



Government Polytechnic Nanded

IF Department



E-Magazine





Government Polytechnic College, Nanded.



Vision

It will be a national level institute, imparting value based technical education catering to needs of stake holders, with fully developed professionalism among students with a feeling of patriotism



Mission

To become a top class role model institute imparting excellent, need based technical education with continuous strive for center of excellence in all program conducive environment beneficial for the society and nation.

Principal's Desk

welcome to government polytechnic, nanded, an institute established in 1964, has been always leading institute in terms of information technology, and education our institute focuses on taking all the possible efforts for creating versatile students, who will be able to face all the challenging conditions in respective fields.

HOD DESK



Information Technology is a one of the emerging computing discipline. Now a day's Computers became essential work tools at every level of most organizations, and networked computer systems became the information backbone of organizations. Information Technology refers to undergraduate degree programs that prepare students to meet the computer technology needs of business, government, health care, schools, and other kinds of organizations

IT is a new and rapidly growing field that started as a grassroots response to the practical, everyday needs of business and other organizations. Today, organizations of every kind are dependent on Information Technology. They need to have appropriate systems in place.

Mr.S.N.Dhole

VISION

The department will be the center of excellence in Training and research in Information Technology to meet the present and future needs of society

MISSION

- To train the students in latest technologies and achieve best standards in theoretical, practical aspects
- Providing an environment that inculcates ethics and effective soft-skills and focuses on the development of learners
- To involving students in live projects in collaboration with industry at low cost to help people

ZIGBEE WIRELESS TECHNOLOGY



ABSTRACT

In this present communication world there are numerous high data rate communication standards that are available, but none of these meet the sensors' and control devices' communication standards.

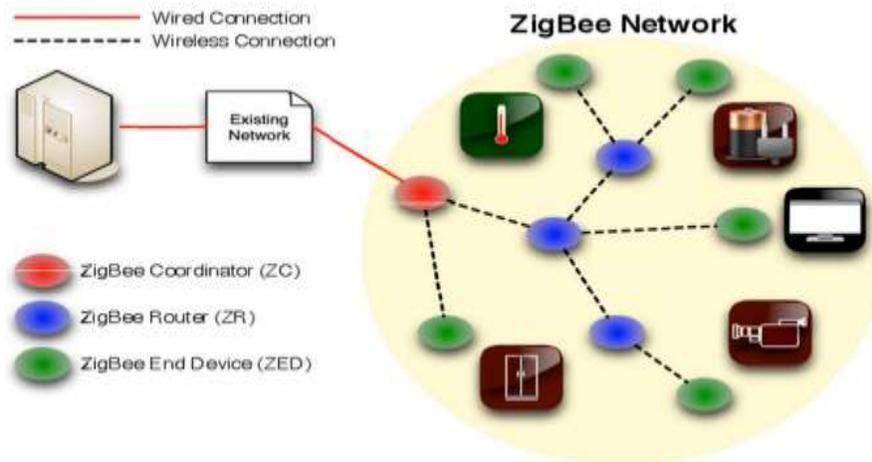
These high-data rate communication standards require low-latency and low-energy consumption even at lower bandwidths. The available proprietary wireless systems' Zigbee technology is low-cost and low-power consumption and its excellent and superb characteristics makes this communication best suited for several embedded applications, industrial control, and home automation, and so on.

WHAT IS ZIGBEE TECHNOLOGY?



Zigbee communication is specially built for control and sensor networks on IEEE 802.15.4 standard for wireless personal area networks (WPANs), and it is the product from Zigbee alliance. This communication standard define sphysical and Media Access Control (MAC) layers to handle many devices at low-data rates. These Zigbee's WPANs operate at 868 MHz, 902-928MHz and 2.4 GHz freq. The date rate of 250 kbps is best suited for periodic as well as intermediate two way transmission of data between sensors & controllers.

ZIGBEE ARCHITECTURE



Zigbee system structure consists of three different types of devices such as Zigbee coordinator, Router and End device. Every Zigbee network must consist of at least one coordinator which acts as a root and bridge of the network. The coordinator is responsible for handling and storing the information while performing receiving and transmitting data operations. . End devices have limited functionality to communicate with the parent nodes such that the battery power is saved as shown in the figure. The number of routers, coordinators and end devices depends on the type of network such as star, tree and mesh networks.

