ALL INDIA SHRI SHIVAJI MEMORIAL SOCIETY'S

INSTITUTE OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

PRESENTS

IT-EXPLORE

Annual Technical Magazine - 2k16

DESIGNED BY :- ANUJ TOGARE

DEPARTMENT OF INFORMATION TECHNOLOGY

Welcome to the Department of Information Technology.

As we all know, this is an era of Information Technology, and almost every one of us uses some device or a gadget which invariably leverages the benefits of Information Technology.The advent of Information Technology has revolutionized the way we live. Moreover Internet and mobile wireless technology are the boons of Information Technology. So, the department strives hard to groom our students with this cutting edge technology, thereby instilling high valued ethics and morale. The department prepares them to take up the challenges of ever changing dynamic IT industry.

To fulfill the vision and mission of Information Technology Department towards imparting quality education to our students we conduct various activities like expert lectures, seminar and workshops and industrial visit to make teaching process effective. We provide a platform to our students to participate in many extra-curricular activities through various technical, non-technical contests for their overall personality development.

ALL INDIA SHRI SHIVAJI MEMORIAL SOCIETY'S

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Vision

To equip students with core and state of the art Information Technologies.

Mission

Imparting knowledge of Information Technology and teaching its application through innovative practices and to instill high morale, ethics, lifelong learning skills, concern the society and environment.

Programme Educational Objectives

I. To prepare students to identify, formulate, and solve multifaceted and complex IT problems.

II. To teach core professional skills with latest information technologies that prepares students for immediate employment in Information Technology Industry.

III. To teach students soft skills that prepares them for leadership roles along diverse career paths.

IV. To make students aware of their social responsibilities in building the nation/society.

Programme Outcomes

a. Graduates will be able to explain and use different computational theories.

b. Graduates will be able to demonstrate knowledge of processor architecture and computer organization.

c. Graduates will be able to describe different methodologies and use modern tools for efficient information management.

d. Graduates will be able to design and develop computer networks for resource sharing.

e. Graduates will be able to apply software development process to develop solutions for engineering and real life problems.

f. Graduates will be able to apply and use latest Information technologies.

g. Graduates will be able to identify the area and its scope for higher studies.

h. Graduates will be able to exhibit sound interpersonal skills.

i. Graduates will be able to exhibit self-motivation and contribute for team efforts.

j. Graduates will be able to work with professional ethics and will have human values.

k. Graduates as Engineers will develop a concern for the Society and Environment.

l. Graduates will be able to identify the need for and develop an ability to engage in life long learning.

Message from HOD

It gives me an immense pleasure and pride that Department of Information Technology is publishing 4th annual technical magazine "IT EXPLORE – 2016. It is the presentation of student's hidden talent and caliber. It is the platform of and by our students for gathering, sharing and presenting creative ideas.

This technical magazine is a collection of technical papers, articles etc. which will be the hub for the students and readers to broadcast and enhance their knowledge.

Finally, I express my sincere gratitude and thanks to Hon'ble Shri Malojiraje Chhatrapati– Honorary Secretary of All India Shri Shivaji Memorial Society and Dr. P. B. Mane – Principal AISSMS IOIT for their valuable guidance and support.

I thank the chief editor Mrs. Reshma Y. Totare and her team of staff and students editors for providing students the area for creative thoughts and knowledge expansion.

Prof. Pritesh A. Patil
HOD, I.T Department
AISSMS IOIT, Pune

Message from EDITOR

It gives me an immense pleasure as our Department of Information Technology is presenting 4th annual technical magazine “IT EXPLORE – 2016” to our dear reader.

“IT EXPLORE” providing a technical platform to the students and teachers to express their innovative ideas, hidden talent and writing skills.

I am very thankful to Hon’ble Shri Malojiraje Chhatrapati – Honorary Secretary of All India Shri Shivaji Memorial Society and Principal, Dr. P. B. Mane. I must thank our Head of Department, Prof. Pritesh A. Patil for his continuous encouragement and guidance and also for giving me the opportunity to work as the editor of magazine. Special thanks to the entire enthusiastic participant as without their contribution this magazine would not have been possible. There is equal contribution of student editor team to make this difficult task possible. I am sure you will enjoy reading the interesting articles in the magazine.

Mrs. Reshma Yogesh Totare
Chief Editor and Magazine Coordinator
Assistant Professor
Department of Information Technology

EDITORIAL TEAM- IT EXPLORE

L-R: Damini Khaddakar
Anuj Togare
Tejaswini Dhupad

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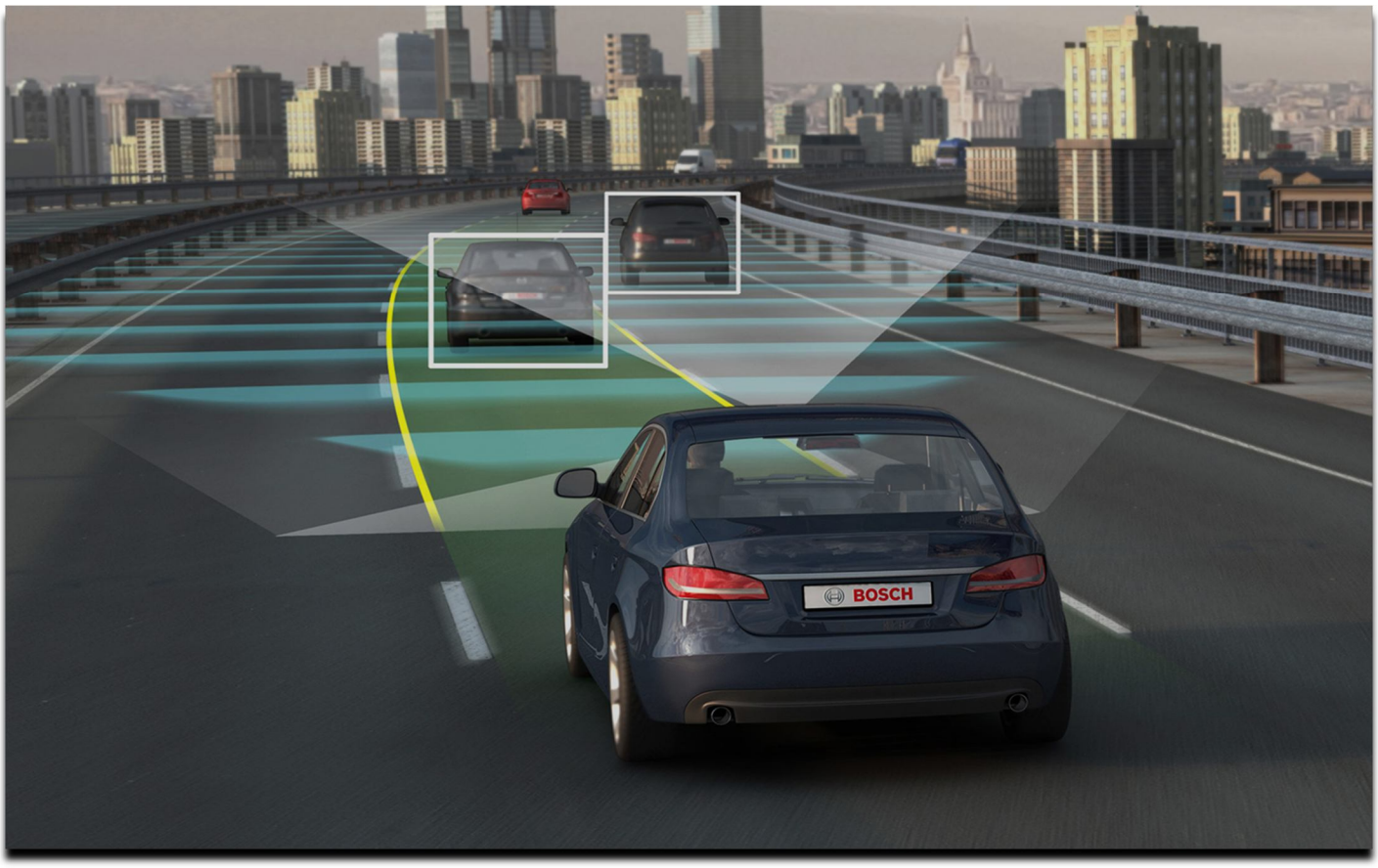
AUTONOMOUS CARS

An autonomous car (driverless car,self-driving car,robotic car) is a vehicle that is capable of sensing its environment and navigating without human input.

Autonomous vehicles detect surroundings using radar, lidar, GPS, odometry, and computer vision. Advanced control systems interpret sensory information to identify appropriate navigation paths, as well as obstacles and relevant signage.Autonomous cars have control systems that are capable of analyzing sensory data to distinguish between different cars on the road, which is very useful in planning a path to the desired destination.

Some demonstrative systems, precursory to autonomous cars, date back to the 1920s and 30s. The first self-sufficient (and therefore, truly autonomous) cars appeared in the 1980s, with Carnegie Mellon University's Navlab and ALV projects in 1984 and Mercedes-Benz and Bundeswehr University Munich's Eureka Prometheus Project in 1987. Since then, numerous major companies and research organizations have developed working prototype autonomous vehicles.An increase in the use of autonomous cars would make possible such benefits as:

- Avoid traffic collisions (and resulting deaths and injuries and costs) caused by human driver errors such as reaction time, tail gating, rubbernecking and other forms of distracted or aggressive driving.
- Reduction in labor costs if human driver isn't required.
- Increased roadway capacity and reduced traffic congestion due to reduced need for safety gaps and the ability to better manage traffic flow.
- Relief of vehicle occupants from driving and navigation chores.
- Higher speed limit for autonomous cars.
- Removal of constraints on occupants' state – in an autonomous car, it would not matter if the occupants were under age, over age, unlicensed, blind, distracted, intoxicated, or otherwise impaired.
- Reduction of physical space required for vehicle parking, and vehicles will be able to drive where space is not scarce.
- Reduction in the need for traffic police and premium on vehicle insurance.
- Reduction of physical road signage – autonomous cars could receive necessary communication electronically (although physical signs may still be required for any human drivers).
- Smoother ride.
- Reduction in car theft, due to the vehicle's increased awareness.
- Increased ergonomic flexibility in the cabin, due to the removal of the steering wheel and remaining driver interface, as well as no occupant needing to sit in a forward-facing position.
- Increased ease-of-use of large vehicles such as motorhomes.
- Increased time in daily leisure activities or work productivity with the replacement of commuting hours.
- The ability for anybody disabled from driving (e.g. with seizures, etc.), children and anyone without a working driver's license to travel independently.
- When used for carsharing:
- Reduces total number of cars.
- Enables new business models such as mobility as a service which aim to be cheaper than car ownership by removing the cost of the driver.
- Elimination of redundant passengers – the robotic car could drive unoccupied to wherever it is required, such as to pick up passengers or to go in for maintenance.



