proteomics: Proteomics includes the sequencing of amino acids in a protein, deciding its three- dimensional structure and relating it to the work of the protein. In such regions, bioinformatics has a gigantic expository and prescient potential. And has seriously proteomic examination of metabolic proteins such as hemoglobin and insulin.

Drug design through bioinformatics is one of the most actively pursued areas of research.

5.2 Glycemic: Glycobiology is the study of carbohydrates of biological origin. Glycemic, the application of bioinformatics procedures to carbohydrates research is the future field of bioinformatics.

5.3 Molecular Phylogenies: Phylogeny is the beginning and advancement of four million of organisms, though not indeed a quarter of them are right now known to science, it is fundamental that they are appropriately classified and named. A number of systematics would be profited on the off chance that bioinformatics give them with computer-based administrations to analyses their orderly information.

6. Scope of Bioinformatics

Bioinformatics may be a flexible, dynamic, cutting edge and vital field, wealthy in applications. Extending the scope of bioinformatics will as it was to be the advantage of bioinformatics and the bioinformatics.

7. Some Databases in Bioinformatics

- GOBASE 2.0: GOBASE is an Organelle Genome Database which provides a powerful tool for mitochondrial gene and genome research.
- EMBL Release 53: The EMBL Nucleotide Sequence Database now contains 1,917,868 sequence entries comprising 1,281,391,651 nucleotides. This represents an increase of about 8% over Release 52.
- Pfams 2.1: Pfams is a large collection of protein domain family alignments which were constructed semi-automatically using profile hidden Markov models (HMMs's). Pfam families contain functionalannotation and cross-references to other databases.

Soft Wares Used For Drug Detection:

- FTDOCK 1.0: The developing number of person structures within the crystallographic databases and the generally little number of unraveled complexes makes prescient docking an important theoretical method. FTDOCK could be a UNIX program for bimolecular docking using shape complementarities and electrostatics. Sequa 0.8 Sequa may be a natural arrangement editor and examination program. It includes links to network administrations and outside examination programs. It is usable on common computer frameworks that bolster the Java 1.1 runtime environment, including Macintosh, MS-Windows and X-Windows.
- W2H 2.1: A unused discharge of the WWW interface to the GCG Arrangement Examination Program Bundle. W2H tries to cover as much functional it yes possible, and to do it exceptionally client inviting. It gives you the opportunity to get to more than hundred programs from any stage where Netscape runs.

8. Conclusion

Science is an ever-ending story. The solution of one puzzle is the seed of numerous others. Bioinformatics ought to be a critical component of biotechnology instruction and it ought to be instructed from a wide based stage. Bioinformatics is a fundamental component of cutting-edge science and not autonomous of it. The total zone of science can gigantically advantage from the bioinformatics approach. We require huge numbers of competent biotechnologists and bioinformatics, but not holders of simple degrees in these areas. Motivating forces are required to attract talent, but actuation, such as assured work situation, tall compensations as in data innovation are not conducive to the long-terminate rests of any subject. Once the swell of build-up is pricked, within the confront of un- kept guarantees, the resultant frustration will be hindering to both biotechnology and bioinformatics. A level headed evaluation and projection of the scope and benefits of these two zones of science are the require of the hour.

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Technical Review on Cloud Computing

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Abstract

Cloud Computing is new buzzword in an IT sectors. The cloud computing has vitalization. In India the 1.4 percentage of total IT use. Today we all cannot think live without internet. the cloud computing has some have problems like troubleshooting problem can be tedious and conflict with business. It is storing data and applications on remote servers and processing the data or applications from servers and also accessing them via internet. Cloud computing use to define a new class of network-based computing that take place over the internet. It is widely distributed.

Key-Words: Cloud, computing, vitalization, Troubleshooting, conflict, widely, distributed, applications, network.

1. Introduction

It is the delivery of on demand computing services over the internet on a pay-as-you –go-basis. Using some one's else server to host process a store data is called CLOUD COMPUTING. Any time anywhere with any device I accessing any services is also called cloud computing. It is universal access and scalable service. New application service model. Cloud Computing provide as the means by which we can access the applications as while over the internet. Cloud Computing is the use of remote servers on the internet to store and manage and process the online data rather than local servers. We can buy our own network and servers to develop the web applications.

2. History

The Evolution of cloud computing is Grid Computing then Utility Computing after that Software as a service and present day is CLOUD COMPUTING.

2.1 Grid Computing: It is solving large of no problems with parallel computing. It made main stream by global alliance.

2.2 Utility Computing: Offering computing resource a meted service. Introduce in late 1990's.

2.3 Software as A Service: Network based subscription to applications gained movement in 2001.

3. Cloud Computing

Next generation is internet computing. Next generation is data center.

- In 1960 we were used supercomputer and mainframe.
- In 1990 we were used the first milestone of clod computing arrival of salesfroce.com
- In 2002 we were used launch of amazon web services.

4. Types of Cloud Computing

4.1 Public Cloud: Public cloud it is a service provided by third party providers. This is available for any person who wants take the benefits of this and they also pay for the service which is taken by them.

4.2 Private Cloud: The computing service provide on the internet. This service is offered to some selected user in place of command people. It provides cloud with high security and privacy is selected by private clouds through the internal hosting.

4.3 Hybrid Cloud: Hybrid cloud is combination between public cloud and private cloud. In this all cloud is managed by independently but data applications can be shared in this.

4.4 Characteristics: Some cloud computing characteristics include

- On demand service
- You use it always when you need it
- Network Access
- Uses internet as a medium
- Shared resources
- Scalability

5. Advantages

Advantage of the Technology encompassing networks, storage, processing power led to epitome of computing.

6. Disadvantages

Security methods for the data storage and transmission, how data and application from various consumers reserved separately, where will data stored.

Delivery Models Of Cloud Computing: -

- **SAAS:** SAAS is software as a service. On-demand service. Independent platform. Runs a single instance of the software. Available for multiple end user. Computing resources managed by vendor.
- PAAS: PAAS is Platform as a service. This service is made up a programming language and execution of environment, an operating system, a web server and database.
- IAAS: (Infrastructure as a Service) this service offers the computing architecture and infrastructure with all resource, all computing resources but in a virtual environment so that multiple users can access.

7. Cloud Computing Architecture

We can divide the cloud architecture into two parts: -

7.1 Front End: Whatever you able to see is front end. It refers to the client part of cloud computing system it consists of interface and applications that are required to access the cloud ex: web browsers.

7.2 Back End: You cannot see the operation are done. It refers to cloud itself it consists of data storage, virtual m/c, security mechanism, service, deployment, models, servers etc.

8. Cloud Computing Application

- Business
- Entertainment
- Data storage

- Education
- Management

8.1 Mail Chimp: It provides an e-mail publishing platform. It is a simple email marketing system. It provides a various options tab deign, send and store the templates of emails.

8.2 Chatta: This application helps to share important information about in organization in real time.

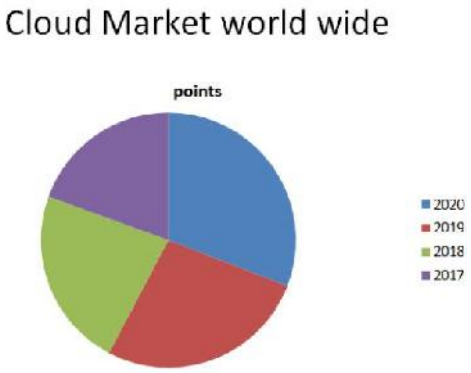
8.3 Goggles Apps in Business: Goggle provides creating text document, spreadsheet, presentations etc.

8.4 Quick Books: It provides online accounting solutions in a business.

Backup Service Applications

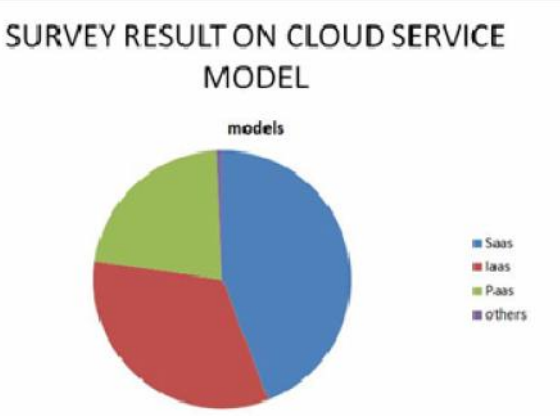
- **BOX-COIN:** It provides drag and drop service in files. It is necessary in the uses to drop the files into box and access from anywhere.
- **MOZY:**It provides online backup service in files to prevent data loss.
- **JOUKUU:** It is a web base in interface it helps to show a single list of content of file stored in goggle Docs.

8. Literature Review



According to predication there will be 230biilon cloud market is grow up in 2020. In 2019 the 200billon market is growing up. In 2018 there will be 170billon market is grow up in worldwide in 2017 the market is 135billon grow up.

In India 83% of enterprise workloads in India.



According to this the SAAS model is more use in market.

9. Conclusion

In this technical review paper, we have elaborated Cloud Computing and it is uses where it Is use and how it is created. We have described the history of cloud computing with their evolution. We also describe the type of the cloud computing and their applications.

We also describe the models of cloud computing. The cloud computing marks the begging of the new era in field of information.

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Technical Review on Cyber Crime.

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Abstract

Cybercrime is a term that refers to all criminal work done using computers, internet and worldwide web. Cybercrime is also computer crime uses a computer as a machine for the different illegal acts such as committing frauds, trafficking in child pornography and intellectual property, stealing identities or violating privacy. Due to widely use of Internet, Cybercrime has enhanced at a level as computer has become a source to commerce, entertainment and government. Cyber law is a try to apply and implement laws designed for the physical world to human work on the internet. IT act 2000 is made to punish. The main aim of this act is to generate an environment where Information Technology can be used without any harm. In India, the IT act 2000 as altered by the IT act 2008 is known as cyber law. It has a different part titled "offenses" in which different cybercrimes have been declare d as penal offenses with imprisonment and penalty. Cyber law includes cybercrimes, intellectual property, data privacy and security, electronic and digital signatures.

Key-Words: - Cybercrime, Cracking, Hacking, Spam, Phishing and Viruses and Software piracy.

1. Introduction

Cybercrime is an attack on data or information about people, corporations or governments. An attack takes place on a personal or corporate virtual body which define people and institutions etc. on the internet. In today's life of digital world any person's virtual identities are important elements and so the information about people can be used in multiple computer databases which are owned by governments and officials. Cyber law is a term used to describe the legal problems which are done using communications technology. Cyber law controls the cyber-attacks done and the security under the cyber space. Cyber law is related to cyber space which contains computers, software, networks, data storage devices, internet, websites, emails and devices like mobiles, ATM machines etc. It is a field of law in which properties or contracts are combined with many legal areas like intellectual property, privacy, freedom of expressing and jurisdiction.

2. History

The first recorded cybercrime took place in the year 1820. In 1820, Joseph-Marie-Jacquard a textile manufacturer in France produced the loom. This device allowed the repetition of a series of steps in the weaving of special fabrics.

This resulted in a fear amongst Jacquard's employees that their traditional employment and livelihood were being threatened. They committed acts of sabotage to discourage Jacquard from further use of the new technology. This is the first recorded cybercrime ever!

3. Cyber Crime

Cybercrime is a generic term that refers to all criminal activities done using the medium of communication technology components, the internet, cyber space and World Wide Web.

Internet crime is any crime or illegal online activity committed on internet through internet.

Categories:

- Individual
- Government
- Property

IT acts:

- Section 425- Mischief
- Section 379- Theft
- Section 319 and 320- Cheating
- Section 292- Capturing, Publishing or transmitting personal images of a person without knowledge.
- Section 465- Punishment for forgery like making a false document.

Types of cybercrimes:

Hacking: Hacking is one of the most known types of computer crime. A hacker is a person who finds out and exploits the weaknesses of computer system or network. It refers to unauthorized usage of computer system

Types of Hackers -

- **White Hat:** These hackers are people who have non malicious reasons whenever he breaks into security system. A white hat that performs vulnerability assessments and penetration tests is also known as ethical hacker.
- **Black Hat:** This types of hackers are also called a s a cracker and have a malicious reason whenever he goes out to breaking computer security systems with technology such as a network, telecommunication system or PC's without authorization.
- **Grey Hat:** A grey hat hacker is a combination of white hats and black hats. These hackers are not penetration testers but they move ahead and surf the internet for vulnerable systems he can exploit.
- **Elite Hacker:** As with any society, average people are rewarded for their talent and treated as special. The elite are the hackers among the hackers in the subculture among the sorts.
- **Script Kiddie:** A script kiddie is a part time or non-expert hacker who breaks into people's computer systems through pre-packaged automated scripts, tools and software written by people who are real hackers.
- **Cracking:** Cracker is a person who breaks into a computer system or network without authorization to do damage. Cracker is used to elaborate malicious hacker. Cracker gets into all kinds of wrong deeds like destroying files, stealing personal information like credit card number or client data, infection of virus etc.
- **Spam:** It is product and services advertisements which experts share to compromise 50% of the emails circulating on internet. It wastes both storage and network capacity of ISP's.
- **Phishing**: It tricks users into submitting personal information and then using it usually in identity theft.

- **Software Piracy**: It means copying and using commercial software which is purchased by another person. It is illegal duplication, distribution or usage of computer software that includes making copies of software, installation and selling of software's. So, individual should understand that purchasing of any software includes purchase of license so that he can use it.
- **Viruses**: A virus is a malicious code that sticks to another program file and replicate itself and spread and infect other systems.

Types:

- DOS: - A denial of service attack where Internet site becomes unavailable by using multiple systems to repeatedly make requests that hangs up the sites and prevent from responding requests.
- DDOS- Here a criminal creates an array of computers with programs called Trojan horses that can be triggered by external systems.

How to Stay Secure from Cyber Crime?

- Use of anti-virus software: It is used to eliminate the malware or to know more about the malware taken place to keep our system secure.
- If in doubt, block: If you receive any unknown mails or messages, block or ignore them.
- Ignore pop-ups: Ignore pop-ups on browser which have simple user interface but contains malicious script code which can hack our systems which installs malware in the background automatically which can harm our system
- Two step verification: If your email or cloud service like Gmail, drop boxes, apple, fb gives two step verification authentications in which when you login it gives verification code through SMS due to which even password is cracked but temporary verification code cannot be cracked And This keeps our account secure.
- Only shop on secure websites: If the website contains a green lock symbol along with https with it, it means that the website is secure.
- Different site, different passwords: Keep different passwords for all the accounts or the websites we have already logged in so that even if one website is hacked the other logged websites remain secure.
- Don't store your card details on the websites: Whenever you have online shopping or register on any online website, do not save the details for the further online transactions.
- Didn't expect, don't click: When you click on an unknown source you become a target and hackers retrieve all your personal information and become familiar with your interests which lows down your security.
- Create strong passwords: Always create strong passwords to secure your systems and keep changing them frequently to keep it more secure.

