



An IT Club Magazine
DEPARTMENT OF COMPUTER SCIENCE

TECH REPOS2020



KKTM GOVERNMENT COLLEGE

Accredited By NAAC with B Grade
Pullut, Kodungallur, Thrissur, Kerala

REPOSTECH

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PREFACE

Binu Mol.T V
HOD Computer Science



The department of Computer Science had formed an IT Club on 3rd August 2020 amid the pandemic covid19 which by default includes all the BSc. Applied Physics and Polymer Chemistry students and IT Club invites all the other department students also to be part of the club and deliver their articles or programs.

We are proud to release our first IT Club magazine TechRepos2020 on 05-11-2020 by online during this NAAC accreditation period on the occasion of the Webinar of Decision Making - A Machine Learning Approach in association with Department of Computer Application , Cochin University of Science and Technology. Dr.Sabu M.K, Professor and Head of Department of Computer Application, CUSAT will be the resource person on the webinar. This edition will be made available in the department and library for your reference. We the department of Computer science congratulate our editors Akarsh M.H. of B.Sc. Applied Physics 2nd Year & Abhishek of B.Sc. Polymer Chemistry 2nd Year and all the IT club members who supported it.

“Tech” stands for technology and “repos” for repository and in information technology, a repository is a central place in which an aggregation of data is kept and maintained in an organized way, usually in computer storage. Altogether TechRepos2020, an ITClub magazine will be exploring the current trends and initiatives to stay up to date with the world of technology.

I take this opportunity to request all the students of this college to come up in your life by holding the golden stick of truth, affection and respect in all matters and be empowered with technological skills to lead the future generation.

THANK YOU

A handwritten signature in black ink, appearing to read 'Binu Mol.T V'.

18-10-2020

HOD Computer Science

ARTIFICIAL INTELLIGENCE 2020



Sneha Santhosh
2nd year
BSc Applied Physics

What is artificial intelligence? Artificial intelligence is wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. Artificial intelligence is an interdisciplinary science with multiple approaches.

* History of Artificial intelligence.

The beginnings of modern AI can be traced to classical philosophers' attempts to describe human thinking as a symbolic system. But the field of AI wasn't formally founded until 1956, at a conference at Dartmouth College, in Hanover, New Hampshire, where the term "artificial intelligence" was coined.

* Why does Artificial intelligence matters...

Artificial Intelligence What it is and why it matters Artificial intelligence (AI) makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks. Most AI examples that you hear about today – from chess-playing computers to self-driving cars – rely heavily on deep learning and natural language processing. Using these technologies, computers

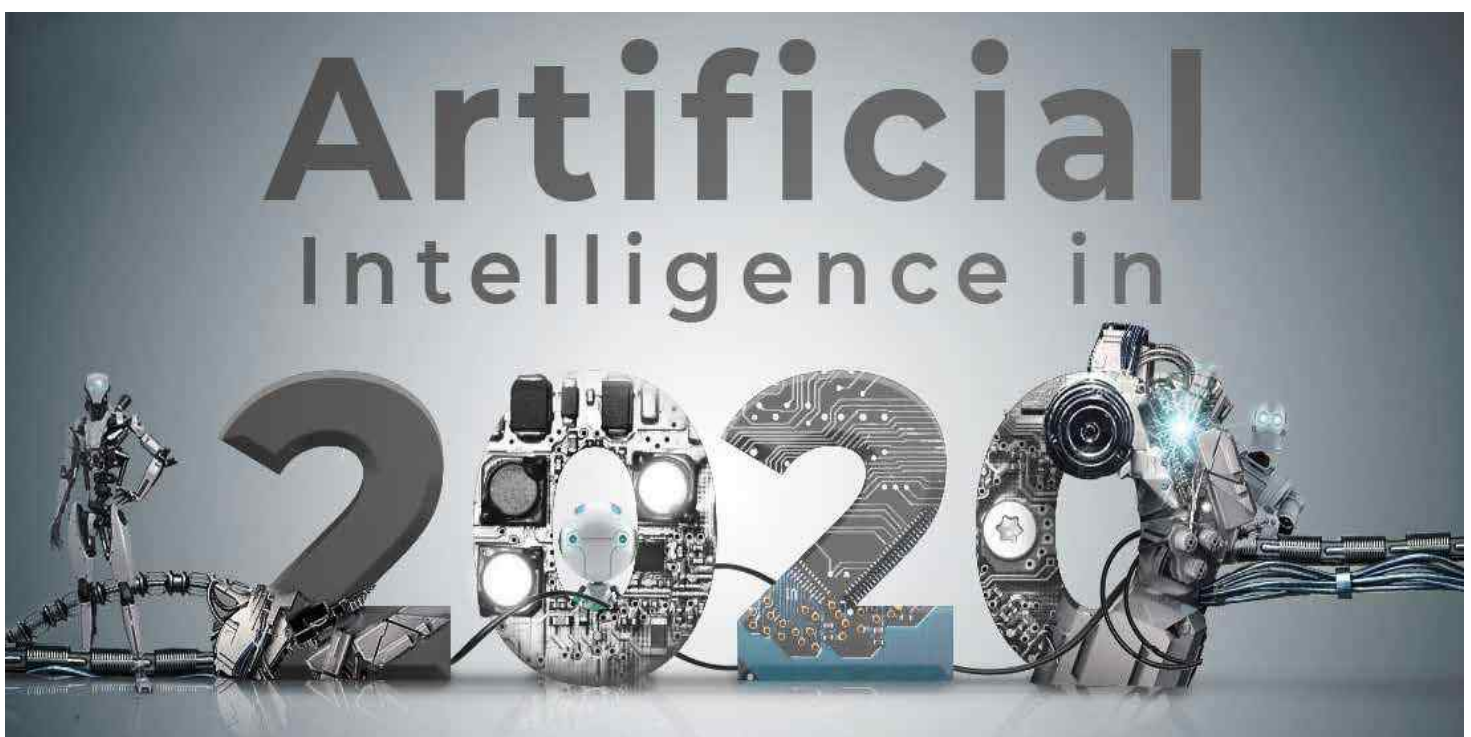
can be trained to accomplish specific tasks by processing large amounts of data and recognizing patterns in the data.