As of March 2016, Google had test driven their fleet of driverless cars, in autonomous mode, a total of 1,498,214 mi (2,411,142 km).In August 2012, the team announced that they have completed over 300,000 autonomous-driving miles (500,000 km) accident-free, typically have about a dozen cars on the road at any given time, and are starting to test them with single drivers instead of in pairs. In late May 2014, Google revealed a new prototype of its driverless car, which had no steering wheel, gas pedal, or brake pedal, being 100% autonomous.

In June 2015, Google founder Sergey Brin confirmed that there had been 12 collisions as of that date, eight of which involved being rear-ended at a stop sign or traffic light, two in which the vehicle was side-swiped by another driver, one of which involved another driver rolling through a stop sign, and one where a Google employee was manually driving the car. In July 2015, three Google employees suffered minor injuries when the self-driving car they were riding in was rear-ended by a car whose driver failed to brake at a traffic light. This was the first time that a self-driving car collision resulted in injuries.On February 14, 2016 a Google self-driving car attempted to avoid sandbags blocking its path. During the maneuver it struck a bus. Google addressed the crash, saying “In this case, we clearly bear some responsibility, because if our car hadn’t moved there wouldn’t have been a collision.”Google characterized the crash as a misunderstanding and a learning experience.

Sheba Wali
BE IT

BASICS (of Programming)

The BASIC language:

BASIC wasn't designed to change the world. "We were thinking only of Dartmouth," says Kurtz, its surviving co-creator. (Kemeny died in 1992.) "We needed a language that could be 'taught' to virtually all students (and faculty) without their having to take a course."

Their brainchild quickly became the standard way that people everywhere learned to program computers, and remained so for many years. But thinking of its invention as a major moment only in the history of computer languages dramatically understates its significance.

In the mid-1960s, using a computer was generally like playing chess by mail: You used a keypunch to enter a program on cards, turned them over to a trained operator and then waited for a printout of the results, which might not arrive until the next day. BASIC and the platform it ran on, the Dartmouth Time Sharing System, both sped up the process and demystified it. You told the computer to do something by typing words and math statements, and it did it, right away.You might assume that a programming language whose primary purpose was to help almost anybody become computer-literate would be uncontroversial—maybe even universally beloved. You'd be wrong. BASIC always had its critics among serious computer science types, who accused it of promoting bad habits. Even its creators became disgruntled with the variations on their original idea that proliferated in the 1970s and 1980s.And eventually, BASIC went away, at least as a staple of computing in homes and schools. Nobody conspired to get rid of it; no one factor explains its gradual disappearance from the scene.Some people say: The world was a better place when almost everybody who used PCs at least dabbled in BASIC.

The C language:

Eventually someone would have come up with something very similar. C is more or less "memory with syntactic sugar", and the central thing it brings to the table is portability between processors--you can work at the "memory level" without tying the code to a particularprocessor.

Up until C and Unix, the notion of portability of source code between processors was not popular because the vendors typically wanted to tie you in to their processor so you'd be forced to buy their hardware. Forcing you to buy just their hardware allowed them to keep their prices very high. So I'd have to think without the portability C offered, the price of owning a computer would still be at the extreme levels it was back in the 1970's. COBOL was also portable from machine to machine, but it had the portability because it didn't go down to the low levels C did. C was the first to have low-level access to the system but was itself "mid-level" and portable.

Of course most operating systems today written in C are typically only compiled for one processor, just like the olden days. Still, it's partly the risk offered by C's portability that keeps the prices decent (another chip company could take over if you tried to be exploitative). Still, the portability of C has allowed some to take advantage, e.g. when Sun moved from Motorola to SPARC chips and gained that huge performance boost, C's portability is what allowed them to move.

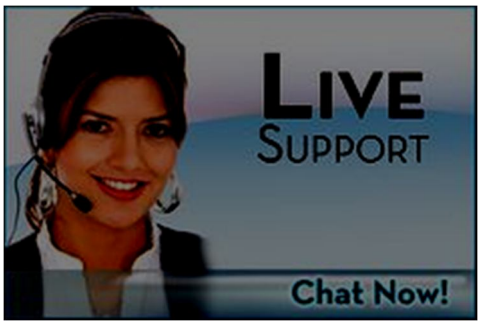
C was able to "take off" the way it did because it wasn't "that much" slower than assembly language, which was formerly the go-to language for low level code like operating systems. Staying close enough to the metal to rival assembly language on speed is perhaps most of the reason people find it difficult to use today, comparative to other higher level languages that are easier and suit their purposes.

Sagar Soni
BE IT

LIVE SUPPORT SOFTWARE

A web chat is a system that allows users to communicate in real time using easily accessible web interfaces. It is a type of Internet online chat distinguished by its simplicity and accessibility to users who do not wish to take the time to install and learn to use specialized chat software.This trait allows users instantaneous access and only a web browser is required to chat. Users will always get the latest version of a chat service because no software installation or updates are required.

Live support software (also called live chat and live help) is a popular term for online chat applications designed specifically to provide online assistance to users of a website. Such software is used to provide instant help to visitors on a website. Live chat is mainly used for text based communication, however software providers bundle services like voice, video, helpdesk, CRM systems along with text chat.



The system typically consists of 2 components:

1. A text box on the website.
2. An operator dashboard to allow the agent to respond to the chat.

The system is usually implemented by pasting a JavaScript code on the website of the user. The Javascript code uses cookies to track user activity on the site.

There are two types of chats:

1. Pro-active chat - In this case, the text box pop-ups on its own and shows a message to the visitor. This message is shown based on different criteria like the amount of time spent on the website, the pages visited, etc. The visitor can then choose to respond to the message displayed.
2. Broadcast- This is a chat initiated by the visitor.

Among the applications available, JavaScript, Java, or Flash Player are used to run the application directly inside the browser. These online applications differ from classic software mostly because Website visitors don't have to install anything on their PCs and they can communicate freely with website's online live chat agents. There are also live support software that goes beyond basic text chat, and offer such advanced communication capabilities as true VoIP (Voice over IP), application sharing, remote view, real-time website traffic monitoring, and remote form filling.

Typically live support applications will open a window that connects the user to an agent. Some software allow the users to be queued, so that one member of staff can deal with a customer and then automatically move on to the next customer. The customer's position in the queue is sometimes displayed.

Live chat software is represented on the market by such applications as HipChat, LiveChat, LiveAgent and many others. Live support can also be in a form of voice communication via automatic callback. The customer enters his phone number and the application initiates connection between the client and sales rep. These apps are mostly useful for companies that implement sales through phone. Callback apps are supplied by the companies like Callmaker, United World Telecom, GlobalTel, Alliance Communication, Save a Minute, Jajah, or on Roaming SIMs.

Some live support applications are written in low-level languages (e.g., C++) and distributed as compiled software that must be installed on a server. Others are written in languages, such as PHP, and can be modified as desired. MySQL and Microsoft SQL Server are common database engines used.

Shashi Kumari
BE IT

ROBOTICS

The Shadow Robot Hand System:

Robotics is the branch of mechanical engineering, electrical engineering and computer science that deals with the design, construction, operation, and application of robots,as well as computer systems for their control, sensory feedback, and information processing.

These technologies deal with automated machines (robots for short) that can take the place of humans in dangerous environments or manufacturing processes, or resemble humans in appearance, behaviour, and or cognition. Many of today's robots are inspired by nature, contributing to the field of bio-inspired robotics.

The concept of creating machines that can operate autonomously dates back to classical times, but research into the functionality and potential uses of robots did not grow substantially until the 20th century.Throughout history, it has been frequently assumed that robots will one day be able to mimic human behavior and manage tasks in a human-like fashion. Today, robotics is a rapidly growing field, as technological advances continue; researching, designing, and building new robots serve various practical purposes, whether domestically, commercially, or militarily. Many robots are built to do jobs that are hazardous to people such as defusing bombs, finding survivors in unstable ruins, and exploring mines and shipwrecks. Robotics is also used in STEM (Science, Technology, Engineering, and Mathematics) as a teaching aid.

Much of the research in robotics focuses not on specific industrial tasks, but on investigations into new types of robots, alternative ways to think about or design robots, and new ways to manufacture them but other investigations, such as MIT's cyberflora project, are almost wholly academic.

A first particular new innovation in robot design is the opensourcing of robot-projects. To describe the level of advancement of a robot, the term "Generation Robots" can be used. This term is coined by Professor Hans Moravec, Principal Research Scientist at the Carnegie Mellon University Robotics Institute in describing the near future evolution of robot technology. First generation robots, Moravec predicted in 1997, should have an intellectual capacity comparable to perhaps a lizard and should become available by 2010. Because the first generation robot would be incapable of learning, however, Moravec predicts that the second generation robot would be an improvement over the first and become available by 2020, with the intelligence maybe comparable to that of a mouse. The third generation robot should have the intelligence comparable to that of a monkey. Though fourth generation robots, robots with human intelligence, professor Moravec predicts, would become possible, he does not predict this happening before around 2040 or 2050.

The second is evolutionary robots. This is a methodology that uses evolutionary computation to help design robots, especially the body form, or motion and behavior controllers. In a similar way to natural evolution, a large population of robots is allowed to compete in some way, or their ability to perform a task is measured using a fitness function. Those that perform worst are removed from the population, and replaced by a new set, which have new behaviors based on those of the winners. Over time the population improves, and eventually a satisfactory robot may appear. This happens without any direct programming of the robots by the researchers. Researchers use this method both to create better robots, and to explore the nature of evolution. Because the process often requires many generations of robots to be simulated, this technique may be run entirely or mostly in simulation, then tested on real robots once the evolved algorithms are good enough. Currently, there are about 10 million industrial robots toiling around the world, and Japan is the top country having high density of utilizing robots in its manufacturing industry.