4. Literature Review

According to predictions there will be $ 5-6 trillion costing of cybercrimes till 2021. This is based on the media outputs, colleges, government officials, associations, cyber security experts and industrialists. According to survey, Phishing attacks in 2017 were 77%, Phishing attacks in 2018 were 76%, Phishing attacks in 2019 were 68%, Financial frauds in 2017 were 52%, Financial frauds in 2018 were 38%, Financial frauds in 2019 were 30%, Confidential and sensitive personal data or other confidential data have accidentally taken place in 2017 is 12%, Confidential and sensitive personal data or other confidential data have accidentally taken place in 2018 is 17%, Confidential and sensitive personal data or other confidential

data have accidentally taken place in 2019 is 29%, Social engineering taken place in 2019 is 28%, Malware taken place in 2017 is 43%, Malware taken place in 2018 is 48%, Malware taken place in 2019 is 27%, Blackmails taken place in 2017 is 58%, Blackmails taken place in 2018 is 24%, Blackmails taken place in 2019 is 20%.

4.1 Tools used in Cybercrimes: The cybercrime tools and anonymous hacking tools are used to deface, takedown or infect a domain. Different cyber criminals have different purpose to exploit any one privacy. So following are the common tools used in cybercrimes.

4.1.1 Darkcomet RAT:

- The popular Darkcomet RAT is being used by Anonymous hackers and cybercriminals to steal personal information from the infected devices.
- The main function of Darkcomet RAT allow the hackers to take full control over the infected devices.
- This software allows everybody to capture in full streaming the desktop and video from webcam.

4.1.2 Andro RAT:

- The Andro RAT is a remote administration tools which is made for Android devices. The administration tools can be used for various purposes and can be loaded with various plugins to make it an effective administration tool.

4.1.3 Black shades RAT: -

- The Black shades RAT uses tools called “spreaders” to infect other computers by using instant messages or links on social websites which appear to come from victim’s friends and contacts.
- It contains a “Keylogger” which allows users to record their victim’s keystrokes and gain access to account numbers and passwords.
- The software also has tool called “file hijacker”, which allows the users to encrypt their victim’s computer files and the demand payment to unlock them.

5. Conclusion

In this technical review paper, we have elaborated Cybercrimes and its impact on the Institutions, universities, corporations and government. We have described history of how the first cybercrime was attempted by the textile manufacturers.

Then we have given categories of cybercrimes and some laws which state the punishments for the crimes. We have described different types of cybercrimes and also ways to keep our system secure from cyber-attacks. In the literature review we have briefly described the changes taken place in different years in different cybercrimes. Then we have described the tools which eliminate the cyber-attacks and keep our system secure.

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Cloud Computing Using AWS

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Abstract

Intellipath is giving a comprehensive AWS certification training made by MNCexperts. This AWS training will prepare you as intern for AWS Certified SolutionsArchitect exam. You will able to learn skills like AWS Elastic Cloud Compute, SimpleStorage Service, Virtual Private Cloud, Aurora database service, Load Balancing,Auto Scaling and more by working on hands-on projects and case studies with yourleading management team of project. You will learn the simplest and easiest practice to be followed while performing and dealing on AWS projects in Industry.

1. Introduction

Cloud security, mainly recognized as cloud computing security, consists of a teamof policies, controls, methods and applied sciences that employment originally toprotect cloud-based systems, records and infrastructure. This security policy calculates are configured to guard data, guide regulatory compliance and shield customers' privacy as nicely as placing authentication rules for customers and devices. From authenticating access to deleting traffic, cloudsafety is concisely configured to the desires of the business When you choose a legal cloud offerings issue or cloud security platform, you can good bye to guide security configurations and apparently stable security updates. These duties can have a tremendous drain on sources, however when you would gothem to the cloud, all security private administration happens to in one vicinity andis utterly system on your behalf.AWS Cloud computing offering give the last in dependability. With the proper cloud protection security calculates in place, customers can safely get entry to statistics math and applications inside the cloud do not depend the place they areor what device they are using.

2. Working

Just as AWS cloud computing centralizes the main purposes and data, cloud safety centralizes protection security. Cloud-based commercial enterprise MNC networks contains numerous and tremendous devices and endpoints. Managing these things centrally and commercially enhances traffic analysis computation and filtering, streamlines the monitoring of network occasions on the internet and outcomes in lesser software program application and coverage updates. One of the major features of using cloud storage or data storage and security is that it eliminates the want to make investments in devoted hardware and devices that are connected to AWS cloud computing. This also reduce amount, but it also reduces administrative over spending in a lot. Whereas soon because it group had been firefighting security privacy problems reactively, cloud protection feature provides proactive safety security features that provide safety 24/7 with little or no human intervention.

3. What is Cloud Computing?

Cloud computing is that the most demanded working space of computing system resources, especially cloud storage and power of calculating computations, without straight active system by the user. The feature is normally wont to describe data capitals free to several users

over internet. Large clouds, predominant today, normally have features divided over more than one location from central servers. If the connection to the user and server is relatively close, it's going to be designed foothold server. Clouds can also be limited to one authorization or be available to severalorganizations.AWS CLOUD relies on sharing of to realize coherence and economies of scale. Managers of public and hybrid clouds check that cloud computing allow companies to ignore or minimize up-front IT infrastructure costs. Leaders also claim that AWS cloud computing permits firms to create their applications up and running faster, with advanced manageability and less maintenance, which it enables IT capitals to most rapidly adjust resources toconquer fluctuating and unpredictable demand providing the burst computing capability

4. Conclusion

Whole world is using AWS CLOUD COMPUTING due to its easy and availability feature its convenient to use and it also provide good interaction between customer and server Cloud computing shares on the resources to achieve coherence and economic scale of users.

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Technical Review on Cloud Computing - Architecture and Different Platform

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1. Introduction

Cloud Computing technologies such as their working in independently platforms. Offering of high access opportunity with virtual computers which work more rapidly than physical servers. And it's not possible to everyone to buy a physical server. So, cloud computing is a best technology for everyone. And is the combination and evaluation of virtualization, utility computing, (IAAS), (SAAS), (PAAS). Cloud computing system on– demand mode that can conventially access shared IT resources through the internet. where the IT, resources include network, server, storage, application, less management and also interaction with service provider. And also, there are many advantages of cloud computing like on-demand mode this would benefit to client.

It is the systems design of the software systems contained in the delivery of cloud computing which usually involves multiple cloud components collaborating with each other over a loose connector mechanism such as a messaging queue.

Cloud computing architecture refers to the subcomponents and components essential for cloud computing. These collective components usually consist of a frontend platform, backend platforms, cloud-based delivery system and a network.

The front end and back end are connected through a network, normally connected through Internet.

- **Front end:** The client uses front end. The front end contains client-side interfaces and applications that are required to access the cloud computing platforms. The front end includes web servers (including Chrome, Firefox, etc.), tablets, and mobile devices.
- **Back end:**The service provider use back end. It manages all the resources which are required to provide cloud computing services. It contains a huge amount of data storage, security mechanism, virtual machines, deploying models, servers, etc. [9]

2. Essential Characteristics

Cloud computing service models: Cloud services cover a wide range of resources that are as follows:

2.1 On-Demand Self Service: Manufacturing organization can use a web self-service portal as an interface to access their cloud accounts to see their cloud services, their usage, and also to provision and de-provision services as they need to.

2.2 Broad network access: The cloud service is also available in broad network access (Using standard mechanisms, the web standard). Capability are available over the network and accessed through standard mechanism. In other word cloud service are available over a network ideally high broadband communication link such as the internet or in the case of a

private clouds it could be local area network. Broad network access they related to the quality of service on the network.

2.3 Resource Pooling: The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different resources dynamically assigned according to demand. Multi-tenancy allows multiple customers to share the same application or the same physical infrastructure while retaining privacy and security over their information.

2.4 Rapid elasticity: Rapid elasticity is rapidly outward and inward with demand. Which means cloud computing gives you the ability to quickly provision resources in the cloud as manufacturing organization need them. It is a key feature of cloud computing.

2.5 Measured Service: In measured service manufacturing organizations pay accordingly for what they used. Which means charge per use capabilities? cloud resources usage –whether virtual server instance that are running or storage in the cloud gets monitored measured and reported by the cloud service provider. The cost model is based on pay for what you used.[1][3]

3. Cloud Computing Architecture

Service providers deliver to customers via the internet.
Types of cloud service:

- **Saas:**
    1. SaaS stands for software as a service.
    2. It is an on-demand service.
    3. It has an independent platform.
    4. And we do not have to install on pc.
    5. The resources managed by the vendor.

Where the vendor delivered everything as a service and all the components customer just have to interact with particular SaaS offering. No need to right code or worry about runtime operating system all of these providers are provided. E.g., CRM, email, virtual desktop.[9]

- **Paas:**
    1. It stands for platform as a service.
    2. Programming language+opratingSystem+server+database
    3. Provides encapsulation
    4. Build, compile and run program
    5. Users manage data and application resources.

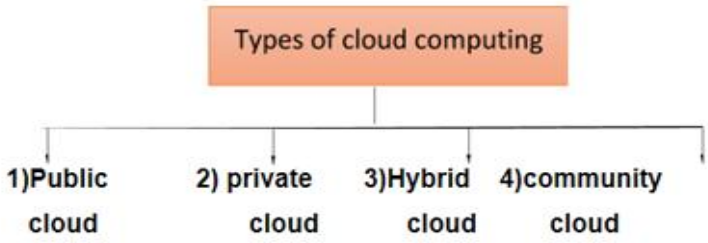
Service providers or cloud providers give the complete platform to use. The server is taking care of virtual machine and of given some pre-defined tools. Which the user can use and build their own application. It means developer are only responsible for application and data. [9]

- **Iaas:**
    1. Stands for Infrastructure as a service.
    2. Provides computing architecture and Infrastructure.
    3. Data storage +virtualization +servers +networking.
    4. Vendors manage above resources.
    5. Users handle data and middleware

Virtualization, servers, storage, networking, manage a provider and delivered as service and rest of ting like application, data, runtime, middleware, operating system are responsibility(customer).

We can say only the infrastructure is given to you everything else you put in it the way you want it and use it.[9][1]

4. Types of cloud computing



4.1 Public Cloud:
Public cloud is **open to all** to store and access information through the Internet computing resources are managed and operated by the (CSP) cloud service provider. Eg. IBM, Google, Amazon.

4.2 Private Cloud: It is also known as an internal cloud or corporate cloud. Private cloud is used by organizations to build and manage their own data centres internally or by the third party. It is based on the location and management, National Institute of Standards and Technology (NIST) parting private cloud into the following two parts-

- On-premise private cloud
- Outsourced private cloud

4.3 Hybrid Cloud: Hybrid Cloud is combination of the public cloud and the private cloud.

Hybrid cloud is secure because the services which are running on the public cloud can be accessed by anyone, while the services which are running on a private cloud can be accessed only by the organization's users.

Example: Google Application Suite (Gmail, Google Apps, and Google Drive), Office 365 (MS Office on the Web and One Drive), Amazon Web Services.

4.4 Community Cloud: It allows systems and services to be accessible by a group of several organizations to share the information between the organization and a specific community. Community cloud is owned, managed, and operated by one or more organizations in the community, or a combination of them.

Example: Health Care community cloud.

5. Storage of the Cloud

Storage of the cloud service, build to produce applications, services and organizations with access to offsite storage ability that may provision quickly are versatile in scaling automatically at runtime and is globally accessible. An IaaS service model delivers scalable, flexible and redundant storage capability through net services API, online interfaces and thin client applications. Cloud Storage also have advantage, the user by providing remote access with the help of internet. The storage services are very fast to access. Cloud information is often held on, altered and retrieved from a remote cloud storage server below a utility computing model.

5.1 Networking: Low latency and high bandwidth. It Allowing users to have uninterrupted access to their data and applications.

5.2 Networking security: Security is all the time important, but when you are dealing with multi-tenancy, it becomes much more important because you are dealing with segregating multiple customers

5.3 Agile network: On-demand access to resources requires the ability to move rapidly, quickly and efficiently between servers and possibly even clouds.

6. Different popular platform in cloud computing

6.1 AWS (Amazon Web Service):AWS provides different all-inclusive clouds IaaS services, which provides virtual compute, storage, and networking to complete computing stacks. AWS is a popular for its storage and compute on demand service. Which named as an Elastic Compute cloud (EC2) and Simple Storage Service (S3). Infrastructure for deploying computing system on the cloud EC2 offers customizable virtual hardware to end user which can be utilize as the base. It is choosing a large variety of virtual hardware configurations including GPU and cluster instances. EC2 have a capability of saving an explicit running instance as image thus allowing users to create their own template for deploying the EC2 instance. [5]

6.2 Microsoft Azure: Microsoft Azure is a platform and cloud operating system in which user can develop the application in the cloud. For a web application and distributed application scalable runtime environment is provided. Azure provide so many services such as support for storage, networking, caching, content, delivery and so on. Microsoft managed data centers, this service proves to be a consistency in their performance and solution. And also azure supports the test and management of applications and services. For web development Azure also support PHP, ASP, .net, Node.js.[6]

6.3 Google Cloud Platform: Google offers you Google cloud platform (GCP) which is public cloud computing solution. It also offers a service like computer, networking, storage, machine learning, internet of things and so on. It has a cloud storage which is highly dynamic storage solution that supports both cloud SQL or cloud No SQL database storage. Google Cloud Platform is the home of Kubernetes. Kubernetes was developed in 2014 by Google as open source.[7].

6.4 Oracle: Oracle Cloud is an (Enterprise Resource Planning) based on this cloud service that helps you to deploy, and manage workloads in the cloud or on-premises. Oracle Infrastructure as a service offers the Compute, Storage, Networking, Governance, Database, Load Balancing, DNS Monitoring, Ravello, and Fast Connect. Infrastructure as a service help to run any different of workload of an Enterprise. Oracle Platform as a Service offers the Data Management, Application Development, Integration, Business Analytics, Security, Management, and Content and Enterprise. PaaS helps developers to develop, connect, secure and share data across the applications [8]

In oracle gives you the benefit of payment according to your uses.

6.5 IBM: IBM offers another set of solutions to the client to deploy their applications on the cloud. It offers Infrastructure as a Service, Software as a Service, and Platform as a Service. services like public, private**,** hybrid and multi-cloud models. Also offers the Compute, Network, Storage, Cloud Packs, Management, Security, Database, Analytics, AI, Internet of Thing, Mobile, Migration, Private Cloud, and VMware are some services offered by IBM cloud. User can select and unite the tools, data models and delivery models in creating the upcoming generation services or applications. Client can manage their applications in different coding languages such as Java, Python, Swift, Php and so on.IBM AI offers with its

multifunctional ability such as text to speech, detecting language, machine learning, classification of natural language and so on.[8]

7. Future OF Cloud Computing

Future of cloud computing IT experts accept that cloud computing will be at the head of all technologies to give a solution on major business challenges. it is likely to say that businesses are no overlong looking at the Cloud as a tool. Their focus is now more on the technology to accomplish different business aim. It is divine to reach 60% of all IT infrastructure and 60-70% of all software, services and technology spend by 2020. It is also divine that in the same year, the cloud will also become a delivery mechanism for analytics. You can already look businesses use the technology to give out more complex or dynamic needs of the organization

8. Conclusion

In this paper we discussed the essential of cloud computing and Architecture and different platform of cloud computing. It also focuses on the future of cloud computing. and also types of cloud computing in detail. Cloud computing is now becoming a large attractive paradigm, especially for large enterprises. Cloud computing first step could affect the enterprises within upcoming year's as it has the capability to significantly change IT.