Some uses of artificial intelligence

- Δ Customer support and assistance
- Δ Data access enabling ubiquity
- Δ Predictive analytics
- Δ Real Time marketing activities
- Δ Artificial intelligence powered chat boxes

Artificial intelligence trends 2020

In 2020, artificial intelligence will move from the hype state to practical usage and value, as corporations begin to harness its power. Data for AI will be a major theme throughout 2020, from new techniques that train AI on less data to data privacy protections gaining traction. On the positive side, AI trends include energy-efficient AI, quantum neural networks and the role of natural language processing in understanding proteins. There are also challenges ahead as AI gains traction. “Deepfakes” are becoming more mainstream, making it difficult to discern real media from fake media.



We may also see an increase in malicious applications of open-source AI tools — which have been fundamental in democratizing AI.

1. Predictive Analytics
2. Higher Use Of Anomaly Detection
3. Machine Learning-Driven Cybersecurity
4. More User-Friendly AI Platforms With Increased Adoption
5. AI For Productivity And Work Balance

Final Thoughts

AI is a game-changer. Despite it being many decades old, it's only recently been globally adopted by a wide range of businesses and industries. Identifying and capitalizing on AI trends can keep your company one step ahead of competitors while achieving a higher level of productivity.



LATEST TECHNOLOGY TRENDS OF 2020

Sahala P S

2nd year
BSc Applied Physics



Technology is constantly updating at such a rapid pace that it seems it might be faster than light! A technology or a programming language that is making the rounds this week may be obsolete by the next few days! As more and more funds are invested in research and development, computer scientists and professionals are constantly tweaking and improving existing technologies to get the most out of them. As a result, a new programming language, library, patch, or plug-in gets released almost every hour. To keep up with this crazy pace of development, you have to keep learning the latest technology concepts.

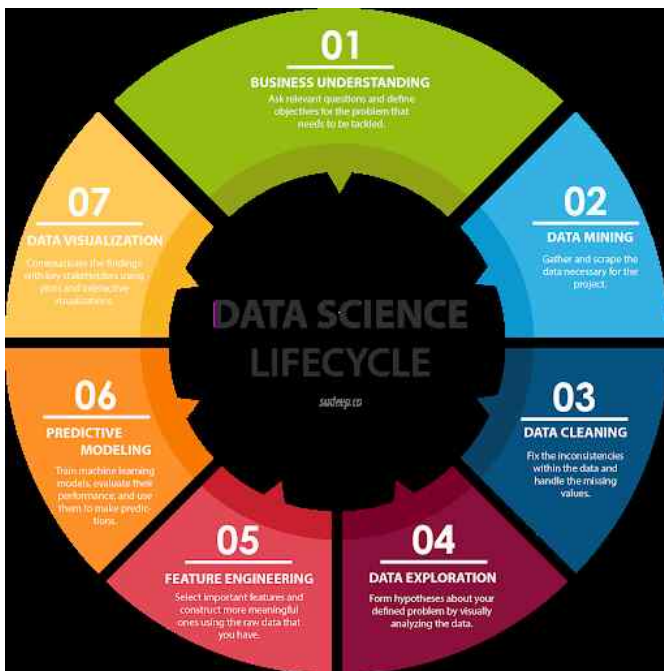
1. ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is the technology used for equipping computer systems with the ability to make decisions like humans. When AI programs are fed to systems, the aim is to mimic human intelligence for performing complex tasks such as pattern recognition, speech recognition, weather forecast and medical diagnosis. AI is used in

navigation based applications like Uber, voice assistants like Siri, video streaming services like Netflix, IoT devices and in search engines like Google and Bing. AI helps in automating tasks such as traffic, scheduling trains, making business predictions and designing driverless cars! By 2030, AI automation is expected to create more than 70 million jobs. The sad fact is that AI might wipe out more than 23 million jobs by the same time frame. AI will create jobs in areas such as testing, support, maintenance, programming and data science. learning AI will help you secure jobs such as

- Machine Learning Engineer
- Data scientist
- Computer Vision Engineer
- Business Intelligence Developer
- Data Analyst