Occupational Safety and Health (OSH):

The greatest OSH benefits stemming from the wider use of robotics should be substitution for people working in unhealthy or dangerous environments. In space, defence, security, or the nuclear industry, but also in logistics, maintenance and inspection, autonomous robots are particularly useful in replacing human workers performing dirty, dull or unsafe tasks, thus avoiding workers' exposures to hazardous agents and conditions and reducing physical, ergonomic and psychosocial risks. For example, robots are already used to perform repetitive and monotonous tasks, to handle radioactive material or to work in explosive atmospheres. In the future, many other highly repetitive, risky or unpleasant tasks will be performed by robots in a variety of sectors like agriculture, construction, transport, healthcare, firefighting or cleaning services.

Despite these advances, there are certain skills to which humans will be better suited than machines for some time to come and the question is how to achieve the best combination of human and robot skills. The advantages of robotics include heavy-duty jobs with precision and repeatability, whereas the advantages of humans include creativity, decision-making, flexibility and adaptability. This need to combine optimal skills has resulted in collaborative robots and humans sharing a common workspace more closely and led to the development of new approaches and standards to guarantee the safety of the "man-robot merger". Some European countries are including robotics in their national programmes and trying to promote a safe and flexible co-operation between robots and operators to achieve better productivity. For example, the German Federal Institute for Occupational Safety and Health (BAuA) organises annual workshops on the topic "human-robot collaboration".

In future, co-operation between robots and humans will be diversified, with robots increasing their autonomy and human-robot collaboration reaching completely new forms. Current approaches and technical aiming to protect employees from the risk of working with collaborative robots will have to be revised.

Shruti Kulkarni
BE IT

AMAZON PRIME AIR – DELIVERY BY DRONES

Amazon already offers delivery in some markets in as little as one hour with Amazon Prime Now, but that still relies upon humans driving cars. How quaint. Amazon's next big idea is the deploy an army of drones to deliver packages over a wide area in as little as 30 minutes. Prime Air was unveiled as a concept several years ago, but Amazon is still developing it. Amazon exec Paul Misener has revealed more details about how Prime Air will work in an interview with Yahoo Tech.

Amazon thinks that in order to get delivery times to half an hour, the drones will need to have a range of about 10 miles. That probably means areas with Prime Now warehouses will serve as hubs for the drones. The drones themselves will weight about 55 pounds and have a maximum payload of five pounds. So, that giant TV you ordered will probably still make its way to you on a truck. Still, most things Amazon sells weight less than five pounds. Misener doesn't know if it's going to cost anything extra, though.

Amazon has yet to come up with a good way to deliver to those in apartments, but if you live in a house, the drone will just drop the package on your doorstep. If your yard has lots of obstacles, that's no problem, according to Misener. He compares Amazon's drones to horses as opposed to cars, which makes more sense than you'd expect. A car will go wherever you steer it, even if you steer it into the tree in your front yard. A horse, on the other hand, will go around the tree because it prefers not to run into things. The drones will be the same — they can avoid obstacles even if an operator steers it into one.

There will be some variation among the drones, though. According to Misener, Amazon is testing different designs for drones to operate in different regions. For example, the drones that fly in arid regions in the southwest will probably be different than the ones that fly in the rainy pacific northwest. A lot of care is being put into making the drones quiet. Amazon knows people aren't going to respond favorably to having drones buzzing all over if they make a racket. Amazon really thinks drones are going to become the preferred delivery method in the future (and people will stop shooting at them).

There are still legal hurdles to clear, though. The drone regulations introduced by the FAA include the requirement that the operator maintains line-of-sight on the drone at all times. This makes Prime Air unfeasible, but Amazon is in talks with the FAA to work something out. The company might have to launch Prime Air outside the US in the meantime. That said, Misener hopes it will come to the US as soon as the drones are ready.

Damini Khadakkar
TE IT

CLOUD STORAGE AND COMPUTING

Cloud in simple word as we all understand is “storage and computing of data on the online server”. Actually there is nothing like “cloud” , its just a metaphor which symbolise the online or remoteness in the digital world. It is referred so by programmer and developer around the world to show the intermidiate medium in any network. Cloud does not exist in real but is a representation of the pool of resource used in the network to process any data.

Cloud Computing and storage gives the ability to share the resources and reallocate it dynamically. Cloud computing and cloud storage are two stages of the same process. We can relate them with “to process we need data, and processed data we need to store somewhere”. So having both computation and storage at a place (in single system) reduce the network traffic to access a resource stored at the remote server. Storing whole data at a single place practically reduce half of the traffic. The cloud computing and storage serve the backbone for the IOT. And Therefore word “Cloud” hold a deep meaning inside it, in all domains.

History:

The word “cloud” was first used to represent the internet based computing. There is no single term which can exactly define the cloud computing. Cloud is collection of modern technology, web services and virtualisation. The word cloud was flipped with mainframe computing, where employees used to access mainframe from the terminal. Since it was not possible to maintain such a computer for every employee, network was create to provide all the resource from one single Mainframe system.

When computer were connected in network, there was need to maintain a system which can store data and process the request coming from different client system. This formed the foundation of Cloud. Cloud computing and storage is a concept of modern IT infrastructure where billions of computer and devices are connected to network of networks just to process the request of other consumer PC. These computer are super computer which have the capability to handle request and process trillions of request in just seconds.

We all heard about the google drive, dropbox, etc where we store our data. We can save all our data there. And the fun part is that we can access it from anywhere like desktop, mobile, tablet, or any other device which support internet. This is a very simple example of Cloud stoage or Online Storage. Cloud form a web platform instead of local hard disk to store and process the data. The data processing capability is distributed and spread across the network to provide better service.

How IoT is linked to the Cloud Computing:

Cloud computing has evolved to greater stage as we expected in very less time. IoT is now an application or side version of cloud computing. IoT provide interface to the user and consumer through cloud computing. Internet of things is nothing but a concept where all the electronics device are trying to connect to internet. Cloud computing provide virtually unlimited computational capability to the device.

IoT is basically a Private network and therefore it is not directly a part of open Cloud but can access private and hybird cloud for the resources. Cloud based computing reduce the overhead of the device and reduce on-chip storage. We can treat cloud as virtual system which can interface any kind of device and process its request. Cloud provide direct storage on the server of the host. Sensor nodes in the IoT can directly access cloud storage to store their data on the servers.

As per basic definition we can state, Cloud computing is a concept of using network of remote server hosted on internet to store, manage and process user’s data, rather than local server or a PC to perform such functions. But if we are integrating Cloud computing and IoT, we need to change some terminology. When IoT is used on cloud a new concept of networking is generated.

IoT is network based on WSN. If WSN have the access to store, manage and process the data through internet, then it must use Cloud. Since the IoT access a private network it need to be protected on the cloud, which is shared network. So that only limited or priveledged user /device can use the resource shared by the IoT WSN. With the advancement of 4G-LTE cellular network and wifi the IoT is growing with a faster rate.

And therefore can access Cloud server more easily and securely.

The collective usage of Cloud and IoT gives a brand new domain of research known as “Fog Computing” also called as “Fogging”. It is a distributed computing infrastructure.Fog sometimes also comes by the name of “Cisco fog computing”, as it a registered name by Cisco. The word Fog conveys meaning of localized cloud which provide faster access by staying closer to the data source.

Fog Computing:

The term “Fog computing” was introduced by professor Salvatore J. Stolfo. The Fog computing is a side version or an improved version of cloud which does not deal with the centralisation but focus mainly on the localization of the resources.

Fog computing is advance concept of sharing IoT on a Cloud, where some application run at client or IoT nodes and some run as cloud servers. Fog computing decentralize the cloud computing concept and emphasise on the end-user or client objective rather than sharing the resources. It dynamically checks the density of traffic and route it to provide quality of service(QoS). The concept is still not yet developed fully or commercially. The concept perceived both large cloud systems and big data structures based servers making it compatible with the existing network of both virtual and real devices.

Fog computing is kind of a new breed of cloud computing which not only connect the cloud but also provide connectivity to the IoT network. It’s main aim is to reduce the amount of the data transported to and back from the cloud server. It also increase the efficiency and reduce the rate of transfer. In fogging most of the data processing will done at node end or client side in a gateway system.

This distributed approach is growing because of the wide acceptability of the IoT. Since the amount of nodes and data handled by the WSN is enormous it need to be processed and standardized at the node itself in order to stored at cloud. This method not only reduce the amount of data but also reduce the time to access the data from cloud. Computation done at client server or localized server reduce the need of storing the data at the Centralised server. User can directly access any info from localized server.

IoT and Cloud:

IoT and Cloud are coupled together to form a unit which will form chain of network. The preference to localized server than centralised server will reduce the rate of data transfer. Special purpose cloud server can be implement by the use to access the information store by the IoT nodes. These cloud will gather and distribute the info more faster and secure. The good thing about integrating IoT with Cloud is that we can practically connect “anything” to the internet which can either process or gather data.

Cloud hold and delivers the resourses on demand over the Internet as a Service (IaaS). Cloud computing process the data as Software as a Service(SaaS). Both these can be utilised to make a smart environment. So many tools are available in the open source which provide the capabality to configure the IoT based on Cloud. Some of those are IoT by Oracle, BlueMix by IBM, SAP IoT, OpenRemote, ioBridge and lot more. These can be used to configure the IoT and we need separately implement the gateway to handle the access to store and process the data.

IoT and cloud are changing the face of normal internet usage by the human kind. Most of the Enterprise and Business are converting their resources into Cloud and IoT based. This increase the productivity of the company and also help them reduce and smartly configure their resources. The number is keep on increasing day after day.