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Face Recognition Door Lock Using Raspberry Pi with AWS Recognition

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Abstract

This paper deals with the idea of a secure face recognition door lock system that covers several aspects of security issues. This face recognition door lock provides essential security to our homes, bank lockers, office sectors. this facial recognition door lock uses AWS Recognition Services and Raspberry Pi and electronic door lock. Through the Raspberry Pi Camera module, images are going to be captured when the doorbell button is going to be pressed that will forward to AWS Recognition Services. Analysis and comparison of images will take place through AWS Recognition, after analysis and comparison door will successfully unlock for an authorized person else will not be open for an unregistered person.

Key-Words: Face Recognition Door Lock, Smart Door Lock, IoT, Face Recognition, Security

1. Introduction

In modern days, individual needs highly secured environment at their home, banking sector, and essential workplaces where valuable data and asset are stored for that purpose we came up with the solution of face recognition door lock by using AWS Recognition service. The home security is a vital and most sensible factor. In previous cases, people were using traditional ways to achieve security by using keys and Pincode based lock but which easily led to robberies and fraud, and in the case of Pincode, there is a threat of shoulder surfing, one can look up to pin over your shoulder while you are typing your pin code in the same way keys can be a clone and intruders and robbers get easy access to the main door by using cloned keys and Pincode with the help of this project we are making impossible for intruders to get access of main entrance. With face recognition technology we can provide strong security service to people, so one can be stress-free for their valuable asset. There are many technologies such as biometric fingerprints and retinal scans. A retinal scan is not too safe for your eyes and cannot be recommended to use on daily basis, it can harm your eyes, and a fingerprint may cause issues and is not proven that accurate and costly too. Meanwhile, fingerprint biometric false positives, bias inaccuracy like false rejects, and accepts can still occur preventing select users from accessing systems or place. Biometrics like facial recognition systems can limit privacy for the user.

In this project, we have created our own Face Recognition Door Lock using Raspberry Pi and AWS Recognition Service provided by AWS Cloud to improve the security. This Project works using a Raspberry Pi Camera to capture the image of the person at the door only if the button is pressed of the doorbell and after that, the image captured and send to AWS Recognition Service for recognizing the face of the person at the door with the authorized user's faces stored in AWS S3Bucket and if the face is recognized successfully then the electronic door lock connected to Raspberry Pi is Unlocked for a given period of time so that

the authorized user can enter the place. In case if a person is not recognized then the captured image of that person is sent to the authorized user through email instantly.

2. Literature Survey

In this section, we briefly survey the various existing works for Face Recognition System using Raspberry Pi and other microcontrollers that were using Open-CV for the recognition part. We found that Open-CV is inaccurate and not reliable for Raspberry Pi and face recognition. As compared to open-cv, AWS provides a more accurate and reliable service called AWS Rekognition using which face recognition technology can be implemented essentially. AWS Recognition uses AWS Cloud computing for the processing of the images for face recognition and it analyzes and compares the bulk of images and videos on daily basis. It has many features like text detection, in which it detects distorted text over images and detects the name of the store, street sign, etc. Face detection analysis contains facial expressions, gender, age, facial hair, and glasses, etc. It also identifies so many objects like a bike, telephone, and buildings and scenes like a parking lot, beach, city and so on. By using Aws Rekognition you also can identify a popular person like a well-known celebrity in videos. You also can capture the path of people while using AWS Rekognition in the video.

3. Methodology

This Project is using AWS Rekognition service for face recognition. All the Face Recognition Part is performed on AWS Cloud.. Amazon Rekognition Service is faster and accurate face recognition, allowing you to recognize a person in a photo or video using your private repository of face images in AWS S3 bucket. You can also verify identity by analyzing a face image against images you have stored for comparison which we are using for comparing stored faces to recognize authorized users and open the door lock.

4. Proposed System

Fig (1) and Fig(2) shows the diagram for Face Recognition Door Lock, Raspberry Pi and AWS Rekognition Service. The project consist of software and hardware components. The hardware components used in the projects are Raspberry Pi, camera module, power bank, push button, electronic door lock, jumper wires. The software consist of Raspberry Pi OS, python and boto3 library provided by AWS is used. Python programming language is for developing the code for the project.

5. System Architecture of Raspberry Pi 3

The Raspberry Pi is a series of small single-board computers with a builtin micro-controller which makes it a combination of micro-controller as well as micro-computer. It is used to teach students about programming, hardware integration with sensors, and IoT-based projects. Developed by the Raspberry Pi Foundation located in the United Kingdom and the first version of Raspberry Pi was released on 29 February 2012. It became very popular among the enthusiast and became the most selling single-board computer. Raspberry Pi 3 B used in the Project has builtin WiFi and Bluetooth with 4 USB, 1 LAN, 1 HDMI output, and Quadcore 1.2Ghz processor.

The Raspberry Pi is low in cost, it comes in size of credit-card, credit-card sized computer that plugs into a computer monitor or Television and uses a usual standard keyboard and mouse. It has capabilities of little device that let people to explore computing, and to make them learn how to program in languages right from scratch in Python. Any age of people can explore it easily because it came up with flexibility and quiet portable in size as well.

Fig. (1)Raspberry Pi Model 3

Fig. (2) Flowchart

6. Conclusion

As a conclusion, security system by using Face Recognition Door Lock combined with AWS Cloud is successfully done. It sends the image if Unknown person is detected at the door over authorized users email. With the use of AWS Recognition service the processing of the image for face recognition is faster as well as accurate and this makes the project fast, reliable, cheap as well as highly secured as compared to other existing projects.

This development scheme using Raspberry Pi is less power consuming as it can be also powered by power bank or 5V power supply and flexible as the size of Raspberry Pi is compact so it can be installed in a small space.

7. Future Improvements

- Adding night vision camera.
- Creating Virtual Assistant so it is user-friendly.
- A PIR sensor can be added to avoid touching button.
- D3 camera can be added to check depth in the image to improve the security.

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A Review Paper on Health Monitoring System Using Iot

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Abstract

They say Health is wealth, indeed health is one of the global challenges for humanity. Nowadays, population has also increased drastically resulting in the increase of various diseases. Reason behind this is nowadays people do not take care of their health as much due to time allocation and highly expensive medical treatment. Hence health monitoring systems using IOT is in great demand. So in this review paper a venture is made to demonstrate the IOT in healthcare system. This paper describes a tool with which we can improve the quality of treatment for patients using an android application. In the current situation of the pandemic we are facing, IOT is gaining importance. This paper describes the health monitoring of the patients by the doctors or the health care professionals. It helps the physicians to monitor the health parameters (heartbeat, Body temperature, Blood pressure) of the patient. Not only the patients but all the fitness freaks /experts can track their daily workout program and store the data. People can tally their targets by the steps tracked by the health monitoring apps.

Keywords: Internet of things (IOT), Raspberry pi, Sensors, Health Parameters, Android, Mobile data, Wi-Fi.

1. Introduction

Iot can be a system of associated computing devices, mechanical and digital machines, objects, animals or those who are supplied with distinctive symbol and therefore the ability to transmit knowledge over a linked system while not requiring person to person to pc interaction. Associated degree of IOT systems include internet enabled sensor devices which are embedded processors, sensors and communication hardware to bring together all the information or data ,send and process on the acquired data for their environment. Iot devices share the detector knowledge they have gathered by connecting to the associated degree IOT entryway or different edge devices wherever the data is being sent for the acknowledgement.

1.1 Health and fitness apps: Nowadays many people are using health monitoring applications to track their daily steps, workouts and gradually these applications are being used for prevention, diagnosis and treatment. These applications has made it easy for the working people to use these apps at home, offices, malls, picnic spots, etc. They provide access to healthcare anywhere at any time, thereby allowing people to self-manage their daily fitness plans by not visiting any gym.

An increasing amount of population is making use of these applications and due to this their demand has been raised in the market of apps. These applications provide a detailed stored information about all the activities the person has done. Not only this it also tracks and records the blood pressure, weight, calories, and heartbeats.

According to the Global Mobile Health Market Report 201015[1], more than a third of the 1.4 billion smart phone users will use a healthcare app in the future. There are thousands of apps available on the play store or app store to be download for the health management.

1.2 Patient Health care monitoring system:

Fig. 1. Shows the front end of health monitoring apps.

Previously it was not possible for the doctors to monitor the patient in remote areas during critical conditions.

Now as we all are facing this pandemic, in this situation it has become common for the doctors as well as the patients to be treated virtually. There are various technologies/ applications which help the physicians to monitor the patient continuously also we can intimate a caretaker in critical condition of the patient.

The growth of internet is tremendous and in a way has helped the patients in diagnosis, treatment, monitoring of the disease. Sometimes it becomes difficult for hospitals to again and again check the conditions of the patients. To deal with all the difficulties IOT system is beneficial. [2]. The results of the data collected is to be sent to server using GSM module. Doctors can login to the website and view the results the Raspberry pi which is a cheap, flexible, fully customizable and small computer board brings the advantages of a pc to the domain of sensor

Network

Fig. 2. Working process of health care mobile apps.

2. Literature Survey

The working and importance of the IOT in healthcare system is described in this paper. We have tracked the data of the health monitoring apps such as Samsung and Omron. The systems can be used to monitor physiological parameters (footsteps, blood pressure, heart be The at, calories and temperature of the human body). The proposed model enables user to reduce health problems by proper diagnosis and reducing the medical expenses by cheap diagnosis, treatment and monitoring. The main objective of this paper is to design and analyses of the health monitoring systems and how it has improved our daily routines. [3] proposed system has an embedded microcontroller connected to a set of medical sensors (related to patient case) and a wireless communication module (Bluetooth). Each patient is considered as a node in a wireless sensor network and connected to a central node installed at the medical center through an internet connection. The embedded microcontroller checks whether the patient's health status is showing any abnormalities, if yes then it uses the patients phone signals transmits reports to the doctor directly. [4]. The health fitness application detects and track each footsteps of the person using a accelerometer and other high-tech sensors, your iPhone can detect when you are walking and how much, using the data based on the speed and movements of the phone. And given that we're rarely apart from our phones. Which in a way is a greater advantage of IOT in our day to day lives.

3. Proposed System

The proposed systems include use of the Raspberry pi microcontroller with Wireless Body Area Sensor Network. The sensors which are used are temperature sensors, blood pressure sensors, heart beat sensors all of these sensors help in the proper monitoring of the healthcare system of the patient. If there is any abnormality in the daily routine of the patient the sensors directly transmit the signals to the physicians.

3.1 Raspberry pi:

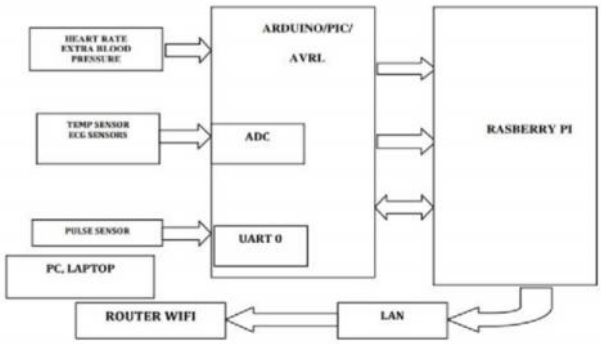

Fig. 3. Block diagram of Rasberry pi

The digital signals are received by the raspberry pi which are sent by the PIC. Raspberry pi can only process digital signals it cannot process analog signals. It doesn't consist an ADC therefore PIC controller is used to convert the analog signals to digital signals and then sent to the raspberry pi. Raspberry pi makes use of email for transmitting signals to the mobile devices or network. The raspberry pi 3 is same as the previous version with an improved system, a double ram and a faster processor. THEIS credit card sized computer is capable of many things that a pc does.

- **WhyRaspberrypi:**The main reason behind choosing raspberry pi is because it is widely used in many IOT applications. The Raspberry pi works on the Linux platform. It is very cheap and cost effective. After connecting the Raspberry pi to an

internet connection it acts as a server. A server that sends data to the webpages. Then these Parameters (heart rate, blood pressure, temperature, etc.) are monitored. And if there is any abnormality detected then the message is directly sent to the doctor or relatives.

- **WIFI Module**

  The definition of Wi-Fi is wireless fidelity, i.e. you can access or connect to a network using radio waves without using wires. The example of Wi-Fi is when you go to a mall your mobile gets connected to a WiFi network without having any wired connection to your mobile.

- **Sensors*:***The proposed system sensors are described:

  i) **TemperatureSensor *(*LM35*):*** It is a type of sensor used for measuring temperature. The LM35 series are precision integrated circuit temperature sensors, whose output voltage is linearly proportional to the Celsius. It is not oxidized due to protection of the seal. It does not require output voltage for amplification.

  ii) **ECG Sensor***:* ECG electrode basically sticks to the chest in order to record the ECG signals. Then wires are connected to AD8232. It's a cost effective sensor. Single lead heart rate monitor works as an op-amp to help produce a proper authentic signal from PR and QT intervals easily.

  iii) **Heart Rate Sensors***:* This sensor produces a digital heartbeat when a human finger is placed on it. When the sensor starts there is a process of LED flashing in unison with the beat. The output is generated in the format of Beats per minute (BPM).

5. Conclusion

The whole Healthcare Monitoring system can be used to measure and track the physiological changes in the human body such as temperature, heartbeat, Blood pressure, Calorie. It is a cheap method by which the Doctors or any healthcare physician can easily monitor the health of the patient. And if there's any abnormality detected the message is directly sent to the doctor. In the Healthcare fitness system, the apps can be used to track the daily workout and calorie burn which in turn helps in the weight management.

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Haptic Technology - A Sense of Real Touch

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Abstract

Haptics is the science of applying touch (tactile) sensation and control to interact with computer applications. Haptic device gives people a sense of touch with computer generated environments, so that when virtual objects are touched, they seem real and tangible. Haptic technology refers to technology that interfaces the user with a virtual environment via the sense of touch by applying forces, vibrations, and/or motions to the user. This mechanical stimulation may be used to assist in the creation of virtual objects (objects existing only in a computer simulation), for control of such virtual objects, and to enhance the remote control of machines and devices. This paper includes how haptic technology works, about its devices, its technologies, its applications, future developments and disadvantages.

Keywords: Human sense of touch, tactile feedback, Virtual object creation and control, Phantam, Haptic rendering.