2. DATA SCIENCE Next up in the list of latest technology concepts is not surprisingly Data Science. Data Science is the technology that helps to make sense of complicated data. You know that



data is produced in a humungous amount every day by companies. This includes business data, sales data, customer profile information, server data, and financial figures. Future scope of data science is bright which will create opportunities for the following career roles:

- Data Scientist
- Data Architect
- Business Intelligence Manager
- Data Engineer
- Data Analyst
- Business Analyst

3. INTERNET OF THINGS The IoT (Internet of Things) is a network of devices that are connected to each other. Their devices can interact and share data with each other. These devices may be connected via WiFi, and they share data about their environments and how they are being used. These devices have a computer chip that facilitates this exchange. It is predicted that more than 41 billion devices powered by IoT will be used by 2025. Learning this latest technology will help you find jobs such as:

- IoT Software Developer
- System Design Engineer
- IoT Product Manager
- IoT Research Developer
- IoT Solution architect

4. BLOCKCHAIN :- Blockchain is the foundational technology that powers electronic currencies such as Cryptocurrencies. In simple terms, a Blockchain is an electronic ledger that can be shared among different users. This helps in creating a record of transactions that cannot be altered. Each of these records is time-stamped and linked to the previous one. There is a rise in careers in Blockchain and it will create different job positions which are as follows:

- Blockchain Developers
- Blockchain Quality Engineer
- Blockchain Legal Consultant or Attorney
- Blockchain Engineer

5. ROBOTIC PROCESS AUTOMATION (RPA) Robotic Process Automation (RPA) is a technology used for automating daily tasks, similar to artificial intelligence. Here, the software is used for automating repetitive tasks such as handling and replying to emails, processing transactions, and handling business data. This technology is used for automating tasks for low-level employees to higher-ranking officials. RPA can automate more than 40% of daily tasks. According to McKinsey, more than 60% of all repetitive tasks can be partially automated using RPA. So, this technology is going to threaten a lot of jobs. The different RPA job roles are as follows:

- RPA Developer
- RPA Business Analyst
- RPA Consultant
- RPA Solution Architect
- RPA Project Manager

6. VIRTUAL REALITY VR is the technology by which you can immerse yourself in an environment that seems astonishingly realistic. It is the use of computer technology for creating a simulated environment. It is very popularly used for playing computer games. Unlike traditional games where you experience the gaming environment by viewing it on the screen, you are directly placed in the environment! Senses such as touch, hearing, smell, and vision are simulated in these environments. Using VR gear such as

headsets, you can walk around and play the game in that 3D world. Augmented Reality (AR) is the technology used for improving this virtual environment. The VR industry is expected to reach close to \$40 billion by 2021. Here are some VR job positions you can look out for:

- Content Producer
- AR and VR Content Writers
- Product Management
- Software Engineer
- UI and UX Design
- Quality Assurance

7. EDGE COMPUTING Edge computing is the latest technology trend that is getting famous by the day. The technology is based on the philosophy of bringing computing power as close to the data source. This helps in reducing bandwidth and latency. The technology aims to run fewer processes in the cloud and shifting those processes to locations such as the user's system or an edge server. Bridging this gap between the data and the computation reduces the long-distance communication between the server and the client, which in turn enhances the speed of the process. This is why edge computing is used for handling time-sensitive data stored in

remote locations that have limited connectivity to the central location. The technology will make cloud computing and IoT devices faster. It is estimated that by 2022, the edge computing market will be worth \$7 billion. The technology will be popular in areas such as healthcare, retail, and manufacturing. Thus, it will open the doors to many job opportunities. It is expected that the salary range of an Edge computing professional will be around \$100,400 to \$123,000 per annum.

8. INTELLIGENT APPS Intelligent apps are software applications that make use of AI components such as machine learning, deep learning, data analytics, robotics, and natural language processing. They help you in making decisions based on realtime data or historical data. Examples of Intelligent apps are voice assistants such as Siri, Google Assistant, and Alexa. As companies such as Google, Apple, and Oracle continue investing in these applications, it is bound to create a lot of jobs in the future. Intelligent applications developers are sure to bring home fat paychecks!

Conclusion In this fiercely competitive IT industry,



getting a job is becoming tough. But, if you keep up skilling and continue learning new tools, you will surely grab your dream job. You can look up institutes that offer the course of your choice. Or,

search online for the courses and videos about the latest technology you want to learn.

E-COMMERCE



Dilsha K.D
2nd year
BSc Applied Physics

E-COMMERCE

- Electronic commerce is the activity of electronically buying or selling of products on online services or over the internet.
- It consists of buying and selling good and services over an electronic system such as the internet and computer network.

Why e-commerce

- Low entry cost.
- Reduce transaction costs.
- Access to the global market.
- More convenient.
- Increase your reach.
- Gives your marketing opportunities.
- scalable

HISTORY OF E-COMMERCE

The beginning of e commerce can be traced to the 1960s, when businesses started using electronic data interchange (edi), to share business documents with other companies. in 1979 the american national standard institute developed asc×12 as a universal standard for businesses to share documents through electronic network. after the number of individual users sharing electronic documents with each other grew in the 1980s the rise of ebay and amazon in the 1990s revolutionized the e-commerce industry. consumer can now purchase endless amount of items online.online, from e-tailers, typical brick and mortar store with e - commerce capabilities and one another.