Tejaswini Dhupad
TE IT

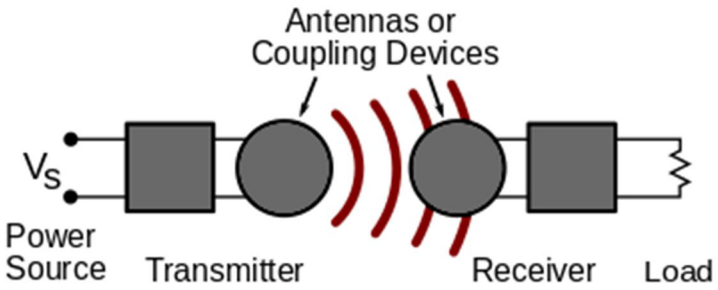
WIRELESS POWER TRANSMISSION

Wireless power transfer (WPT) or wireless energy transmission is the transmission of electrical energy from a power source to an electrical load, such as an electrical power grid or a consuming device, without the use of discrete man-made conductors. Wireless power is a generic term that refers to a number of different power transmission technologies that use time-varying electric, magnetic, or electromagnetic fields. In wireless power transfer, a wireless transmitter connected to a power source conveys the field energy across an intervening space to one or more receivers, where it is converted back to an electrical current and then used. Wireless transmission is useful to power electrical devices in cases where interconnecting wires are inconvenient, hazardous, or are not possible.

Wireless power techniques fall into two categories, non-radiative and radiative. In non-radiative techniques, power is typically transferred by magnetic fields using inductive coupling between coils of wire. Applications of this type include electric toothbrush chargers, RFID tags, smartcards, and chargers for implantable medical devices like artificial cardiac pacemakers, and inductive powering or charging of electric vehicles like trains or buses. A current focus is to develop wireless systems to charge mobile and handheld computing devices such as cellphones, digital music players and portable computers without being tethered to a wall plug. Power may also be transferred by electric fields using capacitive coupling between metal electrodes. In radiative far-field techniques, also called power beaming, power is transferred by beams of electromagnetic radiation, like microwaves or laser beams. These techniques can transport energy longer distances but must be aimed at the receiver. Proposed applications for this type are solar power satellites, and wireless powered drone aircraft.

Japan and China both have national ambitions to begin on-orbit testing of Solar Power Satellites by the 2030s which may accelerate both technical and regulatory progress.

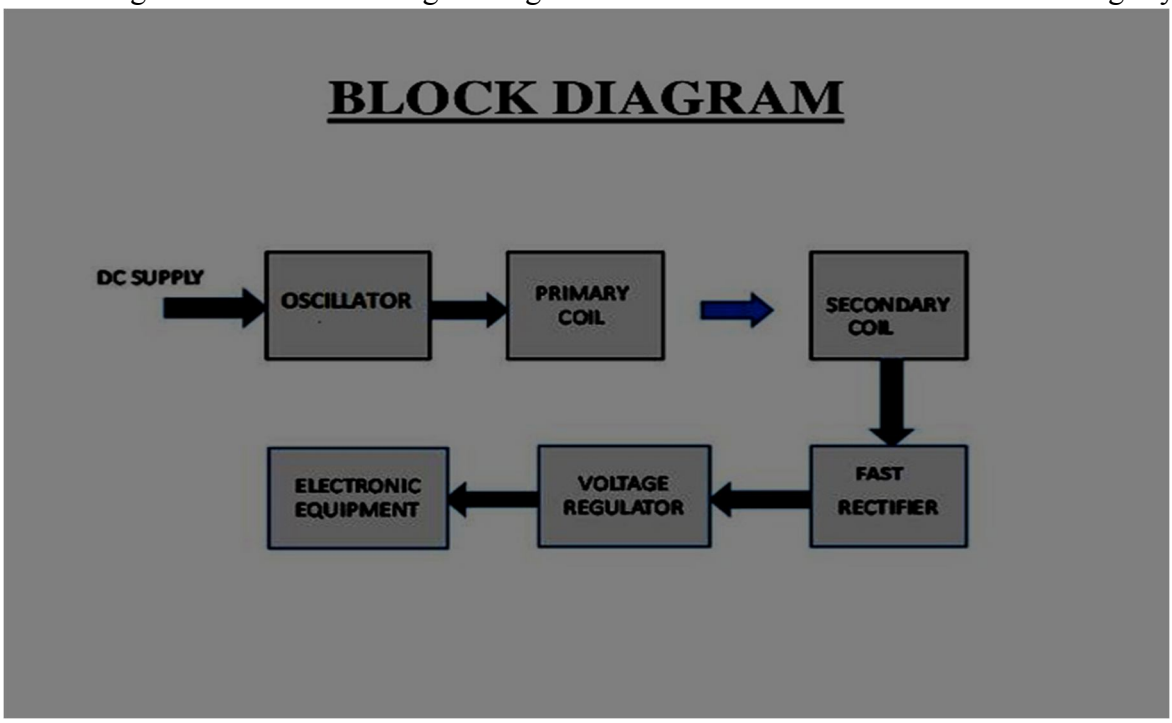
An important issue associated with all wireless power systems is limiting the exposure of people and other living things to potentially injurious electromagnetic fields.



Generic Block Diagram of a Wireless Power

In general a wireless power system consists of a "transmitter" connected to a source of power such as a mains power line, which converts the power to a time-varying electromagnetic field, and one or more "receiver" devices which receive the power and convert it back to DC or AC electric current which is used by an electrical load.At the transmitter the input power is converted to an oscillating electromagnetic field by some type of "antenna" device. The word "antenna" is used loosely here; it may be a coil of wire which generates a magnetic field, a metal plate which generates an electric field, an antenna which radiates radio waves, or a laser which generates light. A similar antenna or coupling device at the receiver converts the oscillating fields to an electric current. An important parameter that determines the type of waves is the frequency f in hertz of the oscillations. The frequency determines the wavelength $\lambda = c/f$ of the waves which carry the energy across the gap, where c is the velocity of light.

Wireless power uses the same fields and waves as wireless communication devices like radio,another familiar technology that involves electrical energy transmitted without wires by electromagnetic fields, used in cellphones, radio and television broadcasting, and WiFi. In radio communication the goal is the transmission of information, so the amount of power reaching the receiver is not so important, as long as it is sufficient so the signal to noise ratio is high enough that the information can be received intelligibly.



In wireless communication technologies, generally, only tiny amounts of power reach the receiver. In contrast, with wireless power the amount of energy received is the important thing, so the efficiency (fraction of transmitted energy that is received) is the more significant parameter.For this reason, wireless power technologies are likely to be more limited by distance than wireless communication technologies.

Kavita Pandey
TE IT

GREEN IT

Green computing, Green ICT as per IFG International Federation of Green ICT and IFG Standard, green IT, or ICT sustainability, is the study and practice of environmentally sustainable computing or IT. San Murugesan notes that this can include "designing, manufacturing, using, and disposing of computers, servers, and associated subsystems—such as monitors, printers, storage devices, and networking and communications systems — efficiently and effectively with minimal or no effect on the environment.

The goals of green computing are similar to green chemistry: reduce the use of hazardous materials, maximize energy efficiency during the product's lifetime, and promote the recyclability or biodegradability of defunct products and factory waste. Green computing is important for all classes of systems, ranging from handheld systems to large-scale data centers.Many corporate IT departments have green computing initiatives to reduce the environmental effect of their IT operations.

In 1992, the U.S. Environmental Protection Agency launched Energy Star, a voluntary labeling program that is designed to promote and recognize energy-efficiency in monitors, climate control equipment, and other technologies. This resulted in the widespread adoption of sleep mode among consumer electronics. Concurrently, the Swedish organization TCO Development launched the TCO Certification program to promote low magnetic and electrical emissions from CRT-based computer displays; this program was later expanded to include criteria on energy consumption, ergonomics, and the use of hazardous materials in construction.

Regulations and industry initiatives:

The Organisation for Economic Co-operation and Development (OECD) has published a survey of over 90 government and industry initiatives on "Green ICTs", i.e. information and communication technologies, the environment and climate change. The report concludes that initiatives tend to concentrate on the greening ICTs themselves rather than on their actual implementation to tackle global warming and environmental degradation. In general, only 20% of initiatives have measurable targets, with government programs tending to include targets more frequently than business associations.

Government

Many governmental agencies have continued to implement standards and regulations that encourage green computing. The Energy Star program was revised in October 2006 to include stricter efficiency requirements for computer equipment, along with a tiered ranking system for approved products.

By 2008, 26 US states established statewide recycling programs for obsolete computers and consumer electronics equipment. The statutes either impose an "advance recovery fee" for each unit sold at retail or require the manufacturers to reclaim the equipment at disposal.

In 2010, the American Recovery and Reinvestment Act (ARRA) was signed into legislation by President Obama. The bill allocated over $90 billion to be invested in green initiatives (renewable energy, smart grids, energy efficiency, etc.) In January 2010, the U.S. Energy Department granted $47 million of the ARRA money towards projects that aim to improve the energy efficiency of data centers. The projects provided research to optimize data center hardware and software, improve power supply chain, and data center cooling technologies.

Industry

Climate Savers Computing Initiative (CSCI) is an effort to reduce the electric power consumption of PCs in active and inactive states. The CSCI provides a catalog of green products from its member organizations, and information for reducing PC power consumption. It was started on 2007-06-12. The name stems from the World Wildlife Fund's Climate Savers program, which was launched in 1999. The WWF is also a member of the Computing Initiative.

The Green Electronics Council offers the Electronic Product Environmental Assessment Tool (EPEAT) to assist in the purchase of "greener" computing systems. The Council evaluates computing equipment on 51 criteria - 23 required and 28 optional - that measure a product's efficiency and sustainability attributes. Products are rated Gold, Silver, or Bronze, depending on how many optional criteria they meet. On 2007-01-24, President George W. Bush issued Executive Order 13423, which requires all United States Federal agencies to

use EPEAT when purchasing computer systems.