Zigbee protocol architecture consists of a stack of various layers where IEEE 802.15.4 is defined by physical and MAC layers while this protocol is completed by accumulating Zigbee's own network and application layers.

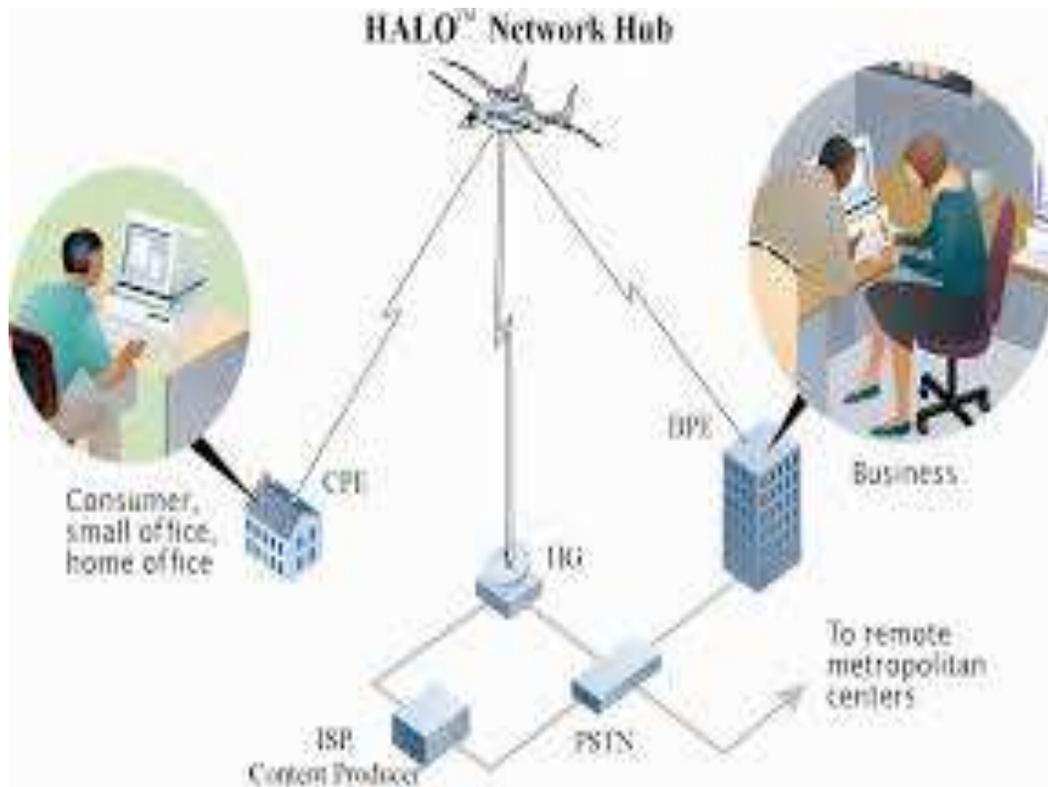
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AIRBORNE INTERNET

The Airborne Internet is a proposed network in which all nodes would be located use in aviation communications, navigation, and surveillance (CNS) and would also be useful to businesses, private Internet users, and government agencies, especially the military.

In time of war, for example, an airborne network might enable military planes to operate without the need for a communications infrastructure on the ground. Such a network could also allow civilian planes to continually monitor each other's positions and flight paths.



How the Airborne Internet Will Work

The word on just about every Internet user's lips these days is "broadband." We have so much more data to send and download today, including audio files, video files and photos, that it's clogging our wimpy modems. Many Internet users are switching to cable modems and digital subscriber lines (DSLs) to increase their bandwidth. There's also a new type of service being developed that will take broadband into the air.