TYPES OF E-COMMERCE

1. Business to Business
2. Business to consumer
3. Business to employee
4. Consumer to consumer

1. Business to business (b2b): also called BtoB is a form of transaction between businesses, such as one involving a manufacturer and wholesaler or a wholesaler and a retailer.

- One company will purchase raw materials from another to be used in the manufacturing process.

2. Business to consumer : B2c is the direct trade between the company and consumer. It provides direct selling through online.

3. Business to employee : B2E encompasses everything that business does to attract and return well-qualified staff in a competitive market.

4. Consumer to consumer : c2c one consumer purchases from another customer using a third-party business or platform. • Eg. Olx

ADVANTAGES OF E-COMMERCE

- No check checkout quotes
- Reduce price
- You can shop anywhere in the world
- Easy access 24 hours a day
- Wide selection to cater for all consumers.

DISADVANTAGES OF E-COMMERCE

- Unable to examine product personally
- There is the possibility of credit card number theft
- On average only 1/9th of stock is available on the net.
- Fake products
- Online forgery



5G ECONOMIC IMPACT

Suvarna Asok PA

2nd year

BSc Applied Physics



Intelligent internet connectivity enabled by 5G technology is expected to create approximately \$3.6 trillion in economic output and 22.3 million jobs by 2035 in the global 5G value chain alone.² This will translate into global economic value across industries of \$13.2 trillion, with manufacturing representing over a third of that output; information and communications, wholesale and retail, public services and construction will account for another third combined.

³ To make that happen, however, trillions will first have to be invested to introduce global 5G networks. 5G presents an opportunity for companies to be first movers, but greater cooperation is needed to accelerate employment while several countries have initiated roadmap for the 5G rollout, others are falling behind due to a diverse set of challenges that will require an unprecedented level of collaboration between business, the public sector and broader stakeholders in society. These have repercussions across several areas of the ecosystem, including in creating new business models, fostering innovation, defining investment models for digital infrastructure, preparing for cybersecurity scenarios and, more broadly, ensuring sustainability and positive societal impact. To understand these systemic challenges, the World Economic Forum has initiated a 5G-Next Generation Networks Programme to help enterprises across industries transform while shaping an inclusive and sustainable transition to the next generation of networks. This programme is part of the Digital Economy and New Value Creation Platform, whose objective is to develop new economic and business models that are digitally driven, creating sustainable value for an inclusive economy. The objective of this White Paper is to shed light on ways to realise the large estimated economic output potential by taking a bottom-up approach through a use-case-driven analysis. The analysis of 40 sample use cases in various industries establishes linkages between commercial and societal impact, and explores how the

functional drivers of 5G could enhance the output of these use cases as 5G networks evolve.

5G is a great opportunity for developers to deploy applications that take advantage of fast, high-speed lower latency networks. But like any data network, people want to know what the advantages and disadvantages are going to be of this new technology.

So let's break down some of the pros and cons of 5G.

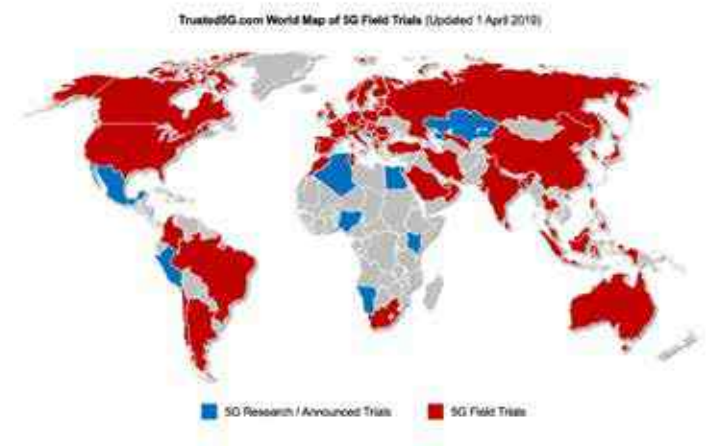
5G Pros

5G Pros include the following:

Killer speeds: If you are close enough to one of the 5G towers with your 5G phone, you will be able to download entire episodes of HD programs in a matter of seconds. Buffering when viewing a video will be a thing of the past.

Less tower congestion: With current 4G LTE technology, when thousands of people descend on a small area, towers tend to get congested and reach capacity. On 5G, this will no longer be an issue. This means that people won't feel like they are competing against each other for the tower using their cell phone on internet-based activities like Facebook, Instagram, Twitter, sending/receiving email, web browsing, searching maps and directions, and reading news with all of the other users at crowded venues like sporting events, concerts and festivals. With more bandwidth available, people will also be able to use this bandwidth to do more with their devices, making them more versatile than ever before.

New technology options: As network speeds have increased, more and more tasks are being transitioned from the world of computers to the world of smart devices. With the increasing network speeds, this could open new doors for smart device technology that may not have been available. We're talking AI, VR and much more.