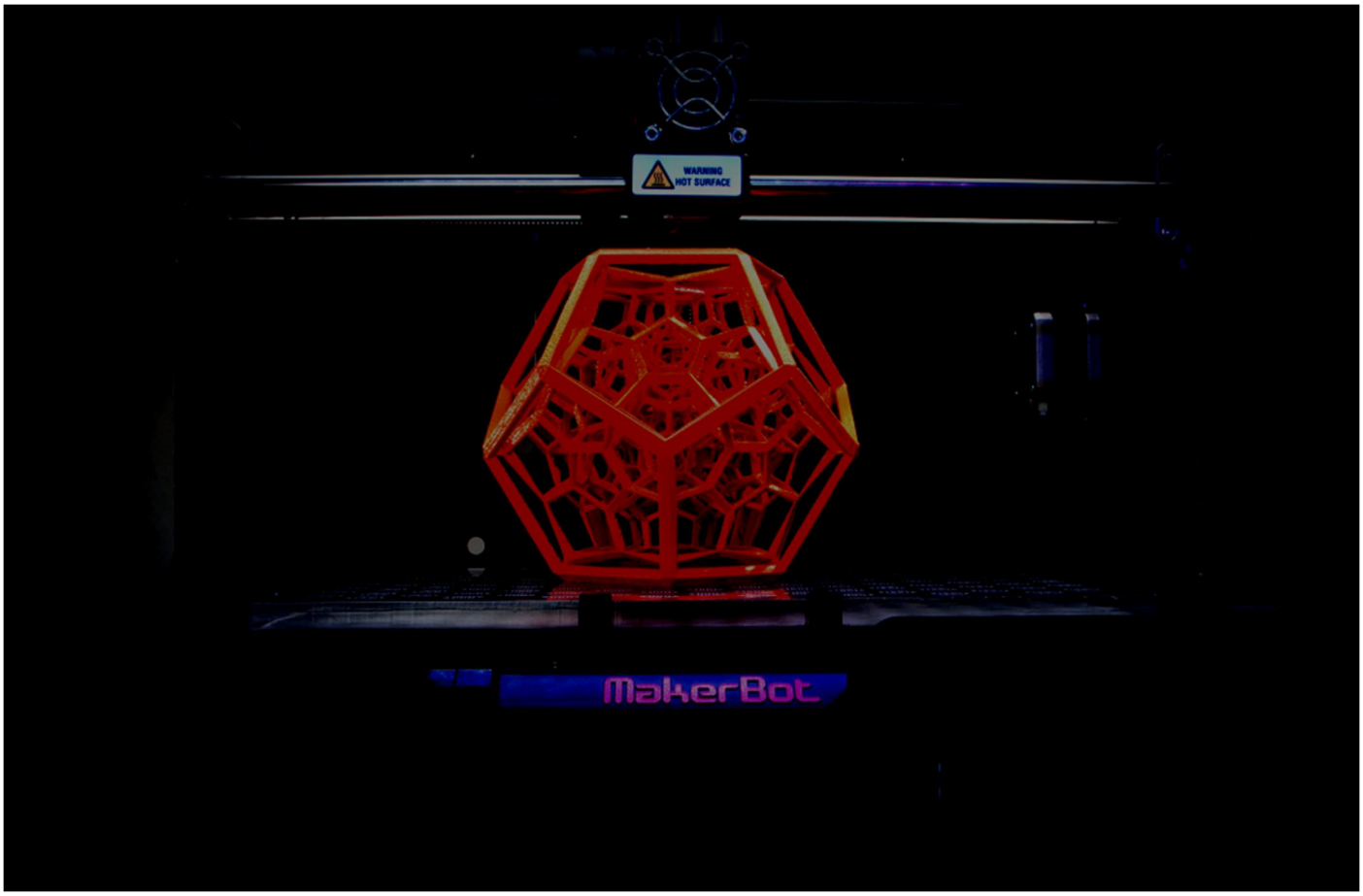
The Green Grid is a global consortium dedicated to advancing energy efficiency in data centers and business computing ecosystems. It was founded in February 2007 by several key companies in the industry – AMD, APC, Dell, HP, IBM, Intel, Microsoft, Rackable Systems, SprayCool (purchased in 2010 by Parker), Sun Microsystems and VMware. The Green Grid has since grown to hundreds of members, including end-users and government organizations, all focused on improving data center infrastructure efficiency (DCIE).

The Green500 list rates supercomputers by energy efficiency (megaflops/watt), encouraging a focus on efficiency rather than absolute performance.Green Comm Challenge is an organization that promotes the development of energy conservation technology and practices in the field of Information and Communications Technology (ICT).

The Transaction Processing Performance Council (TPC) Energy specification augments existing TPC benchmarks by allowing optional publications of energy metrics alongside performance results.SPECpower is the first industry standard benchmark that measures power consumption in relation to performance of satveer for server-class computers. Other benchmarks which measure energy efficiency include SPECweb, SPECvirt, and VMmark.

Ankit Baghel
SE-IT

3D PRINTING



3D printing, also known as additive manufacturing (AM), refers to various processes used synthesize a three-dimensional object. In 3D printing, successive layers of material are formed under computer control to create an object. These objects can be of almost any shape or geometry and are produced from a 3D model or other electronic data source. A 3D printer is a type of industrial robot.

Futurologist Jeremy Rifkin claimed that 3D printing signals the beginning of a third industrial revolution, succeeding the production line assembly that dominated manufacturing starting in the late 19th century. Using the power of the Internet, it may eventually be possible to send a blueprint of any product to any place in the world to be replicated by a 3D printer with "elemental inks" capable of being combined into any material substance of any desired form.

In the term's original sense, 3D printing refers to processes that sequentially deposit material onto a powder bed with inkjet printer heads. More recently, the meaning of the term has expanded to encompass a wider variety of techniques, including extrusion and sintering-based processes. Technical standards generally use the term additive manufacturing for this broader sense.

TERMINOLOGY AND METHODS:

Early Additive Manufacturing (or AM) equipment and materials were developed in the 1980s. In 1981, Hideo Kodama of Nagoya Municipal Industrial Research Institute invented two AM fabricating methods of a three-dimensional plastic model with photo-hardening polymer, where the UV exposure area is controlled by a mask pattern or the scanning fiber transmitter.But on July 16, 1984 Alain Le Méhauté, Olivier de Witte and Jean Claude André filed their patent for the stereolithography process. It was three weeks before Chuck Hull filed his own patent for stereolithography. The application of French inventors were abandoned by the French General Electric Company (now Alcatel-Alsthom) and CILAS (The Laser Consortium). The claimed reason was "for lack of business perspective". Then in 1984, Chuck Hull of 3D Systems Corporation developed a

prototype system based on a process known as stereolithography, in which layers are added by curing photopolymers with ultraviolet light lasers. Hull defined the process as a "system for generating three-dimensional objects by creating a cross-sectional pattern of the object to be formed, but this had been already invented by Kodama. Hull's contribution is the design of the STL (STereoLithography) file format widely accepted by 3D printing software as well as the digital slicing and infill strategies common to many processes today. The term 3D printing originally referred to a process employing standard and custom inkjet print heads. The technology used by most 3D printers to date—especially hobbyist and consumer-oriented models—is fused deposition modeling, a special application of plastic extrusion.

AM processes for metal sintering or melting (such as selective laser sintering, direct metal laser sintering, and selective laser melting) usually went by their own individual names in the 1980s and 1990s. At the time, nearly all metal working was produced by casting, fabrication, stamping, and machining; although plenty of automation was applied to those technologies (such as by robot welding and CNC), the idea of a tool or head moving through a 3D work envelope transforming a mass of raw material into a desired shape layer by layer was associated by most people only with processes that removed metal (rather than adding it), such as CNC milling, CNC EDM, and many others. But AM-type sintering was beginning to challenge that assumption. By the mid 1990s, new techniques for material deposition were developed at Stanford and Carnegie Mellon University, including microcasting and sprayed materials.Sacrificial and support materials had also become more common, enabling new object geometries.

The umbrella term additive manufacturing gained wider currency in the decade of the 2000s.As the various additive processes matured, it became clear that soon metal removal would no longer be the only metalworking process done under that type of control (a tool or head moving through a 3D work envelope transforming a mass of raw material into a desired shape layer by layer). It was during this decade that the term subtractive manufacturing appeared as a retronym for the large family of machining processes with metal removal as their common theme. However, at the time, the term 3D printing still referred only to the polymer technologies in most minds, and the term AM was likelier to be used in metalworking contexts than among polymer/inkjet/stereolithography enthusiasts. The term subtractive has not replaced the term machining, instead complementing it when a term that covers any removal method is needed.

By the early 2010s, the terms 3D printing and additive manufacturing developed senses in which they were synonymous umbrella terms for all AM technologies. Although this was a departure from their earlier technically narrower senses, it reflects the simple fact that the technologies all share the common theme of sequential-layer material addition/joining throughout a 3D work envelope under automated control. (Other terms that have appeared, which are usually used as AM synonyms (although sometimes as hypernyms), have been desktop manufacturing, rapid manufacturing [as the logical production-level successor to rapid prototyping], and on-demand manufacturing [which echoes on-demand printing in the 2D sense of printing].) The 2010s were the first decade in which metal parts such as engine brackets and large nuts would be grown (either before or instead of machining) in job production rather than obligately being machined from bar stock or plate.

As technology matured, several authors had begun to speculate that 3D printing could aid in sustainable development in the developing world.

Himani Gupta
SE IT

GESTURE RECOGNITION

Gesture Recognition is the mathematical interpretation of a human motion by a computing device. Gesture Recognition ,along with facial recognition ,voice recognition ,eye tracking and lip movement recognition are components of what developers refer to as perceptual user interface(PUI).

The ability to track a person's movements and determine what gestures they may be performing can be achieved through various tools. Although there is a large amount of research done in image/video based gesture recognition, there is some variation within the tools and environments used between implementations.

Wired gloves:

These can provide input to the computer about the position and rotation of the hands using magnetic or inertial tracking devices. Furthermore, some gloves can detect finger bending with a high degree of accuracy (5-10 degrees), or even provide haptic feedback to the user, which is a simulation of the sense of touch. The first commercially available hand-tracking glove-type device was the Data Glove, a glove-type device which could detect hand position, movement and finger bending. This uses fiber optic cables running down the back of the hand. Light pulses are created and when the fingers are bent, light leaks through small cracks and the loss is registered, giving an approximation of the hand pose.

Depth-aware cameras. Using specialized cameras such as structured light or time-of-flight cameras, one can generate a depth map of what is being seen through the camera at a short range, and use this data to approximate a 3d representation of what is being seen. These can be effective for detection of hand gestures due to their short range capabilities.

Stereo cameras. Using two cameras whose relations to one another are known, a 3d representation can be approximated by the output of the cameras. To get the cameras' relations, one can use a positioning reference such as a lexian-stripe or infrared emitters. In combination with direct motion measurement (6D-Vision) gestures can directly be detected.