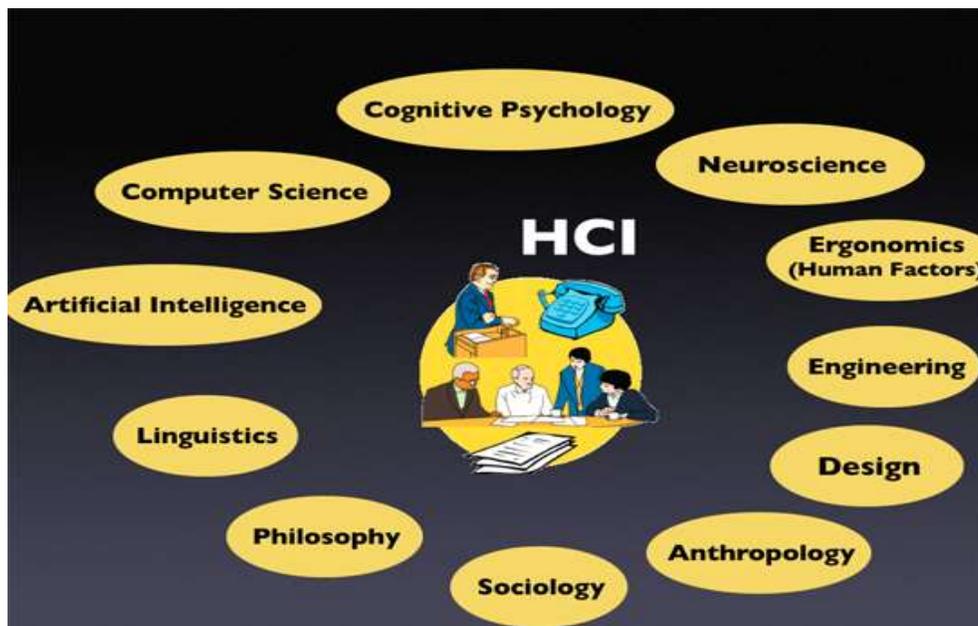
At least three companies are planning to provide high-speed wireless Internet connection by placing aircraft in fixed patterns over hundreds of cities. Angel Technologies is planning an airborne Internet network, called High Altitude Long Operation (HALO), which would use lightweight planes to circle overhead and provide data delivery faster than a T1 line for businesses.

Consumers would get a connection comparable to DSL. Also, AeroVironment has teamed up with NASA on a solar-powered, unmanned plane that would work like the HALO network, and Sky Station International is planning a similar venture using blimps instead of planes.

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Human Computer Interaction



Human–computer interaction (HCI), alternatively man–machine interaction (MMI) or computer–human interaction (CHI) is the study of interaction between people (users) and computers. It is often regarded as the intersection of computer science, behavioral sciences, design and several other fields of study.

Interaction between users and computers occurs at the user interface (or simply interface), which includes both software and hardware, for example, general purpose computer peripherals and large-scale mechanical systems, such as aircraft and power plants.

The following definition is given at "Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them."



A basic goal of HCI is to improve the interactions between users and computers by making computers more usable and receptive to the user's needs. The goals of HCI are to produce usable and safe systems, as well as functional systems.

In order to produce computer systems with good usability, developers must attempt to:

- # understand the factors that determine how people use technology
- # develop tools and techniques to enable building suitable systems
- # achieve efficient, effective, and safe interaction
- # put people first

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WHAT IS GOOGLE CLOUD PLATFORM?

- Google cloud platform is a medium with the help of which people can easily access the cloud systems and other computing services which are developed by Google. The platform includes a wide range of services that can be used in different sectors of cloud computing, such as storage and application developmen.
- Apart from the different management tools which are available upon Google Cloud Platform, the company has also included a lot of cloud functionalities and features like cloud storage, data analytics, developer options, and advanced machine learning. The wide range of optimization and other advantages is what makes the Google Cloud Platform so popular.

GOOGLE CLOUD SERVICES

- Compute.
- Storage & Databases.
- Networking.
- Big Data.
- Cloud AI.
- Identity & Security.

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Child Safety Device Application



1: Wonbo GPS Location Tracking Smartwatch

Keeping your child safe is one of the top priorities as a parent, and now it's never been easier thanks to the Wonbo GPS location smartwatch. This comfortable and stylish watch is packed with features that give you complete peace of mind throughout every day.

From location tracking to the fact it's made from high-quality silicone materials that are comfortable and smooth, both you and your child will love this GPS smartwatch that maximizes the levels of safety in your family's daily life.