5G Cons

The cons include the following:

Broadcast distance/building penetration: One catch is that these frequency waves can only travel a short distance. Just like 5 GHz, Wi-Fi doesn't travel as far as 2.4 GHz Wi-Fi, and 5G cellular will not travel as far from the tower as 4G. Also, the millimeter 5G waves will only travel well in the line of sight (a straight line with the ability to see the tower). Meaning trees, buildings, walls or other obstacles will block, disrupt or absorb the high-frequency signal. Some have predicted that even rain could potentially be a problem for 5G connections.

Battery drain/heat: Phones running on 5G will experience a huge battery drain. Better battery technology will be needed if the object is to run your phone a full day on a single charge running a 5G connection. Users are also reporting that phones are almost hot to the touch while running 5G.

Upload speeds: With the current technology, users see download speeds as high as 1.9 Gbps; however, rarely are the upload speeds seen over 100 Mbps. Granted, this is far superior to 4G LTE. However, the current upload speeds seen by actual 5G users are not as groundbreaking as the download speeds. Also, the ping speeds seen by users on 5G phones are currently not in the anticipated low latency of 1ms or less; the actual speeds are being seen in the 15 ms range.

Lack of widespread coverage: Currently, 5G coverage is limited to narrowly defined areas in specific cities. As a rule, the carriers will be expanding their network in areas with the greatest population. If you live or

work in certain areas of big cities, you will most likely be the first to benefit from the 5G technology. For everyone else, especially in remote areas, it will be some time before it arrives. Carriers are more likely to spend their network upgrade dollars where the greatest number of their users reside or work.

With any new technology, it's important to discuss what the pros and cons are so that you can have a better understanding of how it will impact your business. There's a lot of buzz around 5G, and it can be easy to get confused by what information is correct and what's not. We won't truly know what 5G can do until it's fully implemented, but what we do know is what it's built to do.

As carriers continue to retire their 3G spectrum to repurpose it for 5G, it can be confusing and frustrating as an operator who needs to upgrade their equipment to keep pace. Additionally, MWCA predicts that only 49% of connected devices will be 5G in 2025, with 4G still holding 45%.



MACHINE LEARNING



Anjali C P

2nd year
BSc Polymer Chemistry

INDRODUCTION

Machine learning is a subfield of artificial intelligence (AI). Because of this, machine learning facilitates computers in building models from sample data in order to automate decision-making processes based on data inputs. ... Any technology user today has benefitted from machine learnin

• WHY IT IS CALLED MACHINE LEARNING

It used to be called statistical learning theory. Its because the way human learn different thing machine is learning different thing. we are not telling machine what to do, we are teaching machine how to do, machine will use this skill to solve next problem it will face without explicitly programmed.

• HOW HARD MACHINE LEARNING

Why is machine learning 'hard'? ... There is no doubt the science of advancing machine learning algorithms through research is difficult. It requires creativity, experimentation and tenacity. Machine learning remains a hard problem when implementing existing algorithms and models to work well for your new application.

• HOW LONG MACHINE LEARNING

Usually, when you step up in machine learning, it will take approximately 6 months in total to complete your curriculum. If you spend at least 5-6 hours of study. If you follow this strategy then 6 months will be sufficient for you. But that too if you have good mathematical and analytical skills.

• MACHINE LEARNING GOOD CAREER

• In modern times, Machine Learning is one of the most popular (if not the most!) career choices. According to Indeed, Machine 2 / 2 Learning Engineer Is The Best Job of 2019 with a 344% growth and an average base salary of \$146,085 per year. • WHAT IS THE MACHINE LEARNING

SCOPE Machine Learning is the sub-field of Artificial Intelligence. It helps to build automated systems that can learn by themselves. Then, the system enhances their performance by learning from experience without any human intervention. This helps the machines make data-directed choices.

• START MACHINE LEARNING

For getting started in machine learning, it is broken down into a 5-step process:

Step 1: Adjust Believe you can practice and apply machine learning.

Step 2: Pick a Process. Use a systemic process to work through problems.

Step 3: Pick a Tool.

Step 4: Practice on Datasets.

Step 5: Build a Portfolio.

• WHO IS THE FOUNDER MACHINE LEARNING - Arthur Samuel

The term machine learning was coined in 1959 by Arthur Samuel, an American IBMer and pioneer in the field of computer gaming and artificial intelligence.