Gesture-based controllers. These controllers act as an extension of the body so that when gestures are performed, some of their motion can be conveniently captured by software. Mouse gestures are one such example, where the motion of the mouse is correlated to a symbol being drawn by a person's hand, as is the Wii Remote or the Myo armband or the mForce Wizard wristband, which can study changes in acceleration over time to represent gestures.Devices such as the LG Electronics Magic Wand, the Loop and the Scoop use Hillcrest Labs' Freespace technology, which uses MEMS accelerometers, gyroscopes and other sensors to translate gestures into cursor movement. The software also compensates for human tremor and inadvertent movement. Audio Cubes are another example. The sensors of these smart light emitting cubes can be used to sense hands and fingers as well as other objects nearby, and can be used to process data. Most applications are in music and sound synthesis, but can be applied to other fields.

Single camera:

A standard 2D camera can be used for gesture recognition where the resources/environment would not be convenient for other forms of image-based recognition. Earlier it was thought that single camera may not be as effective as stereo or depth aware cameras, but some companies are challenging this theory. Software-based gesture recognition technology using a standard 2D camera that can detect robust hand gestures.

Challenges:

There are many challenges associated with the accuracy and usefulness of gesture recognition software. For image-based gesture recognition there are limitations on the equipment used and image noise. Images or video may not be under consistent lighting, or in the same location. Items in the background or distinct features of the users may make recognition more difficult.

The variety of implementations for image-based gesture recognition may also cause issue for viability of the technology to general usage. For example, an algorithm calibrated for one camera may not work for a different camera. The amount of background noise also causes tracking and recognition difficulties, especially when occlusions (partial and full) occur. Furthermore, the distance from the camera, and the camera's resolution and quality, also cause variations in recognition accuracy.

In order to capture human gestures by visual sensors, robust computer vision methods are also required, for example for hand tracking and hand posture recognition or for capturing movements of the head, facial expressions or gaze direction.

"Gorilla arm"

"Gorilla arm" was a side-effect of vertically oriented touch-screen or light-pen use. In periods of prolonged use, users' arms began to feel fatigue and/or discomfort. This effect contributed to the decline of touch-screen input despite initial popularity in the 1980s.

In order to measure arm fatigue and the gorilla arm side effect, researchers developed a technique called Consumed Endurance.

The market is changing rapidly due to evolving technology and more and more OEM's are moving towards gesture recognition technology adoption. As per a report published by Markets and Markets, the gesture recognition market is estimated to grow at a healthy CAGR from 2013 till 2018 and is expected to cross $15.02 billion by the end of these five years. Analysts forecast the Global Gesture Recognition market to grow at a CAGR of 29.2 percent over the period 2013–2018.

If we talk in terms of industry, then currently consumer electronics application contributes to more than 99% of the global gesture recognition market. As per the report published, the Healthcare application is expected to emerge as a significant market for gesture recognition technologies over the next five years. The automotive application for gesture recognition is expected to be commercialized in 2015.Gesture recognition is the mathematical interpretation of a human motion by a computing device.

Gesture recognition, along with facial recognition, voice recognition, eye tracking and lip movement recognition are components of what developers refer to as a perceptual user interface (PUI). The goal of PUI is to enhance the efficiency and ease of use for the underlying logical design of a stored program, a design discipline known as usability.

In personal computing, gestures are most often used for input commands. Recognizing gestures as input allows computers to be more accessible for the physically-impaired and makes interaction more natural in a gaming or 3-D virtual reality environment. Hand and body gestures can be amplified by a controller that contains accelerometers and gyroscopes to sense tilting, rotation and acceleration of movement -- or the computing device can be outfitted with a camera so that software in the device can recognize and interpret specific gestures. A wave of the hand, for instance, might terminate the program.

In addition to the technical challenges of implementing gesture recognition, there are also social challenges. Gestures must be simple, intuitive and universally acceptable. The study of gestures and other nonverbal types of communication is known as kinesics .Gesture types

In computer interfaces, two types of gestures are distinguished:[9] We consider online gestures, which can also be regarded as direct manipulations like scaling and rotating. In contrast, offline gestures are usually processed after the interaction is finished; e. g. a circle is drawn to activate a context menu.

Offline gestures:

Those gestures that are processed after the user interaction with the object. An example is the gesture to activate a menu.

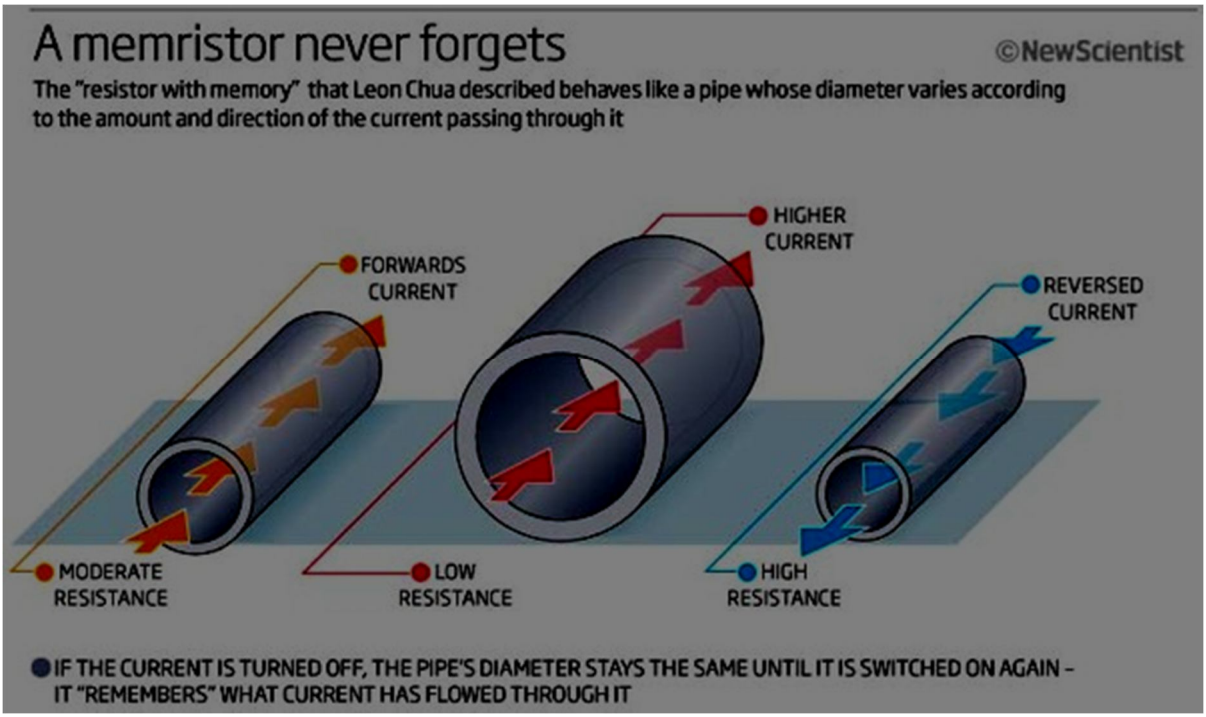
Online gestures:

Direct manipulation gestures. They are used to scale or rotate a tangible object.

Nimish Bhandare
SE IT

MEMRISTOR

Since the dawn of electronics, we've had only three types of circuit components--resistors, inductors, and capacitors. But in 1971, UC Berkeley researcher Leon Chua theorized the possibility of a fourth type of component, one that would be able to measure the flow of electric current: the memristor. Now, just 37 years later, Hewlett-Packard has built one.



What is it? As its name implies, the memristor can "remember" how much current has passed through it. And by alternating the amount of current that passes through it, a memristor can also become a one-element circuit component with unique properties. Most notably, it can save its electronic state even when the current is turned off, making it a great candidate to replace today's flash memory.

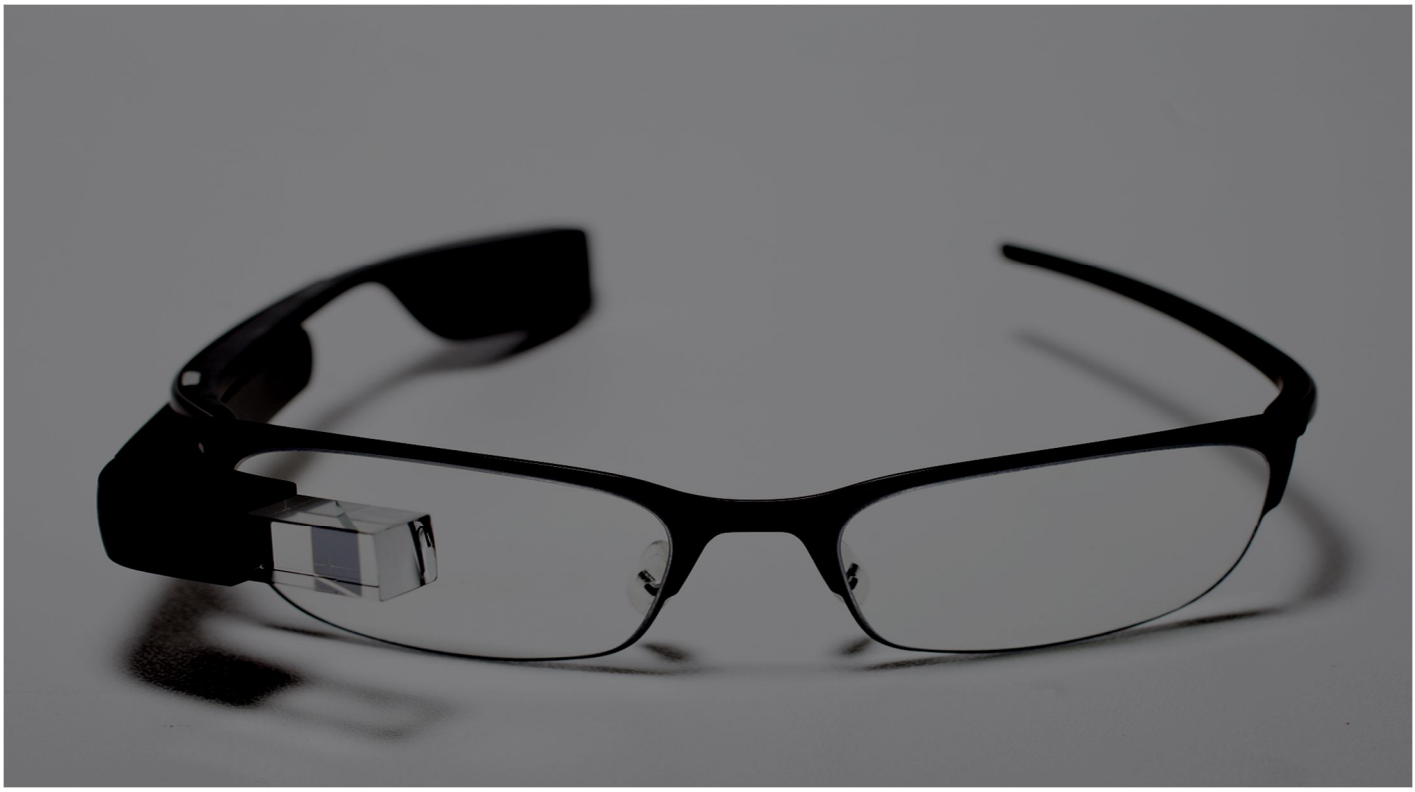
Memristors will theoretically be cheaper and far faster than flash memory, and allow far greater memory densities. They could also replace RAM chips as we know them, so that, after you turn off your computer, it will remember exactly what it was doing when you turn it back on, and return to work instantly. This lowering of cost and consolidating of components may lead to affordable, solid-state computers that fit in your pocket and run many times faster than today's PCs.