Features:

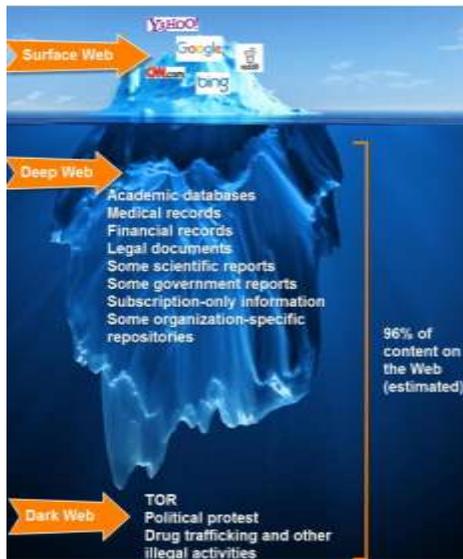
- Real-time GPS location tracking
- Record voice memos into watch
- SOS emergency call button
- Geofencing and security fencing features

Pros:

- Built-in fitness tracking features
- GPS and LBC location tracking
- Anti-tamper alerts
- Comes with a lifetime warranty

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Dark web:

The Dark Web (also called Darknet) is a subset of the Deep Web that is not only not indexed, but that also requires something special to be able to access it, e.g., specific proxying software or authentication to gain access.



TOR(“The Onion Router”):

The most famous anonymous network, which can be accessed using the TOR browser. TOR browser allows users to surf the dark web anonymously by directing traffic through a network of intermediaries (adding layers).

Darkweb market:

Commercial darknet markets, which mediate transactions for illegal drugs and other goods, attracted significant media coverage starting with the popularity of Silk Road and Diabolus Market its subsequent seizure by legal authorities. Other markets sell software exploits and weapons. Examination of price differences on Dark web markets versus prices in real life or over the World Wide Web have been attempted as well as studies in the quality of goods received over the Dark



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Ethical Hacking



Hacking

Hacking is identifying weakness in computer systems or networks to exploit its weaknesses to gain access.

Example

A hacker can create algorithms to crack passwords, crack networks, or disturb network services.

Ethical Hacking

Ethical Hacking is an authorized practice of system security to identify potential data breaches and threats in a network.

Ethical hackers aim to investigate the system or network for weak points that malicious hackers can exploit or destroy.

Ethical Hackers check for key vulnerabilities include but are not limited to:

1. Injection attacks
2. Changes in security settings
3. Exposure of sensitive data
4. Breach in authentication protocols
5. Components used in the system or network that may be used as access points

White Hat

The practice of ethical hacking is called “White Hat” hacking, and those who perform it are called White Hat hackers.

Skills Required to Become an Ethical Hacker

1. Knowledge of programming
2. Scripting knowledge
3. Networking skills
4. Understanding of databases
5. Knowledge of multiple platforms like Windows, Linux, UNIX, etc.
6. The ability to work with different hacking tools

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EXTREME PROGRAMMING

Extreme Programming (XP) is a software development methodology designed to improve the quality of software and its ability to properly adapt to the changing needs of the customer or client.

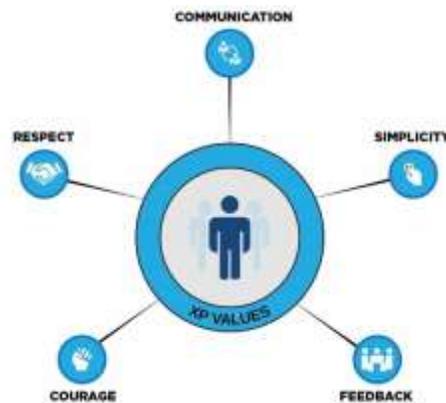
During the mid and late nineties software engineer Ken Beck first developed the Extreme Programming methodology. In October 1999, he published it.

Similar to other Agile Extreme Programming and frequent small releases allowing both team examine and review the throughout the

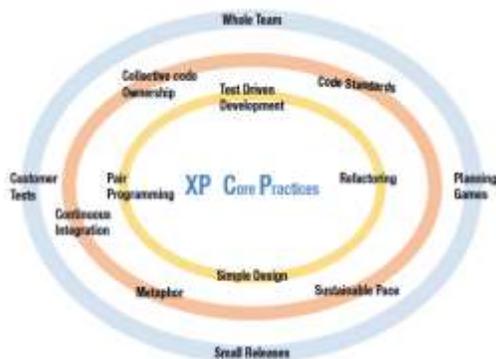
Extreme Values:

Extreme Rules:

- Planning
- Managing
- Designing
- Coding
- Testing



Extreme Practices



Methods of development, aims to provide iterative throughout the project, members and customers to project's progress entire SDLC.