1. Introduction

Haptical Technology or haptics is tactical feedbacks that take advantage of user sense of touch by applying forces, vibration and motion to the user. Haptics refers to sensing and manipulation through touch. The word Haptic is derived from the Greek word “haptesthai” [1]. Haptic Technology promises to have wide reaching applications as it already has in some fields. For example, haptic technology has made it possible to investigate in detail how the human sense of touch works by allowing the creation of carefully controlled haptic virtual objects. Haptics technology can be used to train people for tasks requiring hand-eye coordination, such as surgery and space ship maneuvers. Although haptic devices are capable of measuring bulk or reactive forces that are applied by the user, it should not to be confused with touch or tactile sensors that measure the pressure or force exerted by the user to the interface. Through haptic interface, human can interact with the computer through body sensation and movement [2]. Several applications such as surgical training, gaming etc use haptic technology. Haptic technology has made it possible to investigate in detail how the human sense of touch works by allowing the creation of carefully controlled haptic virtual objects.

2. Literature Review

Haptic interfaces are divided into two main categories:

- Force feedback
- Tactile feedback

Force feedback interfaces are used to explore and modify remote/virtual objects in three physical dimensions in applications including computer-aided design, computer assisted surgery, and computer-aided assembly. Tactile feedback interfaces deal with surface properties such as roughness, smoothness and temperature.

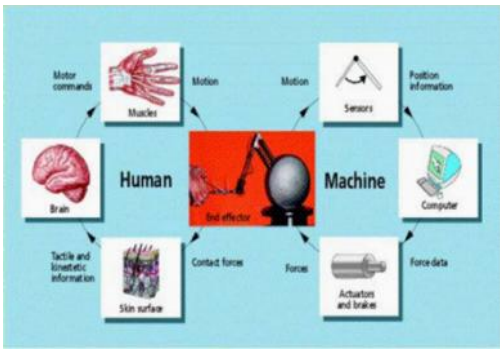

Figure 1: Basic configuration of haptics

2.1 Working of Haptics: Basically haptic system consists of two parts:

- Human part
- Machine part

From the above figure 1, human part (left) controls the position of the hand, while the machine part (right) exerts forces from the hand to simulate contact with a virtual object. Also both the systems will be provided with necessary sensors, processors and actuators. In the case of the human system, nerve receptors perform sensing, brain performs processing and muscles performs actuation of the motion performed by the hand while in case of the machine system, the above mentioned functions are performed by the encoders, computer and motors respectively [2].

2.2 Haptic devices: Haptic devices (or haptic interfaces) are mechanical devices acts as mediator in communicating between the user and the computer. Haptic devices allow users to touch, feel and manipulate three-dimensional objects in virtual environments and tele-operated systems. Haptic devices are input-output devices that track a user's physical manipulations (input) and provide realistic touch sensations coordinated with on-screen events (output). Examples of haptic devices include consumer peripheral devices equipped with special motors and sensors such as force feedback joysticks and steering wheels and more sophisticated devices designed for industrial, medical or scientific applications such as PHANTOM device.

Typically, a haptics system includes;

- Sensor(s)
- Actuator (motor) control circuitry
- One or more actuators that either vibrate or exert force
- Real-time algorithms (actuator control software, which we call a “player”) and a haptic effect library
- Application programming interface (API), and often a haptic effect authoring tool
- The Immersion API is used to program calls to the actuator into your product’s operating system (OS).

When the user interacts with your product’s buttons, touch screen, lever, joystick/wheel, or other control, this control position information is sent to the OS, which then sends the play command through the control circuitry to the actuator.

2.2.1 Phantom Device

Figure 2: Phantom Device

The above figure 2 shows Phantom device. PHANTOM haptic interface is one of the widely used haptic devices. This device measures a user's fingertip position and exerts a precisely controlled force vector on the finger tip. The device has enabled users to interact with and feel a wide variety of virtual objects and will be used for control of remote manipulators [3].

2.3 Human Senses: It is believed that vision and audition convey the most information about an environment while the other senses are subtler. Because of this, their characteristics have been widely investigated over the last few decades by scientists and engineers, which have led to the development of reliable multimedia systems and environments.

2.3.1 Vision: The visual sense is based on the level of absorption of light energy by the eye and the conversion of this energy into neural messages. The acceptable wavelength range for human eyes is between 0.3 and 0.7_m (1_mD10_6m). The temporal resolution sensitivity of the human visual system is biologically limited and not sufficient to detect the presentation of sequential video frames past a certain speed. This is the reason why we do not perceive a digital movie as a series of still images, but rather as moving pictures.

2.3.2 Audition: The human auditory system transmits sound waves through the outer, middle, and inner ears. This sound wave is transformed into neural energy in the inner ear. It is then transmitted to the auditory cortex for processing. The audible frequency of humans ranges from 16 to 20,000Hz and is most efficient between 1,000 and 4,000Hz.

2.3.2 Touch: The sense of touch is mainly associated with active tactile senses such as our hands. Such senses can be categorized in several ways, and they have a link to the kinesthetic senses. According to Heller and Schiff, touch is twenty times faster than vision, so humans are able to differentiate between two stimuli just 5ms apart; Bolanowskiet al. found that touch is highly sensitive to vibration up to 1KHz, with the peak sensitivity around 250 Hz; and skin receptors on the human palm can sense displacements as low as 0.2_m in length

2.4 Haptic feedback: Haptic / Tactile feedback (or haptics) is the use of advanced vibration patterns and waveforms to convey information to a user or operator. Haptic feedback has two major benefits for manufacturers. Firstly, it can improve user experience. Even everyday products are now being built with touch displays and interfaces. They're cheaper to construct than control panels with buttons or switches, and designers can make context specific user interfaces simply by changing the graphical layout on the screen [4].

3. Haptic Concepts

Tactile cues include textures, vibrations, and bumps kinesthetic cues- include weight, impact. In the following section, we present some crucial concepts and terminology related to haptics:

- **Haptic:** Haptic is the science of applying tactile, kinesthetic, or both sensations to human–computer interactions. It refers to the ability of sensing and/or manipulating objects in a natural or synthetic environment using a haptic interface.
- **Cutaneous:** Relates to or involving the skin. It includes sensations of pressure, temperature, and pain
- **Tactile:** Pertaining to the cutaneous sense, but more specifically the sensation of pressure rather than temperature or pain.
- **Kinesthetic:** Relates to the feeling of motion. It is related to sensations originating in muscles, tendons, and joints.
- **Force Feedback:** Relates to the mechanical production of information that can be sensed by the human kinesthetic system.
- **Haptics or Haptic Technology:** An emerging interdisciplinary field that deals with the understanding of human touch (human haptics), motor characteristics (machine haptics),

and with the development of computer controlled systems (computer haptics) that allow physical interactions with real or virtual environments through touch.

- **Haptic Communication:** This means by which humans and machines communicate via touch. It mostly concerns networking issues
- **Haptic Device:** It is a manipulator with sensors, actuators, or both. A variety of haptic devices have been developed for their own purposes. The most popular are tactile-based, penbased, and 3 degree-of-freedom (DOF) force feedback devices.
- **Haptic Interface:** This consists of a haptic device and software-based computer control mechanisms. It enables human–machine communication through the sense of touch. By using a haptic interface, someone can not only feed the information to the computer but can also receive information or feedback from the computer in the form of a physical sensation on some parts of the body.
- **Haptic Perception:** This is the process of perceiving the characteristics of objects through touch
- **Haptic Rendering:** This is the process of calculating the sense of touch, especially force. It involves sampling the position sensors at the haptic device to obtain the user's position within the virtual environment. The position information received is used to check whether there are any collisions between the user and any objects in the virtual environment. In case a collision is detected, the haptic rendering module will compute the appropriate feedback forces that will finally be applied onto the user through the actuators. Haptic rendering is, therefore, a system that consists of three parts, a collision detection algorithm, a collision response algorithm, and a control algorithm [5].
- **Sensors and Actuators:** A sensor is responsible for sensing the haptic information exerted by the user on a certain object and sending these force readings to the haptic rendering module. The actuator will read the haptic data sent by the haptic rendering module and transform this information into a form perceivable by human beings [6].
- **Tele-Haptics:** This is the science of transmitting haptic sensations from a remote explored object/environment, using a network such as the Internet, to a human operator. In other words, it is an extension of human touching sensation/capability beyond physical distance limits.
- **Tele-Presence:** This is the situation of sensing sufficient information about the remote task environment and communicating this to the human operator in a way that is sufficient for the operator to feel physically present at the remote site. The user's voice, movements, actions, etc. may be sensed, transmitted, and duplicated in the remote location. Information may be traveling in both directions between the user and the remote location [7].
- **Virtual Reality (VR):** This can be described as the computer simulation of a real or virtual world where users can interact with it in real time and change its state to increase realism. Such interactions are sometimes carried out with the help of haptic interfaces, allowing participants to exchange tactile and kinesthetic information with the virtual environment.
- **Virtual Environment (VE):** This is an immersive virtual reality that is simulated by a computer and primarily involves audiovisual experiences. Despite the fact that the terminology is evolving, a virtual environment is mainly concerned with defining interactive and virtual image displays.
- **Collaborative Virtual Environments (CVE):** This is one of the most challenging fields in VR because the simulation is distributedamong geographically dispersed computers. Potential CVE applications vary widely from medical applications to gaming.

- **Simulation Engine:** This is responsible for computing the virtual environment behavior over time [8].
- **Collaborative Haptic Audio Visual Environment (CHAVE):** In addition to traditional media, such as image, audio, and video, haptics as a new media plays a prominent role in making virtual or real-world objects physically palpable in a CVE. A C-HAVE allows multiple users, each with his/her own haptic interface, to collaboratively and/or remotely manipulate shared objects in a virtual or real environment.

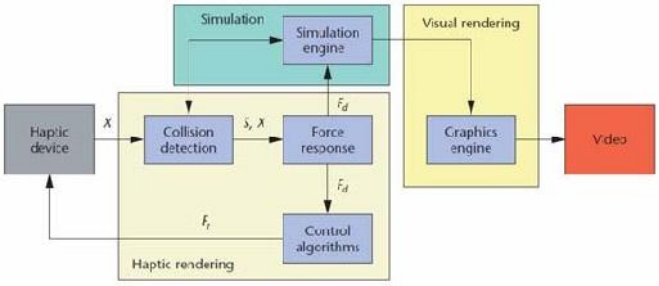

Figure 3: Haptic system block diagram

Figure 3 consists of three blocks, Haptic Rendering, Visual modeling and Simulation. Haptic rendering is divided into three blocks [9].

- **Control Detection Algorithm:** Detects collision between objects and avatar in the virtual environment and yield information.
- **Force Response Algorithm:** Computes interaction between the virtual objects and avatar when the collision is detected [10].
- **Control Algorithms:** Command the haptic devise in order to minimize the error between ideal and application forces [8].

3.1 Comparison of Haptic devices:

Table 1: Comparison of haptic device types

Characteristics of Haptic Devices	Mechanical Arm	Cable Driven	Magnetic Levitation
Workspace	Satisfied	Unsatisfied	Unsatisfied
Maximum Force	Satisfied	Unsatisfied	Satisfied
Maximum Torque	Satisfied	Unsatisfied	Satisfied
Back Drive Friction	Satisfied	Satisfied	Satisfied
Stiffness	Satisfied	Satisfied	Satisfied
Backlash	Satisfied	Satisfied	Satisfied
Resolution	Satisfied	Unsatisfied	Satisfied
Apparent Mass	Satisfied	Satisfied	Satisfied

All types of haptic devices should be evaluated according to their characteristics in order to design a flawless haptic device. Generally, they should have seven basic design characteristics; workspace, maximum force/torque, stiffness, resolution should be maximized and back drive friction, backlash, apparent mass at tip point should be minimized in order to simulate accurately any virtual environment. The above Table shows the characteristics of three different types of haptic devices and its satisfactions for general haptic applications.

4. Applications and Disadvantages

Haptic technology is widely used in many applications such as in gaming, surgical simulation and medical training, military training in virtual environment, Robotics, Virtual arts and design, mobile devices, research and entertainment [10]. Implementation of haptic technology is expensive. Haptics applications can be extremely complex, requiring highly specialized hardware and considerable processing power.

5. Conclusion

We finally conclude that the haptic technology is the solution for interacting with the virtual environment and used widely in many applications Haptic device acts as an input and output device tracking user physical manipulations as an input and providing realistic touch sensations as an output coordinated with onscreen events. As technology evolves and computer power grows, haptic devices and effects evolve and get more realistic. This technology has proved that virtual objects can also be touched, felt and controlled. This technology must be made available for the affordable cost and the haptic devices must be made simpler and easier to use.

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Technical Review on Network Security

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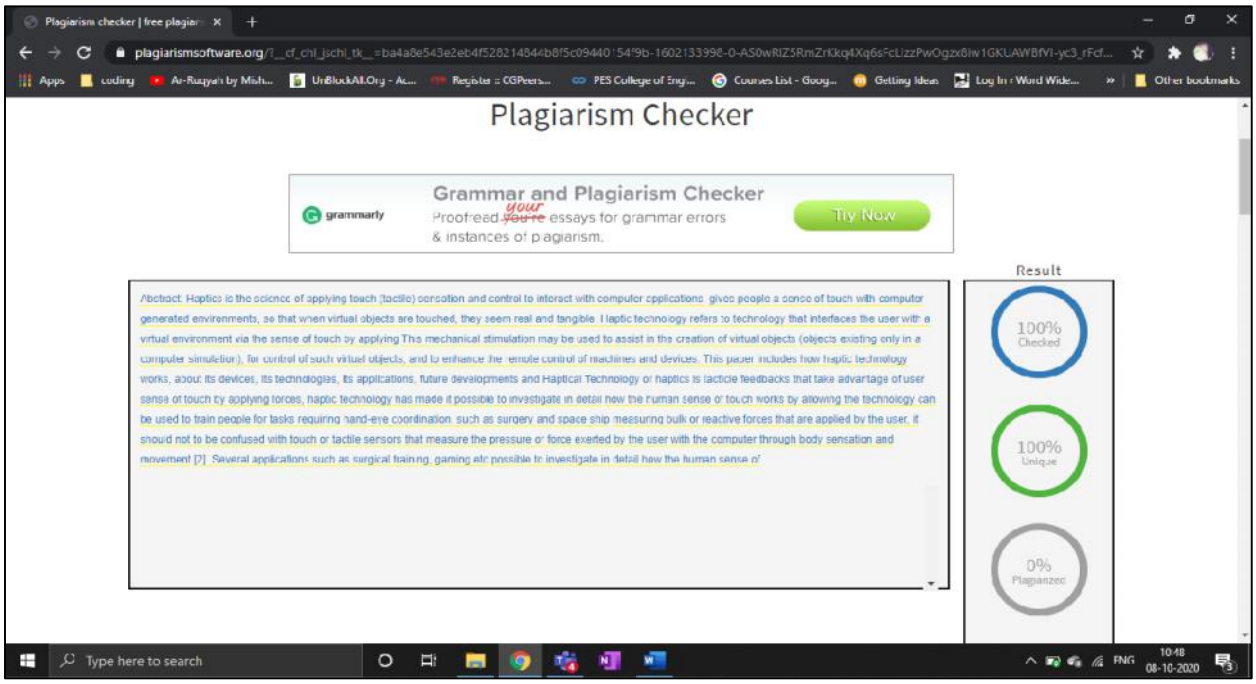
Abstract

Security is a fundamental component in the computing and networking technology. The first and foremost thing of every network designing, planning, building, and operating a network is the importance of a strong security policy. Network security has become more important to personal computer users, organizations, and the military. With the advent of the internet, security became a major concern. The internet structure itself allowed for many security threats to occur. Network security is becoming of great importance because of intellectual property that can be easily acquired through the internet. There are different kinds of attack that can be when sent across the network. By knowing the attack methods, allows for the appropriate security to emerge. Many businesses secure themselves from the internet by means of firewalls and encryption mechanisms



Key- Words: DOS attacks, Encryption, Firewalls, Port Scanning, SHTTP, SSL, VPN, computer network security; threats; basic technique; measures

1. Introduction

Network Security management is different for all kinds of situations and is necessary as the growing use of internet. A home or small office may only require basic security while large businesses may require high-maintenance and advanced software and hardware to prevent malicious attacks from hacking and spamming [1]. New Threats Demand New Strategies as the network is the door to your organization for both legitimate users and would-be attackers. For years, IT professionals have built barriers to prevent any unauthorized entry that could compromise the organization's network The Network Security is constantly evolving, due to traffic growth, usage trends and the ever changing threat landscape

2. Overview of Computer Network Security

Computer network security is fundamentally network information security. It refers to the network system that we use to preserve and flow information and data which may otherwise be exposed to accidental or deliberate damage, leaks or changes. Generally speaking, network security is inextricably related to the confidentiality integrity, authenticity and reliability of network. Its control technologies and concepts are necessary to analyze.