COMPUTER DNA

Aaghna A S

2nd year
BSc Polymer Chemistry

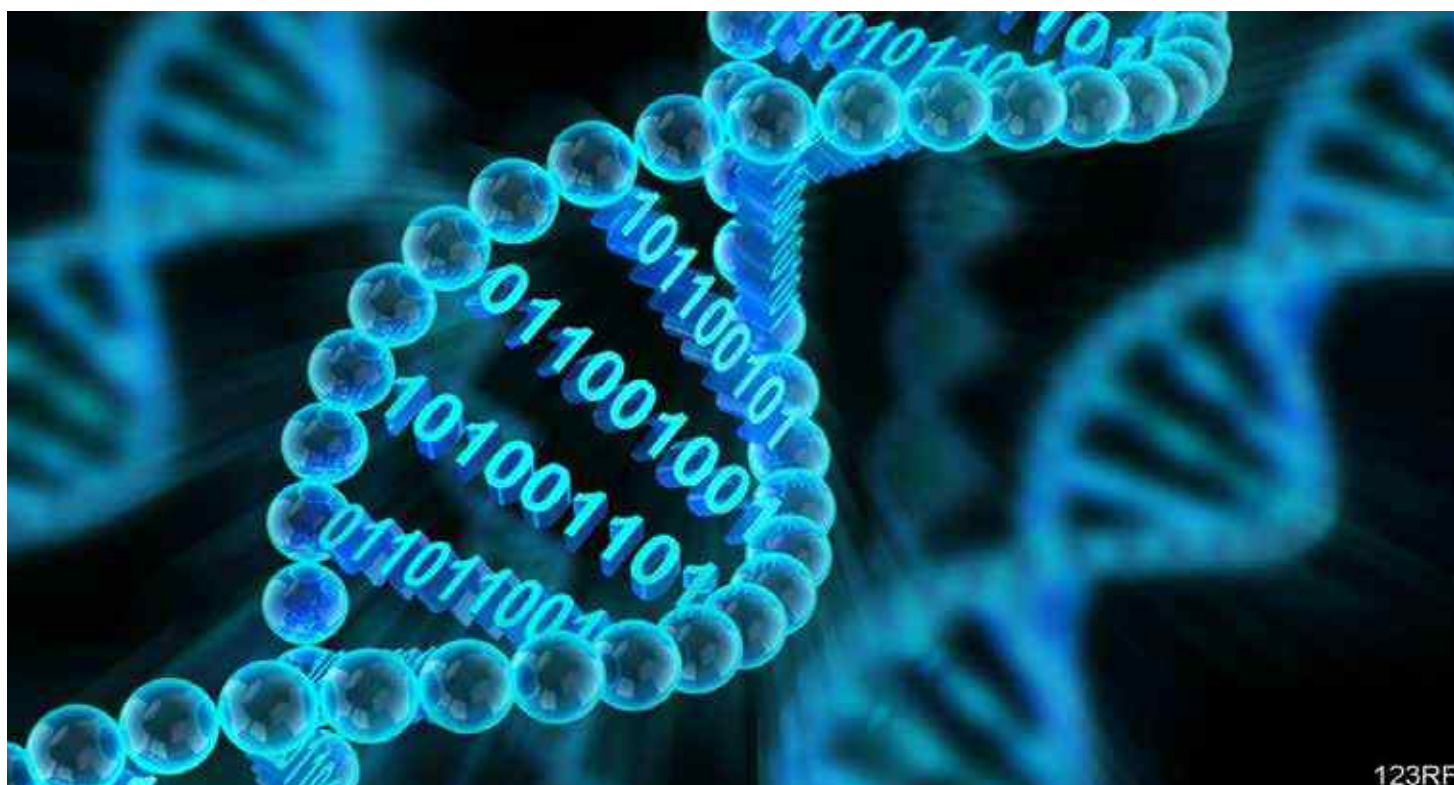


Computing is an emerging branch compacting which uses DNA, biochemistry a molecular biology hardware instead of traditional silicon based computer technology. Development in traditional electronic computer is restricted by hardware problems. DNA computing will solve that problem and serve as an alternative technology. DNA computing is also known as molecular computing. is an computer using the processing power of molecular information instead the conventional digital component. DNA has been show to have massive processing capabilities that might allow a DNA-based computer to solve complex problems in a reasonable amount of time. DNA computing was proposed by LENONARD ADLEMAN. He is one of the creator of the RSA encryption algorithms for which has received the 2002 TURING AWARD often called Nobel Prize of computer science. He is

also known for the creation of the field of DNA computing .In1994 his paper molecular computation of solutions to combination of solutions to combinational problems.He described the experimental use of DNA as computing system.solved a seven-node instance of the Hamitonian graph problems an N^p complete problems.The solution to a seven node instance is trivial.Use of DNA to compute on algorithms.Adleman is widely referred to as the father of DNA computing.

DNA it store all the information and instructions required to build and run a human body,They have managed to encoded long test into DNA.Molecule to create simple logic gates and circuit.

DNA computing is now an interdisciplinary research field where chemistry, molecular biology,computer science,mathematics and technology come together.



123RF

VIRTUAL CLASSROOM

Aparna M S

2nd year
BSc Applied Physics



A virtual classroom is an online learning environment just like in a real-world class room,a student in a virtual class romm participates in synchronous instruction which means that the teacher and students are logged into the virtual learning environment at the same firm.

A virtual classroom is a software-based teaching and learning environment that mimics the qualifies of face-to-face classroom instruction.Teachers and learners can participate in live online classes,communicate with each other,hold disucssion and watch videos or presentations,among other features online learning has many benefits,It can access to course work from any where at any time.



- * It makes combination of structure and freedom.
- * It effective time management and expanded world view

Virtual classroom leverages the best of technology to make learning an easier and more convenient experience.



SILENT SOUND TECHNOLOGY

Roopa C B

2nd year

BSc Polymer Chemistry



When we are in movie theatre, bus, there is lot of noise around us. We can't speak properly on a mobile phone. In future this Problem is eliminated by Silent Sound Technology. It is a technology that helps you to transmit the information without using Vocal cords. This technology notices every lip movement and transforms them into computer generated sound that can be transmitted over phone. Hence person on another end of phone receives information in audio. Silent sound technology is the Perfect solution for the people who lost their voices but wish to speak on mobile devices. This device is developed by Karlsruhe. Institute of Technology Germany. It uses Electromyography and Image Processing for monitoring the tiny muscular movements. That occur when we speak and converting them into electrical pulses that can then be turned into speech without a sound uttered. When demonstrated, it seems to detect every lip movement and internally converts electrical pulses into sound signals and sends them neglecting all other surrounding noise. So, basically it read your lips. It definitely going to be a good solution for those Annoyed while other speak loud over phone.