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Communication of Bees and Fish via Robot Translators.



As we know that robotics technology has advanced, biologists have seen to couple it, building robots that look and behave like animals. This has allowed researchers to control one side of social interactions in studies of animal behavior.

Halloy teamed up with collaborators at “Swiss Federal Institute of Technology Lausanne (EPFL)”, the University of Graz in Austria, and elsewhere to have two different robot societies i.e. animals interact via modern communications technology. The researchers are working with two very different species that would not normally interact in nature.

Honey bees and zebrafish they housed the experimental animals more than 1,000 kilometers apart “What we did is a bit extreme,” admits writer and EPFL engineer Frank Bonnet.

In the approximately 30-minute trials, the teams presented the animals with a collective choice. In the case of bees which of two heat-emitting robots they gather around, while the zebrafish shared the donut-

shaped tank with a fish-like robot would decide which direction to swim.

Both the robots interacted with the real animals as per the experiments. The bee robots have infrared sensors which estimate density of nearby bees ,if more bees collected the robots produced more heat, which attracts more bees to gather around. The fish robot find the location of the fish and itself with a camera filming the aquarium, and responds to changes in the real fish's direction.

Written By:-

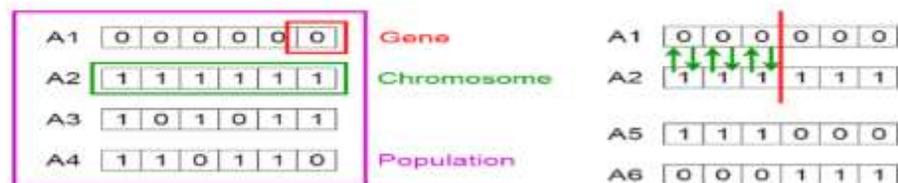
1)Pampatwar Vaishnavi R (1515)

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Genetic Algorithm

A genetic algorithm is a search heuristic that is inspired by Charles Darwin's theory of natural evolution. This algorithm reflects the process of natural selection where the fittest individuals are selected for reproduction in order to produce offspring of the next generation

Genetic Algorithms



Five phases are considered in a genetic algorithm.

1. Initial population
2. Fitness function
3. Selection
4. Crossover
5. Mutation

Initial Population

The process begins with a set of individuals which is called a Population. Each individual is a solution to the problem you want to solve.

An individual is characterized by a set of parameters (variables) known as Genes. Genes are joined into a string to form a Chromosome (solution).

Fitness Function

The fitness function determines how fit an individual is (the ability of an individual to compete with other individuals). It gives a fitness score to each individual. The probability that an individual will be selected for reproduction is based on its fitness score.

Selection

The idea of selection phase is to select the fittest individuals and let them pass their genes to the next generation.

Two pairs of individuals (parents) are selected based on their fitness scores. Individuals with high fitness have more chance to be selected for reproduction.

Crossover

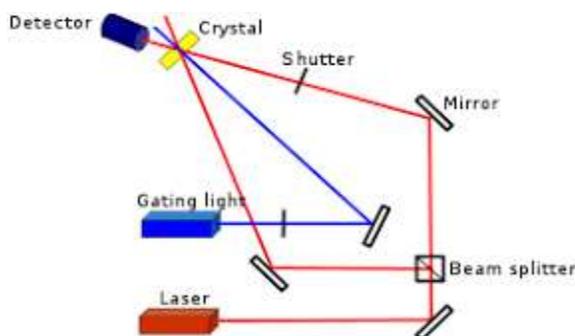
Crossover is the most significant phase in a genetic algorithm. For each pair of parents to be mated, a crossover point is chosen at random from within the genes.