2.1 Types of Attacks: Networks are subject to attacks from malicious sources. And with the advent and increasing use of internet attach is most commonly growing on increasing. The main categories of Attacks can be from two categories: "Passive" when a network intruder intercepts data traveling through the network, and "Active" in which an intruder initiates commands to disrupt the network's normal operation. A system must be able to limit damage and recover rapidly when attacks occur. There are some more types of attack that are also essential to be considered:

- **Passive Attack:** A passive attack monitors unencrypted traffic and looks for clear-text passwords and sensitive information that can be used in other types of attacks. The monitoring and listening of the communication channel by unauthorized attackers are known as passive attack. It includes traffic analysis, monitoring of unprotected communications, decrypting weakly encrypted traffic, and capturing authentication information such as passwords.
- **Active Attack:** In an active attack, the attacker tries to bypass or break into secured systems in the going on communication. This can be done through stealth, viruses, worms, or Trojan horses. Active attacks include attempts to circumvent or break protection features, to introduce malicious code, and to steal or modify information. The unauthorized attackers monitors, listens to and modifies the data stream in the communication channel are known as active attack.
- **Distributed Attack:** A distributed attack requires that the adversary introduce code, such as a Trojan horse or back-door program, to a —trusted‖ component or software that will later be distributed to many other companies and users Distribution attacks focus on the malicious modification of hardware or software at the factory or during distribution.
- **Insider Attack:** According to a Cyber Security Watch survey insiders were found to be the cause in 21 percent of security breaches, and a further 21 percent may have been due to the actions of insiders. More than half of respondents to another recent survey said it's more difficult today to detect and prevent insider attacks than it was in 2011, and 53 percent were increasing their security budgets in response to insider threats.

- **Close-in Attack:** A close-in attack involves someone attempting to get physically close to network components, data, and systems in order to learn more about a network. Close-in attacks consist of regular individuals attaining close physical proximity to networks, systems, or facilities for the purpose of modifying, gathering, or denying access to information
- **Spyware attack:** A serious computer security threat, spyware is any program that monitors your online activities or installs programs without your consent for profit or to capture personal information
- **Phishing Attack:** In phishing attack the hacker creates a fake web site that looks exactly like a popular site such as the SBI bank or PayPal. The phishing part of the attack is that the hacker then sends an e-mail message trying to trick the user into clicking a link that leads to the fake site
- **Hijack attack:** In a hijack attack, a hacker takes over a session between you and another individual and disconnects the other individual from the communication. You still believe that you are talking to the original party and may send private information to the hacker by accidently.
- **Spoof attack:** In the spoof attack, the hacker modifies the source address of the packets he or she is sending so that they appear to be coming from someone else. This may be an attempt to bypass your firewall rules.
- **Password attack:** An attacker tries to crack the passwords stored in a network account database or a password-protected file. There are three major types of password attacks: a dictionary attack, a brute-force attack, and a hybrid attack. A dictionary attack uses a word list file, which is a list of potential passwords [9]. A brute-force attack is when the attacker tries every possible combination of characters
- **Buffer overflow:** A buffer overflow attack is when the attacker sends more data to an application than is expected. A buffer overflow attack usually results in the attacker gaining administrative access to the system in a command prompt or shell.
- **Exploit attack:** In this type of attack, the attacker knows of a security problem within an operating system or a piece of software and leverages that knowledge by exploiting the vulnerability.

3. Threats of Computer Network

3.1 Online virus and its features: Computer network makes it possible to transfer and exchange information, but also makes computer virus spread and endangers people's safety and privacy. Every day, dozens of virus are found and spread fast, peeking into other’s privacy. Survey result of 1500 companies Each year, nearly 99 percent of companies have suffered from varying degrees of virus damages.

4.2 Threats of hackers: Besides viruses, there is also a safety hazard, namely, hacker and hacker program. Hacker mainly refers to the illegal invaders to the computer system, who have powerful skills and talents and are obsessed with computers. Hackers may secretly get access to some restricted areas without consent and sneak into other people's computers systems. Currently, hackers are piled in groups, the development trend of which is staggering.

5. Defense Against Network Attacks

- **Cryptographic systems:** Cryptography is a useful and widely used tool in security engineering today. It involved the use of codes and ciphers to transform information into unintelligible data. Using encryption mechanism one can avert hacker listening to the data because without the equitable key it will be debris to him. Different encryption mechanism such as HTTPS or SHTTP during the data transmission between the client and server, will avert man in the middle attack (MIM), this will also avert any disinter of data and thus any wiretap.
- **Firewall:** The firewall is a typical border control mechanism or perimeter defense. The purpose of a firewall is to block traffic from the outside, but it could also be used to block traffic from the inside. A firewall is the front line defense mechanism against intruders to enter in the system. It is a system designed to prevent unauthorized access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both
- **Driving Security**: To the Hardware Level To further optimize performance and increase security, Intel develop platforms also include several complementary security technologies built into multiple platform components, including the processor, chipset, and network interface controllers (NICs).
- **Intrusion Detection:** Systems An Intrusion Detection System (IDS) is an additional protection measure that helps ward off computer intrusions. IDS systems can be software and hardware devices used to detect an attack. IDS products are used to monitor connection in determining whether attacks are being launched. Some IDS systems just monitor and alert of an attack, whereas others try to block the attack.
- **Antimalware:** Software and scanners Viruses, worms and Trojan horses are all examples of malicious software, or Malware for short. Special so called anti Malware tools are used to detect them and cure an infected system.
- **Secure Socket Layer (SSL):** The Secure Socket Layer (SSL) is a suite of protocols that is a standard way to achieve a good level of security between a web browser and a website. SSL is designed to create a secure channel, or tunnel, between a web browser and the web server, so that any information exchanged is protected within the secured tunnel.
- **Dynamic Endpoint:** Modeling Observable's security solution, represents a profoundly new way to look at IT security. It models each device on your network, so you can understand normal behavior and quickly take action when a device starts acting abnormally.
- **Mobile Biometrics:** Biometrics on mobile devices will play a bigger role in authenticating users to network services, one security executive predicted. Biometrics emerging on mobile endpoints, either as applications that gather users' behaviors or as dedicated features on mobile endpoints that scan personal features.
- **Configuration Management:** It is important for having a dive or slump firewall to avert the system. As soon as the network setup is completing all its remittance logins, ID's, address must be altered as soon as possible if all these information are available for anyone to view on the internet. Anyone can use the remittance login to permit access to the network and as it can put the entire network at risk.

6. Some Advance Network Security Policies

- **Making Security in Clouds Environment:** Analysts project that IT spending will increase slightly from 2013. This increase in investment is largely attributed to cloud computing Over half of IT organizations plan to increase their spending on cloud computing to improve flexible and efficient use of their IT resources
- **Zero-Trust Segmentation Adoption:** This model was initially developed by John Kindervag of Forrester Research and popularized as a necessary evolution of traditional overlay security models. One alternative that is a strong candidate to improve the security situation is the zero-trust model (ZTM).
- **Trend Micro Threat Management:** *Services* Because conventional security solutions no longer adequately protect against the evolving set of multilayered threats; users need a new approach. Trend Micro delivers that approach with the Trend Micro Smart Protection Network.
- **Advanced Threat Protection with:** *Big Data* Big Data makes big sense for security as it involves using specialized technologies and techniques to collect, coordinate, store, and analyze truly massive amounts of related and perhaps even disparate data to uncover insights and patterns that would otherwise remain obscured

7. Encrypting the World Wide Web (Www)

The objectives of privacy, confidentiality and availability our communications on the web should be consistently encrypted this will reduce the number of attacks and averts anyone to view the ongoing transmissions. These can be attained by putting all together for a system of encryption and deploying a system of digital certificates which is used in our digitalization techniques. The most vital way of encryption is the SSL protocol. Network security can also be contrast to human system. The human system can be clasped as analogy, providing a preservation at each point just like a body we can greatly refine the security. Using this mechanism, we can extend our resources and avert dependent on one system.

- õ Secure Sockets Layer It employs both asymmetric and symmetric keys encryption which transfers data in a secure mode over a consistent network. When SSL is deployed in a browser it initiates a secure connection between the browser application and the server. It's like an encrypted subway in which the data can proceed securely. Anyone listening on the network can't decode the data passing in the subway
- õ Secure HTTP (SHTTP) It's an substitution to HTTPS, it has the same working principles as HTTPS and is plotted to secure web pages and their messages. There is a differentiation between SHTTP and SSL protocol such as SSL is a connection oriented protocol and it works on the transport level by dispensing a secure subway for transmission whereas SHTTP works on the application level and here we are encrypting each message separately, but secure subway is created.
- õ VPN Virtual Private Network (VPN) is a mechanism to carry traffic on an unsecured network. It employs a combination of encrypting, authentication and subway. There are different types of way of VPN but of these 5 are easily identified. The well-known and deployed protocols
- õ E-Mail Security Both sender and the receiver of the email must be distressed about the diplomatic of the information in the mail; it has been perspective by unauthorized users,

being altered in the storage or in the middle. Email can be easily be simulated therefore one must always be authenticate its source. E-mail can also be utilized as a delivery mechanism for viruses. Cryptography as in many other discipline plays a significant role in email security

8. Conclusion

Security is a very difficult and vital important topic. Everyone has a different idea regarding security' policies, and what levels of risk are acceptable. The key for building a secure network is to define what security means to your need of the time and use. Once that has been defined, everything that goes on with the network can be evaluated with respect to that policy. It's important to build systems and networks in such a way that the user is not constantly reminded of the security system around him but Users who find security policies and systems too restrictive will find ways around them. There are different kinds of attacks on the security policies and also growing with the advancement and the growing use of internet. In this paper we are trying to study these different kinds of attacks that penetrates our system. As the threats are increasing,

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An Introduction to Cluster Computing

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Abstract

A computer cluster is a group of linked computers, working together closely so that in many respects they form a single computer. The components of a cluster are commonly, but not always, connected to each other through fast local area networks. Clusters are usually deployed to improve performance and/or availability over that provided by a single computer, while typically being much more cost-effective than single computers of comparable speed or availability.

The major objective in the cluster is utilizing a group of processing nodes so as to complete the assigned job in a minimum amount of time by working cooperatively. The main and important strategy to achieve such objective is by transferring the extra loads from busy nodes to idle nodes. The paper will contain the concepts of cluster computing and the principals involved in it.

Keywords: Cluster, Computing, Nodes, Applications, etc.

1. Introduction

Parallel computing has seen many changes since the days of the highly expensive and proprietary super computers. Changes and improvements in performance have also been seen in the area of mainframe computing for many environments. But these compute environments may not be the most cost effective and flexible solution for a problem. Over the past decade, cluster technologies have been developed that allow multiple low cost computers to work in a coordinated fashion to process applications. The economics, performance and flexibility of compute clusters makes cluster computing an attractive alternative to centralized computing models and the attendant to cost, inflexibility, and scalability issues inherent to these models.

Many enterprises are now looking at clusters of high-performance, low cost computers to provide increased application performance, high availability, and ease of scaling within the data center. Interest in and deployment of computer clusters has largely been driven by the increase in the performance of off-the-shelf commodity computers, high-speed, low-latency network switches and the maturity of the software components. Application performance continues to be of significant concern for various entities including governments, military, education, scientific and now enterprise organizations. This document provides a review of cluster computing, the various types of clusters and their associated applications.

Cluster computing is best characterized as the integration of a number of off-the-shelf commodity computers and resources integrated through hardware, networks, and software to behave as a single computer. Initially, the terms cluster computing and high performance computing was viewed as one and the same. However, the technologies available today have

redefined the term cluster computing to extend beyond parallel computing to incorporate load-balancing clusters (for example, web clusters) and high availability clusters. Clusters may also be deployed to address load balancing, parallel processing, systems management, and scalability. Today, clusters are made up of commodity computers usually restricted to a single switch or group of interconnected switches operating at Layer 2 and within a single virtual local-area network (VLAN). Each compute node (computer) may have different characteristics such as single processor or symmetric multiprocessor design, and access to various types of storage devices. The underlying network is a dedicated network made up of high-speed, low-latency switches that may be of a single switch or a hierarchy of multiple switches.

A growing range of possibilities exists for a cluster interconnection technology. Different variables will determine the network hardware for the cluster. Price-per-port, bandwidth, latency, and throughput are key variables. The choice of network technology depends on a number of factors, including price, performance, and compatibility with other cluster hardware and system software as well as communication characteristics of the applications that will use the cluster. Clusters are not commodities in themselves, although they may be based on commodity hardware. A number of decisions need to be made (for example, what type of hardware the nodes run on, which interconnect to use, and which type of switching architecture to build on) before assembling a cluster range. Each decision will affect the others, and some will probably be dictated by the intended use of the cluster. Selecting the right cluster elements involves an understanding of the application and the necessary resources that include, but are not limited to, storage, throughput, latency, and number of nodes.

When considering a cluster implementation, there are some basic questions that can help determine the cluster attributes such that technology options can be evaluated:

- Will the application be primarily processing a single dataset?
- Will the application be passing data around or will it generate real-time information?
- Is the application 32- or 64-bit?