Someday the memristor could spawn a whole new type of computer, thanks to its ability to remember a range of electrical states rather than the simplistic "on" and "off" states that today's digital processors recognize. By working with a dynamic range of data states in an analog mode, memristor-based computers could be capable of far more complex tasks than just shuttling ones and zeroes around.

When is it coming? Researchers say that no real barrier prevents implementing the memristor in circuitry immediately. But it's up to the business side to push products through to commercial reality. Memristors made to replace flash memory (at a lower cost and lower power consumption) will likely appear first; HP's goal is to offer them by 2012. Beyond that, memristors will likely replace both DRAM and hard disks in the 2014-to-2016 time frame. As for memristor-based analog computers, that step may take 20-plus years.

Rahul Anantulwar
SE IT

GOOGLE GOGGLES



Google Goggles is an image recognition mobile app developed by Google. It is used for searches based on pictures taken by handheld devices. For example, taking a picture of a famous landmark searches for information about it, or taking a picture of a product's barcode searches for information on the product.

Google Goggles was developed for use on Google's Android operating systems for mobile devices. While initially only available in a beta version for Android phones, Google announced its plans to enable the software to run on other platforms, notably iPhone and BlackBerry devices.[3] Google did not discuss a non-handheld format. On 5 October 2010, Google announced availability of Google Goggles for iPhone and iPad devices running iOS 4.0.

In a May 2014 update to Google Mobile for iOS, the Google Goggles feature was removed due to being "of no clear use to too many people.

Uses:

The system could identify various labels or landmarks, allowing users to learn about such items without needing a text-based search. The system could identify products barcodes or labels that allow users to search for similar products and prices, and save codes for future reference, similar to the failed CueCat of the late '90s, but with more functionality. The system also recognized printed text and use optical character recognition (OCR) to produce a text snippet, and in some cases even translate the snippet into another language.The Google Goggles platform leveraged the intellectual property and inventions created by futurist and technologist Jason Alan Snyder.

Metropolitan Museum of Art

The Metropolitan Museum of Art announced in December 2011 its collaboration with Google to use Google Goggles for providing information about the artworks in the museum through direct links to the website of the Metropolitan Museum of Art.

Current version

The final version of Google Goggles was 1.9 which adds several new features and improves both quality and ease of use. Goggles is specifically developed to run on mobile devices running the Android operating system and can be installed using Google Play (formerly Android Market).

Although developed for Android there was an iPhone version, as part of the Google Search app, available from the iTunes Store or App Store. Goggles for iPhone required iPhone 3GS or iPhone 4 or iOS 4.0 or higher to run.In January 2011, version 1.3 was released; it could solve Sudoku puzzles.

In late August 2012, Google launched an update to its Google Goggles app, version 1.9. This update put an emphasis on helping users shop by including improved product recognition and new recommendations that help users browse similar products.

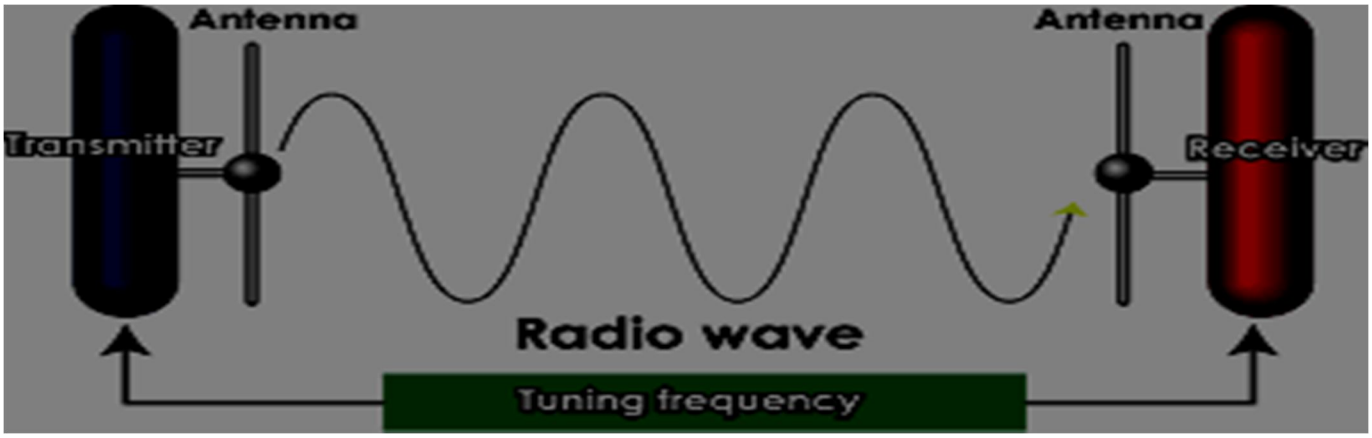
Earlier versions of the Android app were able to load pictures from the phone's gallery, which had been removed in version 1.9.2; however, it could be worked around by sharing the image to the Goggles app from a file browser.

Platform

Google product manager Shailesh Nalawadi indicated that Google wanted Goggles to be an application platform, much like Google Maps, not just a single product.

Rituraj Singh
SE IT

RADIO TECHNOLOGY



Radio is the technology of using radio waves to carry information, such as sound, by systematically modulating some property of electromagnetic energy waves transmitted through space, such as their amplitude, frequency, phase, or pulse width. When radio waves strike an electrical conductor, the oscillating fields induce an alternating current in the conductor. The information in the waves can be extracted and transformed back into its original form.

Radio systems need a transmitter to modulate (change) some property of the energy produced to impress a signal on it, for example using amplitude modulation or angle modulation (which can be frequency modulation or phase modulation). Radio systems also need an antenna to convert electric currents into radio waves, and vice versa. An antenna can be used for both transmitting and receiving. The electrical resonance of tuned circuits in radios allow individual stations to be selected. The electromagnetic wave is intercepted by a tuned receiving antenna. A radio receiver receives its input from an antenna and converts it into a form usable for the consumer, such as sound, pictures, digital data, measurement values, navigational positions, etc. Radio frequencies occupy the range from a 3 kHz to 300 GHz, although commercially important uses of radio use only a small part of this spectrum.

ANTENNA:

Rooftop television antennas. Yagi-Uda antennas like these six are widely used at VHF and UHF frequencies.

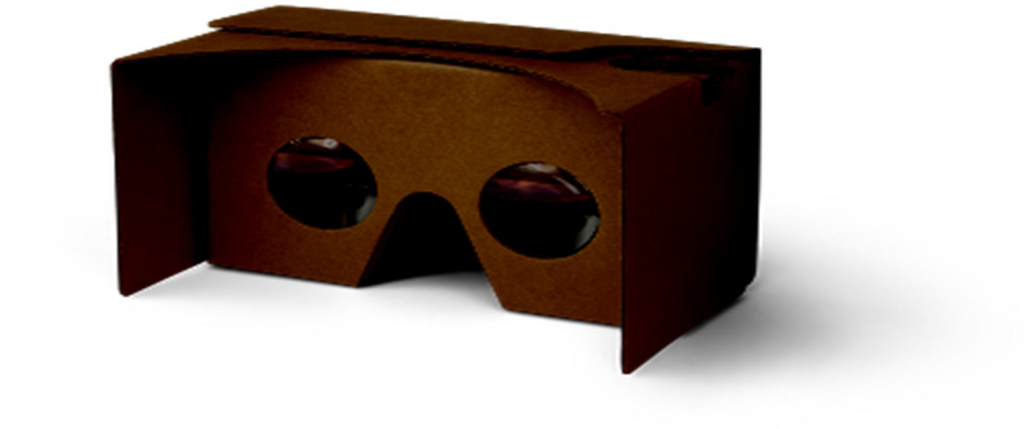
An antenna (or aerial) is an electrical device which converts electric currents into radio waves, and vice versa. It is usually used with a radio transmitter or radio receiver. In transmission, a radio transmitter supplies an electric current oscillating at radio frequency (i.e. high frequency AC) to the antenna's terminals, and the antenna radiates the energy from the current as electromagnetic waves (radio waves). In reception, an antenna intercepts some of the power of an electromagnetic wave in order to produce a tiny voltage at its terminals, that is applied to a receiver to be amplified. Some antennas can be used for both transmitting and receiving, even simultaneously, depending on the connected equipment.

RESONANCE:

Electrical resonance of tuned circuits in radios allow individual stations to be selected. A resonant circuit will respond strongly to a particular frequency, and much less so to differing frequencies. This allows the radio receiver to discriminate between multiple signals differing in frequency.