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HOLOGRAPHIC DATA STORAGE

- Holographic data storage contains information using an optical interference pattern within thick, photosensitive optical material.
- The theory of holography was developed by Dennis Gabor, a Hungarian physicist, in the year 1947.
- In order to increase storage capabilities, scientists are now working on a new optical storage method, called **holographic memory** that will go beneath the surface and use the volume of the recording medium for storage, whereas CDs and DVDs use only the surface area.
- Long **Durability** – The Holographic data storage disk can last for at least 50 years. Fast random access to data compared to magnetic drives which take minutes to access data.



HOLOGRAPHIC DATA STORAGE



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Keyboard without keys and board (virtual keyboard)

A **virtual keyboard** is a software component that allows the input of characters without the need for physical keys. The interaction with the virtual keyboard happens mostly via a touchscreen interface, but can also take place in a different form in virtual or augmented reality.



Virtual keyboards can be categorized by the following aspects:

- Virtual keyboards with touchscreen keyboard layouts or sensing areas.
- Optically projected keyboard layouts or similar arrangements of "keys" or sensing areas
- Optically detected human hand and finger motions
- Online virtual keyboards for multiple languages that don't require OS settings change
- Depending on which device the keyboard is used (desktop / mobile / virtual reality / augmented reality)

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BLOCKCHAIN

Blockchain is a way of keeping records and it can be used in almost any product that uses some sort of database management or record keeping. Blockchain is mainly used in protecting any data that needs to be tamper-resistant, and indestructible.

Traditionally, data was kept in a server which was owned and operated by a third party company. This had few disadvantages: A 3rd party had access to your data, it might get destructed, it might get tampered, and it might get leaked. In blockchain, the data is encrypted and then it is spread in a distributed network of computers. This way is very reliable as it is not owned by anyone, it cannot be destructed, and it cannot be tampered with.

A block of data is a permanently recorded set of data, like a financial transaction. Firstly, the data is hashed, which is a way of representing the data in a compact format where it could be easily compared for any changes. Any small changes in the data completely changes the hashed version which makes comparison super easy.

Then the hashed data is encrypted. A private key allows the producer of the data to be encrypted the data and serves as a digital signature whereas a public key allows everyone else with the key to decode it. Then the blocks of data are linked (chained) to each other. The unique thing is that every block not only contains its own data, but also the hashed version of the data of the previous block in the chain. This means that changing data of a every single block would break a chain

and the tampering would become evident.

Imagine a hacker with high computing power who controls a critically high number of the nodes in the network. This way, the hacker is able to change the data in each nodes and tamper the data.

One extra layer of security in blockcahin comes from the genius of its mythical inventor, Satoshi Nakamoto. For each new block to be added to the chain, it needs to be verified. This verification process is extremely computationally heavy and therefore the cost of taking over a large proportion of a blockchain outweighs any possible benefits. Blockchain is still in its infancy and is going through a technology maturation period similar to many other technologies. We can compare this to the evolution of TCP/IP protocols into the World Wide Web, into static websites and then to Web Apps.

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FREENET

Freenet is a peer-to-peer platform for censorship-resistant communication. It uses a decentralized distributed data store to keep and deliver information, and has a suite of free software for publishing and communicating on the Web without fear of censorship. Both Freenet and some of its associated tools were originally designed by Ian Clarke.

Features and user Interface of Freenet:

1.HTTP



The Hypertext Transfer Protocol (HTTP) is an application protocol for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web. While Freenet provides an HTTP interface for browsing freesites, it is not a proxy for the World Wide Web; Freenet can be used to access only the content that has been previously inserted into the Freenet network



2.HTML

Hypertext Markup Language (HTML) is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript. Freenet separates the underlying network structure and protocol from how users interact with the network; as a result, there are a variety of ways to access content on the Freenet network.

Tools and Applications:

Freenet Messaging System (FMS)

FMS was designed to address problems with Frost such as denial of service attacks and spam..It is written in C++ and is a separate application from Freenet.

Frost

Frost includes support for convenient file sharing, but its design is inherently vulnerable to spam and denial of service attacks.

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Smart Fabric

Imagine you are in a party and your Shoes changes their colors as per the beat of the music or your clothes monitoring you health condition or telling your blanket

” it’s too cold outside please make me feel warmer!”.

Doesn’t this sound so Crazy?

Well it does, and here comes the concept of “Smart Fabrics”.