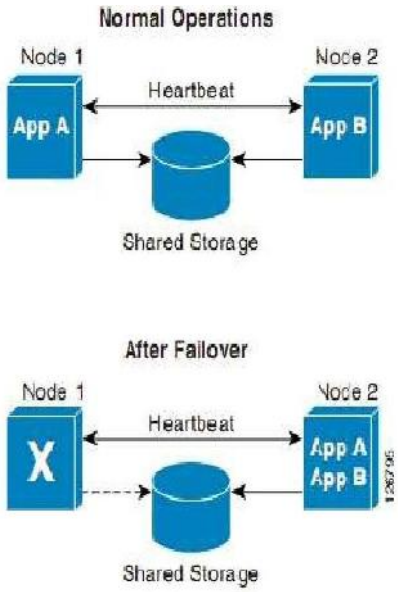
The answers to these questions will influence the type of CPU, memory architecture, storage, cluster interconnect, and cluster network design. Cluster applications are often CPU-bound so that interconnect and storage bandwidth are not limiting factors, although this is not always the case.

2. Types of Cluster

There are several types of clusters, each with specific design goals and functionality. These clusters range from distributed or parallel clusters for computation intensive or data intensive applications that are used for protein, seismic, or nuclear modeling to simple load-balanced clusters.

2.1 High Availability or Failover Clusters: These clusters are designed to provide uninterrupted availability of data or services (typically web services) to the end-user community. The purpose of these clusters is to ensure that a single instance of an application is only ever running on one cluster member at a time but if and when that cluster member is no longer available, the application will failover to another cluster member. With a high-availability cluster, nodes can be taken out-of-service for maintenance or repairs. Additionally, if a node fails, the service can be restored without affecting the availability of the services provided by the cluster (see Figure 2.1). While the application will still be available, there will be a performance drop due to the missing node.

High-availability clusters implementations are best for mission-critical applications or databases, mail, file and print, web, or application servers.

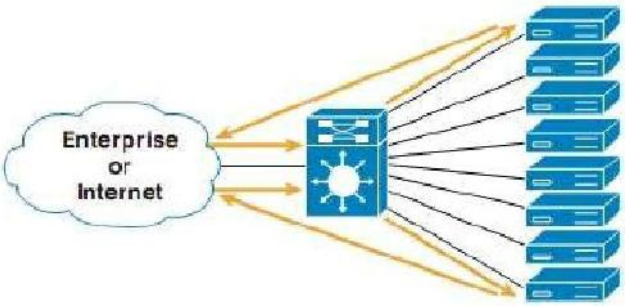


(Failover Clusters) (Figure- 2.1)

Unlike distributed or parallel processing clusters, high-availability clusters seamlessly and transparently integrate existing standalone, non-cluster aware applications together into a single virtual machine necessary to allow the network to effortlessly grow to meet increased business demands.

2.2 Load Balancing Cluster: This type of cluster distributes incoming requests for resources or content among multiple nodes running the same programs or having the same content (see Figure 2.2). Every node in the cluster is able to handle requests for the same content or application. If a node fails, requests are redistributed between the remaining available nodes. This type of distribution is typically seen in a web-hosting environment.

Both the high availability and load-balancing cluster technologies can be combined to increase the reliability, availability, and scalability of application and data resources that are widely deployed for web, mail, news, or FTP services.



(Load Balancing Cluster)

(Figure- 2.2)

2.3 High Performance Cluster: High-performance computing (HPC) clusters are implemented primarily to provide increased performance by splitting a computational task across many different nodes in the cluster, and are most commonly used in scientific computing. Such clusters commonly run custom programs which have been designed to exploit the parallelism available on HPC clusters.

HPCs are optimized for workloads which require jobs or processes happening on the separate cluster computer nodes to communicate actively during the computation. These include computations where intermediate results from one node's calculations will affect future calculations on other nodes.

One of the most popular HPC implementations is a cluster with nodes running Linux as the OS and free software to implement the parallelism. This configuration is often referred to as a Beowulf cluster. Microsoft offers Windows Compute Cluster Server as a high performance computing platform to compete with Linux. Many software programs running on High-performance computing (HPC) clusters use libraries such as MPI which are specially designed for writing scientific applications for HPC computers.

3. Cluster Components

The basic building blocks of clusters are broken down into multiple categories: the cluster nodes, cluster operating system, network switching hardware and the node/switch interconnect (see Figure 3). Significant advances have been accomplished over the past five years to improve the performance of both the compute nodes as well as the underlying switching infrastructure.

3.1 Application: It includes all the various applications that are going on for a particular group. These applications run in parallel and sequential. This includes various queries running on different nodes of the cluster. This can be said as the input part of the cluster component.

3.2 Parallel Programming Environment: This provides easy to use tools for working in a parallel environment and run applications simultaneously. Some of the examples of parallel programming environment are PVM (Parallel Virtual Machine) and MPI (Message Passing Interface).

3.3 Cluster Middleware: These are software packages which interacts the user with the operating system for the cluster computing. In other words we can say that these are the layers of software between applications and operating system. Middleware provides various services required by an application to function correctly.

3.4 High performance computers: These can be PCs, Workstations and SMP etc. These are also called as nodes. In each node it includes its own memory, I/O facility, and Operating system and Network infrastructure hardware.

3.5 High speed networks / Switch: Interconnected as Gigabit Ethernet, ATM etc. are suitable high performance switches are used for connections. Interconnection between the various nodes of the cluster system can be done using 10GbE, Myrinet etc. In case of small cluster system these and be connected with the help of simple switches.

3.6 Nodes: Nodes of the cluster system implies about the different computers that are connected. All of these processors can be of Intel’s or AMD 64 bit.

4. Conclusion

Cluster computing became a major part of many research programs because the price to performance ratio of clusters is very good and efficient. As from above report the cost of processing power is less in cluster computers as compared to other individual machines. A cluster is a logical arrangement of independent entities that collectively provide a service which helps in execution of various complicated operations in less time.

Also, because the nodes in a cluster are clones, there is no single point of failure, due to which it enhances the reliability to the cluster. In cluster system if any of the node gets failed then the system still be high available for the execution of processes by handing over the load to other nodes. From above data we can conclude that this is the reason behind why cluster computers are more in implementation.

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Animation Techniques

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Abstract

Animatronics is a process in which values are used to appear as moving images. In traditional animation, images are drawn or hand-painted on transparent celluloid sheets that will be photographed and shown on film. Today, most pornography is done with computer-generated images (CGI). Computer animation can be described in detail with 3D animation, while 2D computer animation can be used for style reasons, low bandwidth or fast real-time rendering. Other common methods of animation use a stopping movement in two- and three-dimensional objects such as paper cuts, dolls or clay figures.

1. Introduction

Usually the effect of animation is obtained by a rapid sequence of successive images that differ slightly from each other. This trick - as in most animated images - is thought to be based on the phi process and beta movement, but the exact causes are unknown. Analog media graphics equipment based on fast display of sequential images includes phénakisticope, zoetrope, flip book, praxinoscope and film. Television and video are popular electronic image mediathat were originally analogous and are now working digitally. For computer display, techniques such as animated GIF and Flash animation have been developed.

Pornography is far more widespread than most people realize. In addition to short films, featured films, television series, animated GIFs and other media dedicated to motion pictures, animation is also prevalent in video games, motion pictures, user frames and visual effects.

2. Animation Techniques and Type of animations:

2.1 Traditional Animation: Traditional animations include animators to draw by hand each frame. Feature animations create drawings one by one in the frame. 2D animation involves creating multiple drawings and inserting them into plastic cells, painting them by hand and creating an animated sequence on a painted background.

2.2Digital 2D Animation: Creating animation in 2 equal spaces with the help of digital technology is known as digital 2d animation. You don't need to create digital models, you just need to draw frames. Create 100s of drawing and animation to show a kind of movement known as digital 2d animation. Using Adobe flash, animators can limit the number of graphics used, making it easy to create 2d digital animation. Minor variations such as color change or frame rate can be changed almost immediately, thus making it easier for animators to work on it.

2.3Digital 3D Animation: If you have a desire to make real characters real, then it is Digital 3d animation. Digital 3d animation characters are very fast to create and are very popular in the movie industry. Using computer software 3d images used to create many short films, full-length

movies and TV commercials and digital 3d animation work is very beneficial. By comparing 2D animation with the traditional method, 3d animation models are very realistic.

2.4 Stop Motion Animation: Using a frame with a cartoon frame, static elements of the body are distributed and during the production of the post are indicated by liquid movement. Stop motion animation has been around since the advent of the dolls. There were many movies made using the stand, some of the best examples of “Fun in a bakery shop” created in 1902. Edwin Porter directed "The Teddy Bears," which was one of the first animated films to be made. The movie is a short sequence of playing teddy bears, just over a minute long, which took more than 50 hours to heal.

2.5 Clay Animation or Clay mation: If you like to play with clay then this is one of the best types of standing movements made in Claymation. In this Claymation, pieces of clay are formed to create characters and according to the animator's imagination, a story emerges. There is oil-based and aquatic clay available. Sometimes clay is molded into free forms or filled with wire like a structure called an armature. Animated characters are kept on set and with only a short run, the whole scene is film.

2.6 Sand Animation: This method is dirty as you will have to get your hands dirty with sand. The illuminated glass table is used as a fabric and the animator creates animation by moving the sand in certain places and yes you guessed it well, and the andators should always wipe their creations to create another scene. The whole process is filmed and then during the production of the post, it is combined to show the drying of the sand. Even if it takes hours to complete the animation, the final construction will blow your mind.

3. Conclusion

In conclusion, computer animation has had a profound effect on entertainment, the movie industry, and children. Internet animation makes entertainment more enjoyable and exciting animation is nothing more than the imitation of a series of motion pictures, or frames.

Finally, although technology today is advanced, there is a great future reserved for computer animation.

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An Introduction to Big Data

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What is the Big Data?

As the name shows that the Big Data means that we are dealing with some huge amount of data. Yes, we are taking about the large amount of data which may contain your photos, Documents, web logs, social media interactions, ecommerce and online transactions, financial transactions like banks and other and many more also nowadays whatever data is getting generate in the world most of it comes under the Big Data.

So, many of us thinking that we are generating huge amount of data that's the good thing that we are getting more data. But, the real scenario behind the scene is that in actual, the Big Data is the biggest problem that we were facing. Because the data has different varieties and its tedious to manage different types of the data and it is not possible to manage from the traditional database but every problem has a solution.

There are several technologies leaders like Microsoft, IBM, cloudera and many more. According them they have different definitions of big data that are as follows.

The business media firm Gardner has given 3 v's of Big Data they are as follow.

1. Volume: It ranges from terabyte to the petabytes

2. Variety: The variety includes the data from a wide range of sources and formats (for example web logs, social media interactions, ecommerce and online transactions, financial transactions like banks and other and many more)

3. Velocity: The velocity is the speed of the data that is as we know that increasingly, businesses have stringent requirements from the time data is generated, to the time actionable insights are delivered to the users. Therefore, data needs to be collected, stored processed, and analyzed within relatively given short windows of time its ranging from daily to real-time also. If in an organization is not able to handle these3 V's then we can say that there is big data problem in that organization.

Then, IBM added 4th V that is Veracity.

4. Veracity: It means that truthfulness of the data (means some time data may contain wrong information or corrupted data or unexpected data) it will get removed by veracity of data.

According to the **SAP** the definition of big data is: the OLTP & OLAP these are two of data bases,

OLTP: online Transaction Processing, in it the short queries are get run like transaction from one account to other.

OLAP: online Analytical Processing, in it the long-time queries are get processed.

Definition of big data by Oracle: Oracle says that the data that cannot be processed in the traditional data management system are known as big data.

2. So why do we need Big Data?

As we are seeing that many more organizations even don't realize that they are facing to the big data problem or we can say that they are don't want to think in terms of big data. In general scenario an organization is likely to be benefit from big data technologies when existing databases and applications can no longer scale to support sudden increases in volume, variety, and velocity of data.

Actual types of data: Mainly there are three types which differentiate the data, they are as follow:

- Structured
- Unstructured
- Semi structured

3. So how we will solve the problem?

By using the various new tools that addresses the entire data management cycle, the big data technologies make it technically and economically feasible, not only to collect and store larger datasets, but also to analyze them in order to uncover new precious and valuable insights. In most of the cases, big data processing involves a common data flow that is from collection of raw data to the consumption of actionable information.

There are mainly four parts that we perform on the big data they are as follow:

1. Collect
2. Store
3. Process and Analyze
4. Consume and Visualize

1) Collect: The first thing is that we will collect the data like as we mentioned above. It is the first challenge that many organizations are face when dealing with the big data. So, we required a good platform that will perform the task of collecting the data in real time.

2) Store: Every big data platform needs scalable, secure and durable repository to store data prior or even after processing tasks. It's totally depends on your specific requirements; we may also need temporary stores for data in-transit.

3) Process & Analyze: In this step the data is transformed from its raw state into a usable applicable. Usually by means of sorting, joining, aggregation and even we can perform more advanced algorithms and functions. The throughput data sets are then stored for further processing or made available for consumption through data visualization tools and business intelligence.

4) Consume & Visualize: Big data is nothing but the getting high amount of values, actionable insi4ghts your data assets. In general, data is given to stakeholders through self-service business intelligence and agile data visualization tools that allow for fast and easy exploration of datasets

So, these are the methods from which we can solve the big data problem.

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A: Review Paper on Cloud Computing

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Abstract

Cloud computing is based on the Internet. And also it has most powerful architecture of computation. It rate in of compilation of integrated and network hardware, software and also their internet infrastructure. In this review paper we describe Introduction, components of cloud computing, Types of cloud computing, Services of cloud computing, Advantages of cloud computing.

Keywords: Cloud, Saas, Paas, Iaas, and Cloud Computing.

1. Introduction

Like the real clouds which are the collection of water molecules, term 'cloud' in the cloud computing is the collection of networks The user can use the modalities of cloud computing it does not have a limitations whenever demanded. Instead of setting up the their own physical infrastructure, the users ordinarily prefer a mediator provide for the services of the internet in the cloud computing. The user can use the service that can user can used. the workload can be reduced with the help of cloud computing. Demand of hardware and software at the user side is decrease. To use the cloud computing web browser is needed. And also chrome is important Cloud Computing has three types of services.

- Software as a services { SaaS}
- Platform as a services {PaaS}
- Infrastructure as a services {IaaS}

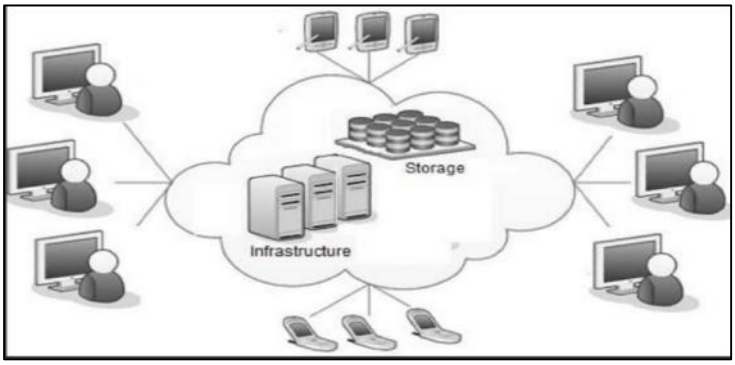

Fig 1. Network of cloud

2. Components of Cloud Computing

- Client computers
- Distributed servers
- Data centers

Client Computers: clients on cloud computing are in general to the operation of local area network. They are desktop where they than their desk place. They might be also in the form of laptops, mobiles, tablets to enhance mobility. The end user can interact with the cloud using cloud computing.