Sonali Alwani
SE-IT

GOOGLE CARDBOARD



Google Cardboard is a virtual reality(VR) platform developed by Google for use with a head mount for a smartphone. Named for fold-out cardboard viewer, the platform is intended a slow-cost system to encourage interest and development in VR applications. Users can either build their own viewer from simple, low-cost components using specifications published by Google, or purchase a pre-manufactured one. The viewer is used by placing a smartphone into the back of it and viewing through the lenses in the front. The platform was created by David Coz and Damien Henry, Google engineers at the Google Cultural Institute in Paris, in their 20% "Innovation Time Off".It was introduced at the Google I/O 2014 developers conference, where a Cardboard viewer was given away to all attendees. The Cardboard software development kit (SDK) is available for the Android and iOS operating systems; the SDK's VR View allows developers to embed VR content on the web as well as in their mobile apps.

Through January 2016, over 5 million Cardboard viewers had shipped and over 1,000 compatible applications had been published. Following the success of the Cardboard platform, Google announced an enhanced VR platform, Daydream, at Google I/O 2016. In November 2014, Volvo released Volvo-branded Cardboard goggles and an Android app, Volvo Reality, to let the user explore the XC90. In February 2015, toy manufacturer Mattel, in cooperation with Google, announced a VR version of the stereoscopic viewer View-Master. Android support was available at the viewer's release in fall 2015, with support for iOS and Windows smartphones available later.

Google also collaborated with LG Electronics to release a Cardboard-based headset for the LG G3 known as VR for G3. Released in February 2015, it was distributed as a free accessory with new G3 models sold in certain countries, and was perceived to be a competitor to the Samsung Gear VR accessory.On November 8, 2015, The New York Times included a Google Cardboard viewer with all home newspaper deliveries. Readers can download the NYT VR app on their smartphone, which displays journalism-focused immersive VR environments.In December 2015, Google offered free Star Wars-themed Cardboard viewers through the Google Store and Verizon as a part of promotional tie-in for the film Star Wars: The Force Awakens.

Ticket holders for the 2016 Coachella Valley Music and Arts Festival received a Google Cardboard–inspired cardboard VR viewer in their welcome package that can used with the Coachella VR mobile app. The festival's organizers partnered with Vantage.tv to offer VR content for the festival, such as 360° panoramic photos of previous events, virtual tours of the 2016 festival site, interviews, and performances. Google provides three software development kits for developing Cardboard applications: one for the Android operating system using Java, one for the game engine Unity using C#, and one for the iOS operating system.After initially

supporting only Android, Google announced iOS support for the Unity plugin in May 2015 at the Google I/O 2015 conference.Third-party apps with Cardboard support are available on the Google Play store and App Store for iOS. In addition to native Cardboard apps, there are Google Chrome VR Experiments implemented using WebGL; phones, including Apple's, that support WebGL can run Google's web experiments. A port of the Google Cardboard demonstration app to iOS was released at Google I/O 2015. In January 2016, Google announced that the software development kits would support spatial audio, a virtual reality effect intended to simulate audio coming from outside of the listeners head located anywhere in 3D space.

In March 2016, Google released VR View, an expansion of the Cardboard SDK allowing developers to embed 360-degree VR content on a web page or in a mobile app, across desktop, Android, and iOS. The Javascript and HTML code for web publishing VR content is open source and available on GitHub, allowing developers to self-host their content.

Viewer assembly and operation:

Google Cardboard headsets are built out of simple, low-cost components. The headset specifications were designed by Google, which made the list of parts, schematics, and assembly instructions freely available on their website, allowing people to assemble Cardboard themselves from readily available parts. Pre-manufactured viewers were only available from third-party vendors until February 2016, when Google began selling their own through the Google Store.

The parts that make up a Cardboard viewer are a piece of cardboard cut into a precise shape, 45 mm focal length lenses, magnets or capacitive tape, a hook and loop fastener (such as Velcro), a rubber band, and an optional near field communication (NFC) tag. Google provides extra recommendations for large scale manufacturing, and pre-assembled kits based on these plans are available for less than US$5 from multiple vendors, who have also created a number of Cardboard variations.

Once the kit is assembled, a smartphone is inserted in the back of the device and held in place by the selected fastening device. A Google Cardboard–compatible app splits the smartphone display image into two, one for each eye, while also applying barrel distortion to each image to counter pincushion distortion from the lenses. The result is a stereoscopic ("3D") image with a wide field of view.

The first version of Cardboard could fit phones with screens up to 5.7 inches (140 mm) and used magnets as input buttons, which required a compass sensor in the phone. An updated design released at Google I/O 2015 works with phones up to 6 inches (150 mm) and replaces the magnet switch with a conductive lever that triggers a touch event on the phone's screen for better compatibility across devices.

This was how the google cardboard was invented and later developed by various companies at very much glance level, to punctuate in the market. We can buy this kind of cardboard at $35.And this is the basic price it may be varying as per the models.

Suyash Patekar

SE IT

LI-FI

Lifi is a bi-directional , high speed and fully networked wireless communication technology simillar to Wi-fi. Li-fi stands for Light Fidelity. The term was coined by Harald Haas and is a form of visible light communication and a subset of optical wireless communications and could be a complement to RF communications. Lifi has reached speed upto 10 Gbps as stated by its creator in TED talk session.

Technical details:

This OWC (Optical Wireless Communication) uses light from LEDs as a medium to deliver networked, mobile, high speed communication in a simillar manner as Wifi. Visible light communication works by switching the current to the LEDs off and on at a very high rate, too quick for the human eye to notice. Although Lifi LEDs would have to be kept on to transmit data, they could be dimmed to below human visibility while still emiting enough light to carry data. The light waves cannot penetrate walls which makes a much shorter range though more secure from hacking realtive to Wifi.

Lifi Advantages over Wifi:

Lifi has the advantage of being useful in electromagnetic sensitive areas such as in aircraft cabins, hospitals and nuclear power without causing electromagnetic interference. Both wifi and lifi transmit data over electromagnetic spectrum, but Wifi uses radio waves whereas Lifi uses visible light.Wifi is being saturated day by day, but according to its creators, Lifi has no limitations on capacity. The visible light spectrum is 10,000 times larger than the entire radio frequency spectrum. Lifi is expected to be 10 times cheaper than Wifi.

Standards for Lifi:

Like Wifi, Lifi is wireless and uses 802.11 protocols but it uses visible light communication which has a much higher bandwidth. One part of VLC is modeled after communications protocols established by the IEEE 802 workgroup. However, the IEEE 802.15.7 standard is out of date, it fails to consider the latest technological developements in the field of optical wireless communications, specially with the introduction of orthogonal frequency division multiplexing (O-OFDM) modulation methods which have been optimized for data rates, multiple access and energy.

Products of Lifi:

The first VLC smartphone was presented at the Consumer Electronics Show in Las Vegas from January 7-10 in 2014. The phone uses SunPartner's Wysips CONNECT, a technique that converts light waves into usable energy, making the phone capable of recieving and decoding signals without drawing on its battery. A clear thin layer of crystal glass can be added to small screens like watches and smartphones that make them solar powered.

Phillips lighting company has developed a VLC system for shoppers at stoeres. They have to download an app on their smartphone and their smartphone works with the LEDs in the store. The LEDs can pinpoint where they are located in the store and give them corresponding coupons and information based on which aisle they are on and what are they looking for.

SQOOP

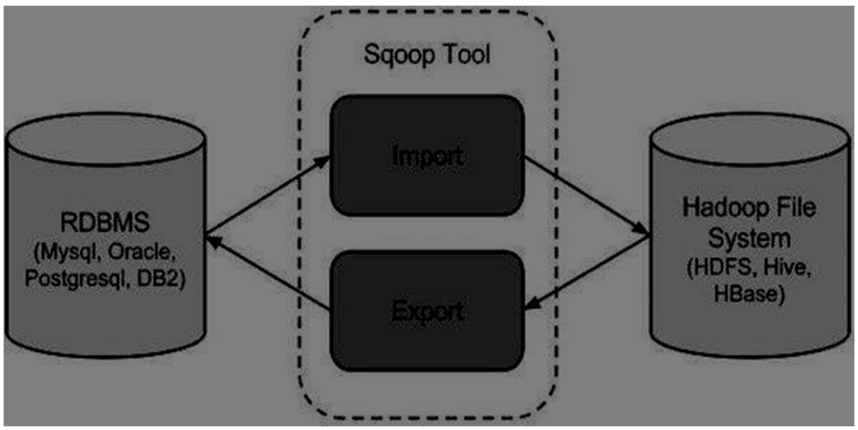
Sqoop is a tool designed to transfer data between Hadoop and relational database servers. It is used to import data from relational databases such as MySQL, Oracle to Hadoop HDFS, and export from Hadoop file system to relational databases. This is a brief tutorial that explains how to make use of Sqoop in Hadoop ecosystem.The traditional application management system, that is, the interaction of applications with relational database using RDBMS, is one of the sources that generate Big Data. Such Big Data, generated by RDBMS, is stored in **Relational Database Servers** in the relational database structure. When Big Data storages and analyzers such as MapReduce, Hive, HBase, Cassandra, Pig, etc. of the Hadoop ecosystem came into picture, they required a tool to interact with the relational database servers for importing and exporting the Big Data residing in them. Here, Sqoop occupies a place in the Hadoop ecosystem to provide feasible interaction between relational database server and Hadoop's HDFS.

Sqoop: "SQL to Hadoop and Hadoop to SQL"

Sqoop is a tool designed to transfer data between Hadoop and relational database servers. It is used to import data from relational databases such as MySQL, Oracle to Hadoop HDFS, and export from Hadoop file system to relational databases. It is provided by the Apache Software Foundation.

How Sqoop works?

The following image describes the workflow of Sqoop.



Sqoop Import and Sqoop Export:

The import tool imports individual tables from RDBMS to HDFS. Each row in a table is treated as a record in HDFS. All records are stored as text data in text files or as binary data in Avro and Sequence files.The export tool exports a set of files from HDFS back to an RDBMS. The files given as input to Sqoop contain records, which are called as rows in table. Those are read and parsed into a set of records and delimited with user-specified delimiter.

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Once a new technology rolls over you, if you are not part of streamroller, then you're part of road

--Bill Gates

Designed by: Anuj Togare

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