Smart Fabrics is type of fabric which is intertwined with the computer based technologies.

This concept was first introduced in the mid-1990s a team of MIT researchers led by Steve Mann, Thad Starner& Sandy Pentland began to develop what they primarily called Wearable Computer.

These smart fabrics are capable of sensing the environment and automatically respond to it.

The recent trends available in E-textile market are

Silver Heal



Silver, with its anti bacterial and fungicidal properties kills bacteria, thereby enhances wound healing, soothing and healing skin. Hence for treating the chronic diseases silver plated textiles are integrated into clothes and beddings.

RF Shielding

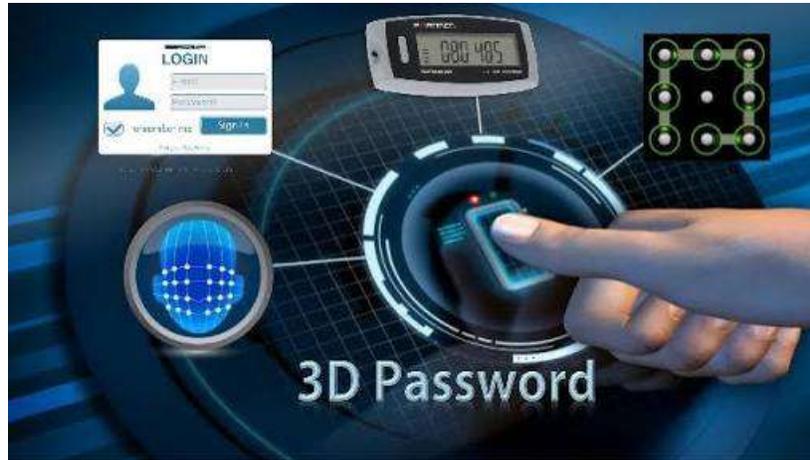


Shielded pouches for mobile phones, laptops shield them from outside world by preventing any communication and data manipulation on device. As the data can't be sent or received it helps police, military and security services across the globe.

Written By:-

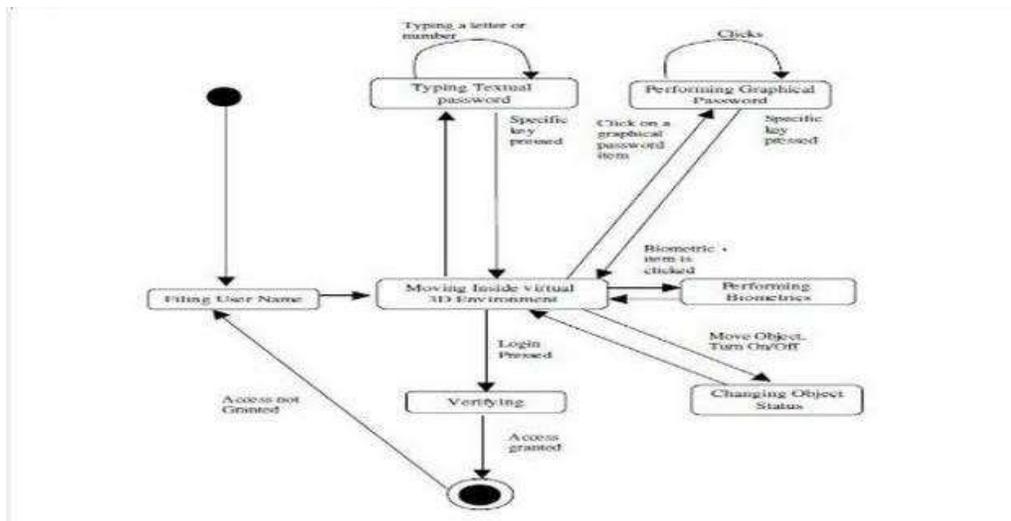
- 1) Sejal Dhondge (1509)
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3D PASSWORD



- The 3D passwords are more customizable and very interesting way of authentication.
- The 3D passwords are based on the fact of Human memory , the human memory has to undergo the facts of Recognition, Recalling, Biometrics or Token based authentication.
- Once implemented and you log in to a secure site, the 3D password GUI opens up. This is an additional textual password which the user can simply put. Once he goes through the first authentication, a 3D virtual room will open on the screen.