Distributed Servers: it is server placement in different locations. But the server's don't have to be housed in the same location. Servers are geographically disparate location. The server's are distributed among the different place but acts like they as working with each other.

Data Centers: is a collection of servers where the application to which you subscribe is housed. It could be a large room in the basement of your building full of servers on the other side of the world that you can access with the help of internet.

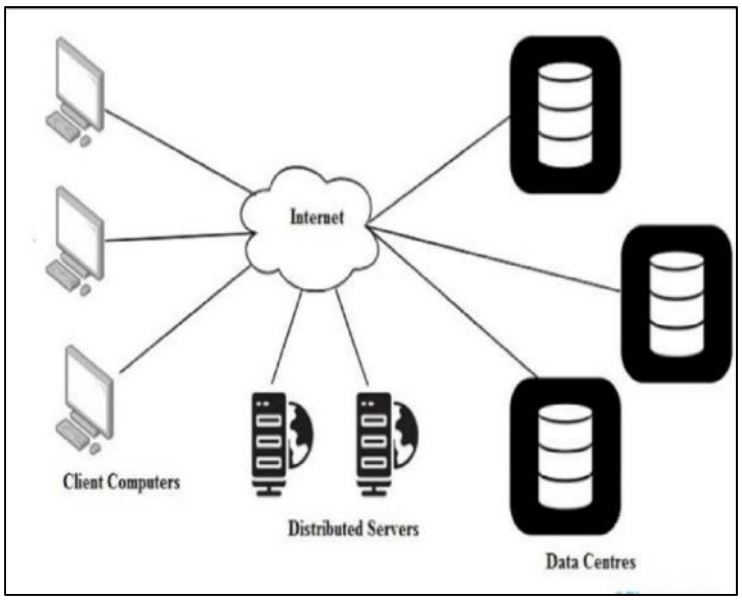

Fig 2.Components of cloud

3. Types Of Cloud Computing

- Public
- Private
- Hybrid
- Community cloud.

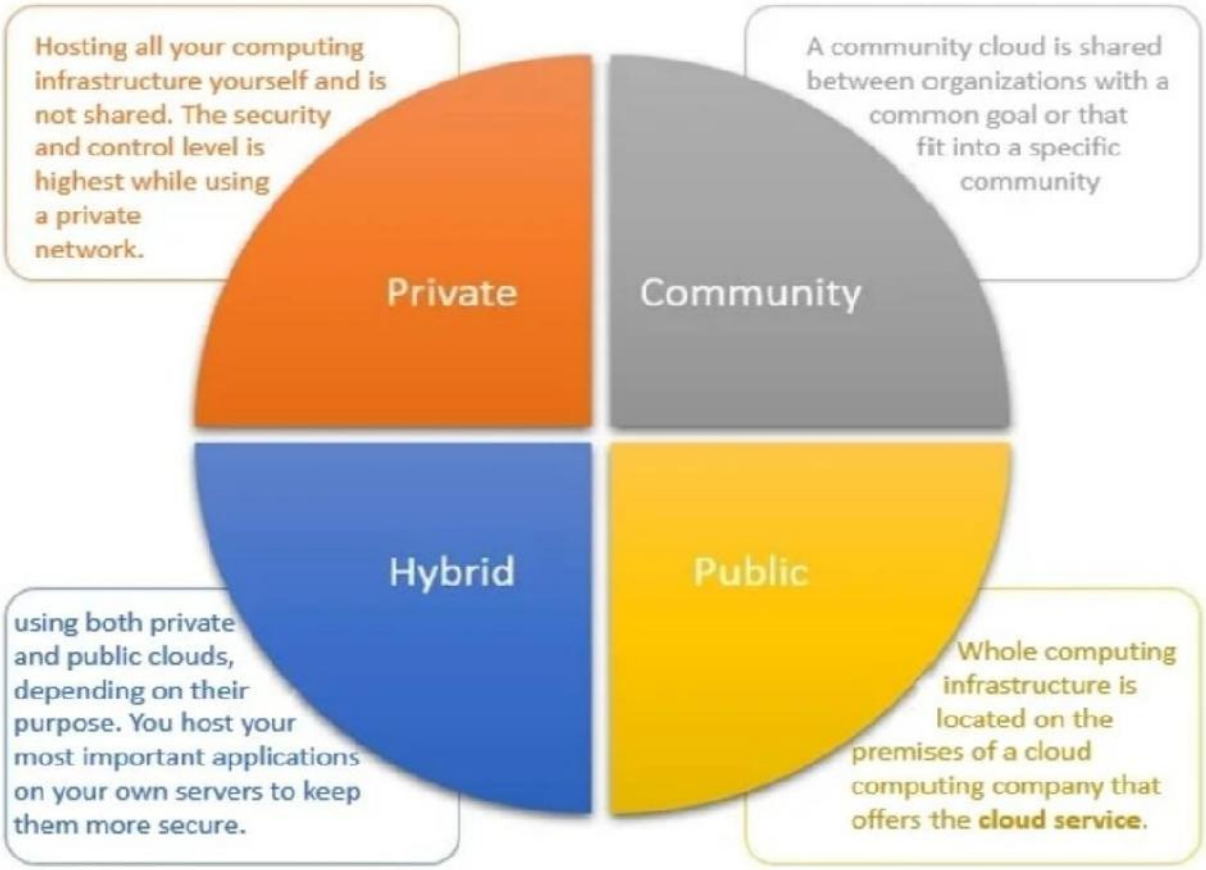

Fig 3. Types of cloud

3.1 Public: It is a type of cloud hosting in which the cloud services are delivered from a network which is open for a public usage. From the technical viewpoint. And also the whole computing infrastructure is located on the premises of cloud computing company that offers the cloud service.

3.2 Private: in the private cloud computing the platform of cloud computing is implemented on a cloud based secure environment that is safeguard by a firewall. Which use under the governance of IT department. It can give permission only authorized user. Private cloud is also known as internal cloud. Hosting of all your computing infrastructure yourself and is not shared. The security and control level is high using the private network.

3.3 Hybrid: in the hybrid cloud it is integrated. It can using both private and public clouds, depending on their purpose. You can host your important application on your own servers to keep them more secure and also secondary applications anywhere. It is cross isolated. It is heterogeneous distributed system.

3.4 Community Cloud: Community cloud is a distributed system. It is created by interesting the services of different clouds to address the specific needs of an industry, or a business sector. The infrastructure is shared between organizations which have shared a task. The cloud may be manager by an organization or a third party.

4. Services of Cloud Computing

- Software as a services { SaaS}
- Platform as a services {PaaS}
- Infrastructure as a services {IaaS}

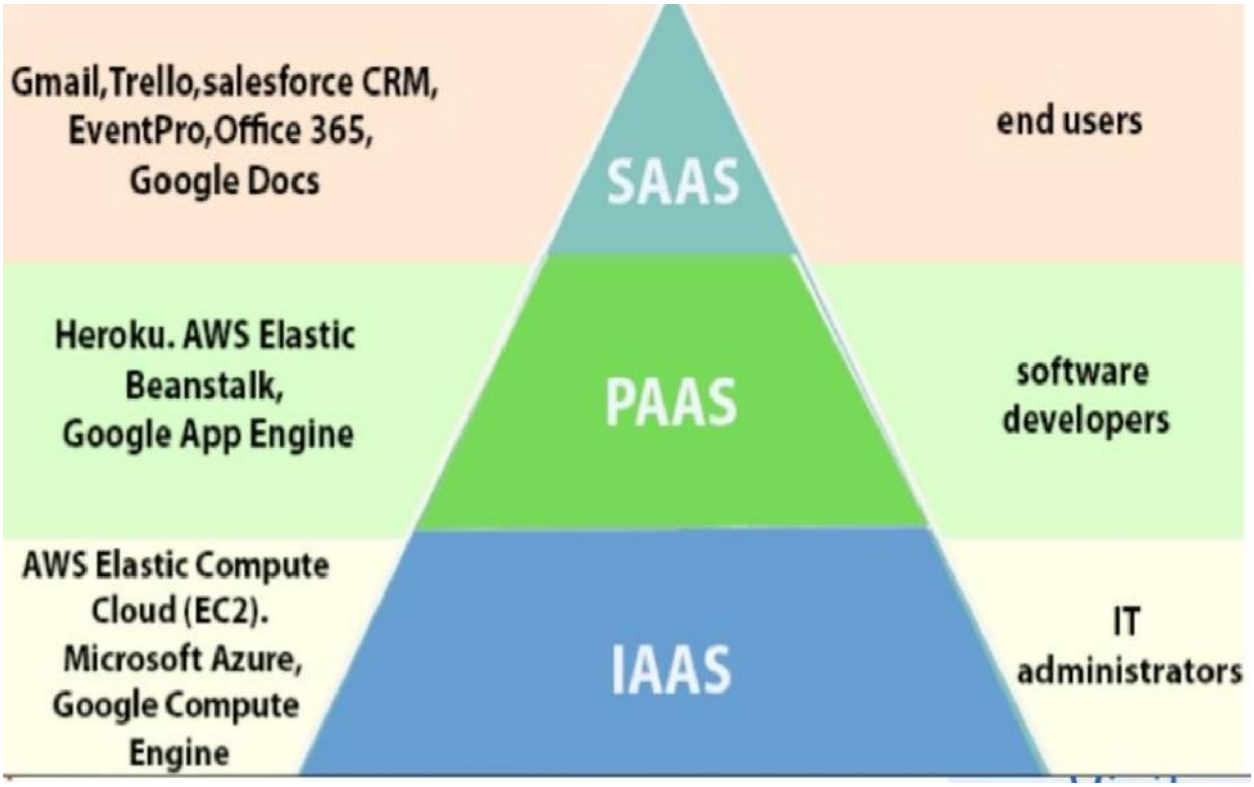

Fig 4.Services of cloud

4.1 Software as a services (SaaS): SaaS model are provided with the access to the application software which are often referred as the "On- demand software". The SaaS users don't need to buy software .Most SaaS applications can be run directly from a Web browser, without any downloads or installation required.

Example: Microsoft Office 365, Google Apps.

4.2 Platform as a services (PaaS): PaaS providers provide various programming languages for the developers to develop the application . PaaS Is a framework they can build upon to develop or customize the applications.

Example : Lamp(Linux, Apache, MySQL, and PHP).

4.3 Infrastructure as a services (IaaS): infrastructure as a services offers a stand edited way of acquiring capabilities on demand and over the web. It can include some resources that is storage facilities, network processing power, and virtual private servers.

Example : Google compute engine.

5. Advantages of Cloud Computing

5.1 Cost Savings: In cloud computing users have to pay for the services they consumed. Maintenance cost is low then user don't need to purchase the infrastructure.

5.2 Mobility: Employee who are working at the remote locations can easily access all the cloud services all they need is an internet.

5.3 Unlimited Storage Capacity: The cloud offers almost limitless storage capacity.

5.4 Enhance Security: It can provide high security by using data encryption, strong access control, key management and also security intelligence.

6. Conclusion

In this review paper we described short introduction, types, evaluation and component of cloud computing and also services of cloud computing and some advantages. All small and also big industries are using cloud computing to manage traffic, storage and hardware requirements. Day by day application area of cloud computing will continuously be increasing.

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Load Balancing & Auto Scaling in Cloud Technology

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Abstract

Cloud computing is a latest technology that uses internet and centralized servers to maintain data and various types of applications. Cloud computing allows consumers and business people to use applications without any installation of either hardware or software and accessing their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing storage, memory, processing. The cloud computing system is the newer version of utility computing which has replaced its area at various data centers. The Load balancer determines when to start or end any virtual machine in the Cloud. The auto scaling feature along with the load balancing technique makes any one easy to automatically increase or decrease back-end capacity to meet traffic fluctuation levels.

1. Introduction

Cloud computing has grown extremely well in business by effectively providing the world class services to all its users. The latest technology has shifted from existing ones to cloud computing. Due to the less resources investment and maintenance cost, the companies are moving towards the cloud. The cloud which operates through the Internetwork protocol has the features of virtualization, grid computing, autonomic and utility computing. It is a general term for anything that involves delivering hosted services over the Internet. It is a pay-go-use model wherein the clients pay for the requested resources. Cloud computing customers have complete access to information technology capabilities and services which is provided through Internet. Cloud computing has brought tremendous change in operations of IT industries. It has greater benefits to the IT industries with less infrastructure investment and maintenance costs. This article deals with the auto scaling and load balancing features various cloud providers. The remainder of this article is organized as follows. Section 2 presents the related work. Section 3 presents the comparison between different load balancers and auto scaling techniques with respect to different cloud platforms. Section 4 represents the conclusion and future work.

2. Load Balancing

Load Balancing is a technique to redistribute the load across the nodes. The decision to balance load is made locally by a node, based on its current utilization. Each node continuously measures its resource utilization of CPU, memory, network consumption and disk space.

3. Auto Scaling

Auto scaling technique provides on-demand resources availability based on certain workloads in cloud computing systems. The Auto scaling service allows the configuration of capacity

management policies applied to dynamically decide on acquiring or releasing resource instances for a given application. Amazon EC2 offers load balancing through Amazon Elastic Load Balancing service (ELB). ELB technique provides high availability of EC2 instances and enhances EC2 applications availability by distributing incoming application traffic across multiple instances [18]. EC2 includes OS such as Linux, Windows, Suse Linux, Fedora, Open Solaris, Red Hat, Open Suse, Ubuntu etc. Any user can interact with EC2 using set of SOAP messages. The elastic load balancer provides high availability of EC2 instances and also enhances EC2 application availability by distributing incoming application traffic across multiple instances. Elastic load balancing also detects unhealthy instances and automatically routes the traffic as necessary energy efficiency, power saving and cost estimation strategy. Amazon EC2 automatically distributes incoming application traffic among multiple instances using ELB feature and monitoring method using Cloud Watch techniques with high.

4. Conclusion

Auto scaling and load balancing features are the two methods which assure service level objectives in cloud computing era.

Research Paper on Virtual Memory

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1. Introduction

In today's world, computers have become an integral and inseparable part of our lives. We use them for many different things in many different ways. However, what is the reason for accepting them so much in our lives? The answer is that computers make our job easier and more efficient. Sometimes, it can be very frustrating or stressful to work with computers that don't run as fast as we want them to or they just cannot handle certain processes due to shortage of system resources. When the limitations of the system resources become a major barrier in achieving our maximum productivity, we often consider the apparent ways of upgrading the system, such as switching to a faster CPU, adding more physical memory (RAM), installing utility programs, and so on. This process of making sure that the operating system uses its resources most efficiently is called System Optimization. A virtual machine is a virtual representation, or emulation, of a physical computer. They are often referred to as a guest while the physical machine they run on is referred to as the host. Virtualization makes it possible to create multiple virtual machines, each with their own operating system (OS) and applications, on a single physical machine. A VM cannot interact directly with a physical computer. Instead, it needs a lightweight software layer called a hypervisor to coordinate between it and the underlying physical hardware. The hypervisor allocates physical computing resources—such as processors, memory, and storage—to each VM. It keeps each VM separate from others so they don't interfere with each other. While this technology can go by many names, including virtual server, virtual server instance (VSI) and virtual private server (VPS), this article will simply refer to them as virtual machines.