Need for silent sound technology are for better way of communication in noisy public place. Gives a better and new way of communication for those peoples who lost their voices. Helps peoples for giving any confidential information's over a phone without worrying about others working of silent sound technology is to proceed with this research work, the Process Model assumed is Iterative Process Model since it is more adaptable for this work. Once the face detection and mouth region detection is achieved, speech analysis can be performed with the use of lip motion features strategies and emotional expression with the use of other facial parts. If efficiency with identification technique is not proper, then the threshold value falls out of the defined unique index value and retrieval has

to be made. Those are one of the main reasons to choose the Iterative process. As the live video is captured by a high-resolution camera, the video can be processed as normal or grayscale color mode /or saved as Mpeg, Avi Flv etc. for customization. Region of Interest (ROI) video is segmented from which Facial features like Mouth, nose & Eyes are detected

. There are two methods that are used in silent sound technology. The first method is Electromyography. It is a technique which monitors tiny muscular movements and pulses generated by it. The transducers involved converts the pulses in to electrical signals. Then the second method is Image processing. It is Convert digital tape in to a film image with minimal corrections and calibrations. Large main frame computers employed for sophisticated interactive manipulation of the data. There are two types of Image processing. Analog Image processing and digital image processing. Analog image processing is applied to hard copy data such as photographs or printout. It adopts certain elements of interpretation such as primary element and spatial arguments. Digital Image process is the use of computer algorithm to perform image processing on digital image. It refers to manipulation of electronic data to Specific data.

The advantages of silent sound technology are it helping people who have lost their voice due to illness or accident. We can make silent calls even if we are standing in crowded place. Very useful for sharing confidential information like secret PIN number on phone at public place. The limitations of this technology are it cannot work for language that different tones mean different meaning like Chinese. It is working perfect only if electrode inserted into face. There won't be emotional feeling the speech because it will be talking like robi. It's application are It will help people who have lost their voice as a result of accident or cannot speak loudly again as

result of old age. It can be used in military for communication of secret or sensitive information. It is applicable if you want to make a call in conference meeting or library without disturbing the others. Speaker can speak his native language like German and listener can listen to it in his native language like English. It is applicable for those who want to make a call in noisy environment e.g. people working in train station, Movies theatre, market etc.

Engineers claim that the device is working with 99 percent efficiency

Silent Sound Technology one of the recent trends in the field of information technology implements "Talking Without Talking". It will be done of the innovating and useful technology and in future this technology will be use in day to day life.

DATA MINING

Stefin Meron

2nd year
BSc Polymer Chemistry



INTRODUCTION

The practice of examining large pre-existing databases in order to generate new information.

- **DATA MINING Definition:** In simple words, data mining is defined as a process used to extract usable data from a larger set of any raw data. It implies analysing data patterns in large batches of data using one or more software. Data mining is also known as Knowledge Discovery in Data (KDD).

- **DATA MINING USE** For example, a company can use data mining software to create classes of information.

TYPE OF DATA MINING

- Association.
- Classification.
- Clustering Analysis.
- Prediction.
- Sequential Patterns or Pattern Tracking.
- Decision Trees.
- Outlier Analysis or Anomaly Analysis.
- Neural Network
- **DATA MINING POPULAR** For marketing, it can be applied effectively. Using data mining we can of customers and we can do advertising by getting

more close to them. It will help to identify trends of customers for goods in the market and it allows the retailer to understand the purchase of a buyer.

- **DATA MINING GOOD OR BAD** But while harnessing the power of data analytics is clearly a competitive advantage, overzealous data mining can easily backfire. As companies become experts at slicing and dicing data to reveal details as personal as mortgage defaults and heart attack risks, the threat of egregious privacy violations grows.

- **DATA MINING USED** Data mining involves exploring and large blocks of information to glean meaningful patterns and trends. It can be used in a variety of ways, such as database marketing, credit risk management, fraud detection, spam Email filtering, or even to discern the sentiment or opinion of users.

- **DATA MINING CONCLUSION** In the future, data mining will include more complex data types. In addition, for any model that has been designed, further refinement is possible by examining other variables and their relationships. Research in data mining will result in new methods to determine the most interesting characteristics in the data.



DATABASE

Vishnupriya P B
2nd year
BSc Applied Physics



A database is a organized collection of data, generally stored and accessed electronically from a computer system. The database management system is the software that interacts with the end users, applications, and the database itself to capture and analyse the data. The sum of the total of the database, the DBMS and the associated applications can be referred to as a "database system". Often the term "database" is also used to loosely refer to any of the DBMS, the database system or an application associated with the database.