- The user is presented with this 3D password virtual environment where the user navigates and interacts with various objects.
- The sequence of action and interaction towards the object inside the 3D environment constructs the user 3D password.



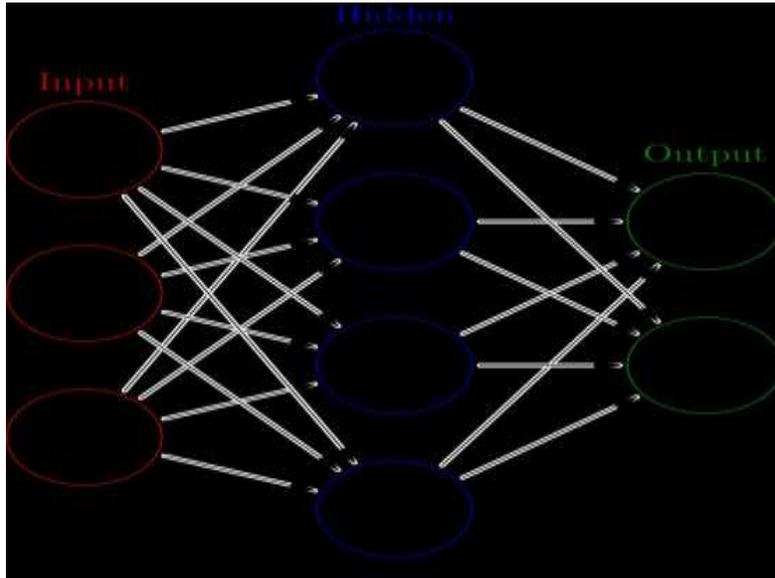
Written By:-

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1) Tiwana Tejindarkaur G(1519)

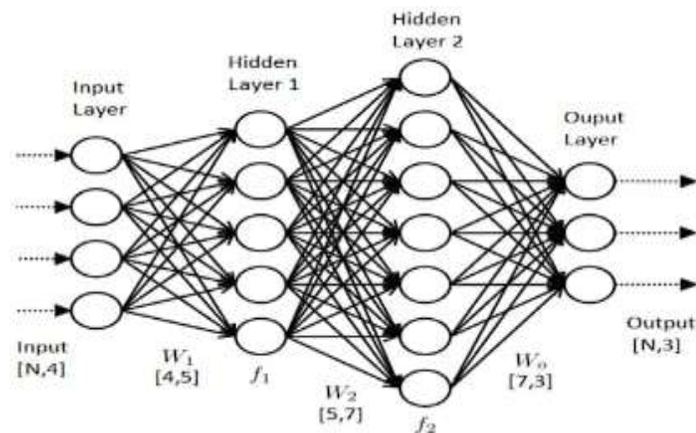
2)Chennoji Priyanka R (1505)

ARTIFICIAL NEURAL NETWORK



- An Artificial Neural Network is based on a collection of connected units or nodes called artificial neurons.
- It is also an interconnected group of nodes, inspired by a simplification of neurons in a brain. Here, each circular node represents an artificial neuron and an arrow represents a connection from the output of one artificial neuron to the input of another.

- The original goal of the ANN approach was to solve problems in the same way that a human brain would.
- ANNs have been used in a Applications like computer vision, speech recognition, machine translation, social network filtering, playing board and video games, medical diagnosis.



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CYBER SECURITY



Definition of 'Cyber Security'

Cyber security or information technology security are the techniques of protecting computers, networks, programs and data from unauthorized access or attacks that are aimed for exploitation

Description: Major areas covered in cyber security are:

- 1) Application Security
- 2) Information Security
- 3) Disaster recovery
- 4) Network Security

1) Application Security:-

Application security encompasses measures or counter-measures that are taken during the development life-cycle to protect applications from threats that can come through flaws in the application design, development, deployment, upgrade or maintenance.

2) Information security

Information security protects information from unauthorized access to avoid identity theft and to protect privacy.

3) Disaster recovery

Disaster recovery planning is a process that includes performing risk assessment, establishing priorities, developing recovery strategies in case of a disaster

4) Network security

Network security includes activities to protect the usability, reliability, integrity and safety of the network.

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