2. History

The first virtual memory machine was developed in 1959. It was called the one level storage system. Although it was heavily criticized, it spurred many new prototypes during the early 1960's. Before virtual memory could be regarded as a stable entity, many models, experiments, and theories were developed to overcome the numerous problems Sumit Sehgal 4 that were associated with it. Specialized hardware was developed that would take a "virtual" address and translate it into an actual physical address in memory (secondary or primary). The final debate was laid to rest in 1969 when IBM's research team, lead by David Sayre, showed that the virtual memory overlay system worked consistently better than the best manual-controlled systems. By the late 1970's the virtual memory idea had been perfected enough to use in every commercial computer. Virtual Memory was introduced in Personal computers in 1985 when Intel offered virtual memory along with cache in the 386 microprocessor and Microsoft offered multiprogramming in Windows 3.1. Others finally followed and virtual memory found its place in our everyday lives.

3. Concepts and Implementations of Virtual Memory:

Due to the limitations of physical memory, it is increasingly difficult to store multiple processes in memory to facilitate multiprogramming. One of the techniques to solve this problem is virtual memory. It is defined as a technique that allows the execution of processes that may not be completely in memory (Silberschatz & Galvin). Virtual memory separates logical memory and physical memory. From this separation, the amount of available physical memory is no longer a constraint and less physical memory is needed for each program, thus increasing CPU utilization and throughput, and little if no change in response or turnaround time. Each process has a virtual address, which is used to map the process into main memory. The process can access its data with the virtual address space. On the other hand, the available range of actual memory is known as the physical address space. And the addresses available in main memory are called physical addresses. When executing a process, the virtual address space must be mapped into a physical location.

It's generally better to have as much physical memory as possible so programs work directly from RAM or physical memory. The use of virtual memory slows a computer because data must be mapped between virtual and physical memory, which requires extra hardware support for address translations.

4. Advantages

- Large virtual memory.
- More efficient use of memory.
- There is no limit on degree of multiprogramming.
- Allows jobs to be allocated in non-contiguous memory locations.
- Memory used more efficiently; more jobs can fit.
- Job no longer constrained by the size of physical memory (concept of virtual memory).
- Utilizes memory more efficiently than the previous schemes.

5. Disadvantages

- Number of tables and the amount of processor overhead for handling page interrupts are greater than in the case of the simple paged management techniques.
- Address resolution causes increased overhead.
- Internal fragmentation still exists, though in last page.
- Requires the entire job to be stored in memory location.
- Size of page is crucial (not too small, not too large).

6. Benefits of Using a Virtual Machine

They allow multiple operating systems (OS) environments to exist simultaneously on the same machine. They empower users to go beyond the limitations of hardware to achieve their end goals. Using VMs ensures application provisioning, better availability, easy maintenance and recovery.

7. Conclusion

Virtual memory provides the illusion of large address space that almost eliminates considerations imposed by the limited capacity of physical memory. Thus, both system and user programs can provide the desired functionality without concern for the amount of real memory installed in a particular system. However, the main disadvantage of virtual memory is the complex hardware and software needed to support it. Both the space and time complexities of virtual-memory operating systems exceed those of their Sumit Sehgal 19 real-memory counterparts. Large virtual-address space and management of file-map tables contribute to considerably higher table fragmentation.

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Artificial Intelligence and Robotics

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Abstract

While there is nowadays a general agreement on the basic structure of the autonomous AI/robot, the question of how this structure can be implemented has been subject to a long debate and is still under investigation. Agents and, specifically, robots, usually present various kinds of sensing and acting devices. The flow of data from the sensors to the actuators is processed by several different modules and the description of the interaction among these modules defines the agent architecture. The first, purely deliberative, architectures [1,2] view the robot as an agent embedding a high-level representation of the environment and of the actions that it can perform. Perceptual data are interpreted for creating a model of the world, a planner generates the actions to be performed, and the execution module takes care of executing these plans. In practice a sense-plan-act cycle is repeatedly executed. The problem is that building a high-level world model and generating a plan are time consuming activities and thus these systems have shown to be inadequate for agents embedded in dynamic worlds.

Keywords: Artificial Intelligence, Robotics, Machine Learning, Computing, Genetic Programming

1. Introduction

Artificial Intelligence and Robotics have a common root and a (relatively) long history of interaction and scientific discussion. The birth of Artificial Intelligence and Robotics takes place in the same period (’50), and initially there was no clear distinction between the two disciplines. The reason is that the notion of “intelligent machine” naturally leads to robots and Robotics. One might argue that not every machine is a robot, and certainly Artificial Intelligence is concerned also with virtual agents (i.e. agents that are not embodied in a physical machine). On the other hand, many of the technical problems and solutions that are needed in order to design robots are not dealt with by Artificial Intelligence research. A clear separation between the fields can be seen in the ’70, when Robotics becomes more focused on industrial automation, while Artificial Intelligence uses robots to demonstrate that machines can act also in everyday environments. Later, the difficulties encountered in the design of robotic systems capable to act in unconstrained environments led AI researchers to dismiss Robotics as a preferred testbed for Artificial Intelligence. Conversely, the research in Robotics led to the development of more and more sophisticated industrial robots. This state of affairs changed in the ’90s, when robots begun to populate again AI laboratories and Robotics specifically addressed also less controlled environments. In particular, robot competitions1 started: indeed they played a major role in reestablishing a strict relationship between AI and Robotics, that is nowadays one of the most promising developments of research both in the national context and at the European level.

Summarizing, the borderline between the work in Artificial Intelligent and Robotics is certainly very difficult to establish; however, the problems to be addressed in order to build intelligent robots are clearly identified by the research community, and the development of robots is again viewed as a prototypical case of AI system [3].

2. Methodology

Indeed, the robotic agent can be seen as a main target for the grand goal of Artificial Intelligence, and thus for all the aspects of AI somewhat related to Robotics. Below, w address the main connections with the other AI research topics included in this collection.

2.1Machine Learning: Learning approaches are being applied to many problems arising in the design of robots. According to the structure adopted above, both action and perception can be supported by learning approaches. Moreover, several approaches that include a training step are pursued ranging from machine learning approaches to genetic programming, and neural networks. From the standpoint of action, learning approaches can be used for the basic action skills, specifically locomotion, but also learning cooperative behaviour, adaptation to the environment, and learning opponent's behavior, among others. Obviously, the learning process must face the challenges of the experiments with real robots. Nevertheless, in several experimental settings (e.g. RoboCup), learning and adaptation of the basic skill, such as walking, vision calibration, have shown to be much more effective than parameter tuning by hand.

2.2 Edutainment: Toy robots are very promising to be used both for research purposes and for education, because of low costs and high attraction for students. Even though, at this moment, the available educational kits seem to provide too limited capabilities, toy robots are certainly an interesting commercial market. Consequently, the design of intelligent toy robots is an interesting opportunity for AI researchers. The experience with Aibo robots [4] shows this potential: they have been successfully used by many research groups in the world not only in the RoboCup competitions (Four-Legged League), but also for demonstrating other AI and Robotics research issues.

2.3 Logic for AI and Automated Reasoning: The connection to the Logics for AI and Automated Reasoning is central to the work on Cognitive Robotics, but we do not further expand it here, as it is discussed in the previous section.

2.4 Evolutionary Computation and Genetic Programming: Evolutionary Robotics is a new approach that looks at robots as autonomous artificial organisms that develop their own skills in close interaction with the environment without human intervention. Evolutionary robotics thus applies techniques coming from evolutionary computation.

2.5 Computer Vision: Robot Vision is specific with respect to computer vision, because Robot Vision is intrinsically active, in the sense that the robot may actively find its information sources and it can also reach the best view position to maximize the visual information. Moreover, Robot Vision must be performed in real-time, because the robot must immediately react to visual stimuli. In general, the robot cannot process for a long time the same image because the environmental conditions may vary, so the robot has to deal with approximate, but just in time information. Several research topics and debates in this field have strong correlations with AI and Robotics, for example, if a Computer Vision system may be based on inner representation of the environment or it should be purely reactive.

3. Interaction with Other Disciplines

Robotics is a multidisciplinary field: to make an operational robot, several contributions from many disciplines are needed: physics, electrical engineering, electronic engineering, mechanical engineering, computer science, AI, and so on. It is therefore difficult also to have a common background of terms, notations and methodologies. In this sense, the efforts to define a common ontology of terms for a robotics science [5] are noteworthy. In particular, AI Robotics interacts with several research disciplines outside AI. Many contact points may be found between AI, Robotics and Industrial Robotics. In early days there were not clear and cut distinctions between the two fields, as already mentioned. Today, research in Industrial Robotics is oriented towards the safe and intelligent control of industrial manipulators and in the field of service robotics. The methodologies in Industrial Robotics are grounded in Automatic Control Theory [6]. The relationship between the robot and the environment is generally model by means of several types of feedback systems. Moreover, methodologies are typically based on numerical methods and optimization theory.

4. Conclusion

The development of a HW/SW framework to support the system; the study and implementation of a supervisor agent; realization of robotic agents and technology integration. Alongside the above research tasks, common usability and acceptability issues are analyzed, contributing to the implementation of SW development, visualization and simulation tools for multi-robot systems.

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5G Technology

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1. Introduction:

5G technology is a breakthrough. The next-generation of telecom networks (fifth generation or 5G) has started hitting the market end of 2018 and will continue to expand worldwide. Beyond speed improvement, the technology is expected to unleash a massive 5G IoT (Internet of Things) ecosystem where networks can serve communication needs for billions of connected devices, with the right trade-offs between speed, latency, and cost. According to communication principles, the shorter the frequency, the larger the bandwidth. The use of shorter frequencies (millimetre waves between 30GHz and 300GHz) for 5G networks is why 5G can be faster. This high-band 5G spectrum provides the expected boost not only in speed but also in capacity, low latency, and quality. However,5G download speed may differ widely by area. According to the February 2020 issue of Fortune Magazine, average 5G speed measures done in Q3/Q4 2019 range. 5G technology offers an extremely low latency rate, the delay between the sending and receiving of information. From 200 milliseconds for 4G, we go down to 1 millisecond (1ms) with 5G.

2. History

- In telecommunications, **5G** is the fifth generation technology standard for broadband cellular networks, which cellular phone companies began deploying worldwide in 2019, and is the planned successor to the 4G networks which provide connectivity to most current cell phones.[2] 5G networks are predicted to have more than 1.7 billion subscribers worldwide by 2025, according to the GSM Association.[3] Like its predecessors, 5G networks are cellular networks, in which the service area is divided into small geographical areas called *cells*. All 5G wireless devices in a cell are connected to the Internet and telephone network by radio waves through a local antenna in the cell. The main advantage of the new networks is that they will have greater bandwidth, giving higher download speeds,[2] eventually up to 10 gigabits per second (Gbit/s).[4] Due to the increased bandwidth, it is expected the networks will not exclusively serve cellphones like existing cellular networks, but also be used as general internet service providers for laptops and desktop computers, competing with existing ISPs such as cable internet, and also will make possible new applications in internet of things (IoT) and machine to machine areas. 4G cell phones are not able to use the new networks, which require 5G enabled wireless devices.
- The increased speed is achieved partly by using higher-frequency radio waves than previous cellular networks.[2] However, higher-frequency radio waves have a shorter useful physical range, requiring smaller geographic cells. For wide service, 5G networks operate on up to three frequency bands — low, medium, and high.[5][2] A 5G network will be composed of networks of up to three different types of cells, each requiring specific antenna designs, each providing a different tradeoff of download

speed vs. distance and service area. 5G cell phones and wireless devices connect to the network through the highest speed antenna within range at their location:

- Low-band 5G uses a similar frequency range to 4G cell phones, 600-850 MHz, giving download speeds a little higher than 4G: 30-250 megabits per second (Mbit/s).[5] Low-band cell towers have a range and coverage area similar to 4G towers. Mid-band 5G uses microwaves of 2.5-3.7 GHz, allowing speeds of 100-900 Mbit/s, with each cell tower providing service up to several miles in radius. This level of service is the most widely deployed, and should be available in most metropolitan areas in 2020. Some regions are not implementing low-band, making this the minimum service level. High-band 5G uses frequencies of 25–39 GHz, near the bottom of the millimeter wave band, although higher frequencies may be used in the future. It often achieves download speeds in the gigabit per second (Gbit/s) range, comparable to cable internet. However, millimeter waves (mm Wave or mm W) have a more limited range, requiring many small cells.[6] They have trouble passing through some types of materials such as walls and windows. Due to their higher cost, plans are to deploy these cells only in dense urban environments and areas where crowds of people congregate such as sports stadiums and convention centers. The above speeds are those achieved in actual tests in 2020, and speeds are expected to increase during rollout.[5]

3. Challenges in using a 5G Technology:

- Frequency bands. Unlike 4G LTE that already operates on established frequency bands below 6GHz, **5G** requires frequencies up to 300GHz. ...
- Deployment and coverage. ...
- Costs to build and buy. ...
- Device support. ...
- Security and privacy.
- **Inter-cell Interference** − This is one of the major technological issues that need to be solved. There is variations in size of traditional macro cells and concurrent small cells that will lead to interference.
- **Efficient Medium Access Control** − In a situation, where dense deployment of access points and user terminals are required, the user throughput will be low, latency will be high, and hotspots will not be competent to cellular technology to provide high throughput. It needs to be researched properly to optimize the technology.
- **Traffic Management** − In comparison to the traditional human to human traffic in cellular networks, a great number of Machine to Machine (M2M) devices in a cell may cause serious system challenges i.e. radio access network (RAN) challenges, which will cause overload and congestion.

4. Conclusion

5G will provide users with fiber-like access data rate and “zero” latency user experience. ... **5G** will be able to deliver a consistent experience across a variety of scenarios including the cases of ultra-high traffic volume density, ultra-high connection density, and ultra-high mobility. Communications together. Industry partnerships with computing and communication ecosystem leaders are laying the foundation for future 5G networks now to make amazing user experiences possible in the future. It starts with these ecosystem leaders joining forces on pre-standard 5G radio technologies and network solutions to enable early implementation of both 5G mobile devices and wireless network infrastructure, as well as interoperability of 5G radio technologies to meet the device connectivity requirements for

wireless networks mid- and long-term. Computing and communication industry leaders are developing and verifying 5G mobile device and network solutions for centimeter and millimeter wave bands including spectrum sharing in unlicensed spectrum bands. The industry is also working on advances in radio access network technologies, including anchor-booster cell and massive MIMO to further improve 5G wireless network capacity. New, highly integrated modems, antennas, and highly sophisticated systems on-chips are required to provide robust connectivity for IoT, mobile devices, and PCs. Chipset suppliers already offer 5G mobile trial platforms to develop early high-performance prototype solutions that put 5G development on a fast-track. Chipset suppliers, infrastructure providers, and mobile network operators are collaborating on these 5G mobile trial platforms to drive network transformation.

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