ROBOTICS

Surya Kiran P S

2nd year

BSc Polymer Chemistry



The field of computer science and engineering concerned with creating robots, devices that can move and react to sensory input. Robotics is one branch of artificial intelligence. Robots are now widely used in factories to perform high-precision jobs such as welding and riveting. They are also used in special situations that would be dangerous for humans—for example in cleaning toxic wastes or defusing bombs.



ADVANTAGES OF ROBOTICS

- *Increased efficiency
- *Higher quality
- *Improved working environment.
- *Increased profitability.
- Longer working hours
- *They are more precise and consistent than human workers.
- Robots help to complete tasks faster.
- *Saving companies time.... etc..



DISADVANTAGES OF ROBOTICS

- *Cost much money in the maintenance and repair, the programs need to be updated to suit the changing requirements, the machines need to be made smarter.
- *In case of breakdown, the cost of repair may be very high
- *The procedures to restore lost code or data may be time-consuming and costly. *The robots can store large amounts of data but the storage, access, retrieval is not as effective as the human brain.
- *They can perform the repetitive tasks for long but they do not get better with experience such as the human do.

NOWADAYS AND FUTURE COMPUTER APPLICATION IN MEDICINE

Sayana Rajesh

2nd year

BSc Polymer Chemistry



Computers are becoming increasingly popular every passing day amongst a wide section of people with the advent of micro computers in late seventies and their subsequent performance enhancement in eighties, computers have reached our homes. Computers have undoubtedly revolutionised our whole life style computer techniques have tremendous application in medical field, when it has largest amount of social impact computer role in remaining in hospitals. Computer are used to store and process large amount of data and provide information of data and provide information and use to perform large number of calculation.

Components of computer is Hardware and Software. Hardware is the term given to physical components of computer system.

Hardware basically divided into 3 types

1. Input device
2. The central processing unit
- 3 output device

Software are the set of program the control the activity of processing by the computer. There are two types of solution system soft ware and Application software . software are collection of program which allow the user to interact with the computer hardware .

Computer techniques in Hospital information system:

Medical informatics is rapidly growing discipline. It seeks to organise and manage information in support of Patients care, biomedical research and education through the aid of computer and information networks It provides easy access to valuable patient care information .A hospital information system generally covers are like registration /admission/transfer/discharge, billing, Medical record, index, ,operation theater. store/inventing, pharmacy, diet, CSSD, bio-m edical etc. To date, several software vendors have developed hospital system relating to managing hospitals. Generally hospital administrator prefer to buy ready made package and customize the same to

suit their needs.

DATA ANALYSIS IN MEDICINE

In medical research large number of data is collected This data is to be compiled ,analysed and interpreted for this purpose certain statistical methods are to be applied these include calculation of standard deviation ,standard error, application tests of statistical significance like ztest ,unpaired, paired t test and chi-square test . Statistical method are time consuming with the help of computer ,large number of statistical calculation can be performed in very short time.

Statistical package include :

1. The bio-medical computer (BMD)
2. Statistical package (SPSS)
3. Genstat
4. Epi-info LABORATORY COMPUTING :

The primary objective of a clinical laboratory is to provide accurate result in short time. Laboratory analysis includes blood chemistry ,photometry, microbiology, etc. Result must match with patients identification details and should be valid .Quick access to laboratory system can contribute to efficient patient care system.

COMPUTER ASSISTED DECISION MAKING (CAD): It is an interactive computer system that directly assist doctors with clinical decision making tasks .The system is intended to support doctors ,complementing their natural abilities to make judgement with computer vast memory .reliability and processing capabilities. A general model of computer assisted medical decision making has been developed.

CARE OF CRITICALLY ILL PATIENTS: Critically ill patients require large number of therapeutic intervention to optimise their chances of survival for this ,the variables must be collected frequently and the data derived therefore made available to the clinicians and nursing staff .This result in a large quantity information ,which may lose its significant unless the data required is present in clean manner. Data management includes the entry

,integration and reporting the entry . integration and reporting of all vital signs , medi ration laboratory values.

COMPUTER ASSISTED THERAPY :Method for planning ,monitoring and adjusting damages regiment of powerful and potentially toxic drugs eg;digitalis and antibiotic and gentamicin have been developed .The physican can plan dosage regimens by selecting a target peak total body concentration of drug.

MEDICAL IMAGING: During last decade computers were commonly used for high resolution image generation Dedicated hardware and software is required to generate such image in CT scan ,MRI,ultrasound and venam cameras .it is possible

to integrate these workstations to the main hospital information system. Three dimensional image of living human anatomy regional physiological and biochemistry in health and disease are in use. Other applications of computer in adding computer are being used in primary health care psychiatry ,physiological measurements,medical education ,literature search and as an aid to the handicapped . It Concluded it is due to computer networking technology that network communication has become easy .medical practitioners can discuss medical issues in forums they can exchange image and messages in second derives conclusion directly.They can seek advice and share knowledge in convenient manner over the internet.



DEEP LEARNING

Sumi A S

2nd year

BSc Polymer Chemistry



INTRODUCTION

Deep learning is a branch of machine learning which is completely based on artificial neural networks, as neural network is going to mimic the human brain so deep learning is also a kind of mimic of human brain. In deep learning, we don't need to explicitly program everything. The concept of deep learning is not new. It has been around for a couple of years now.

- **WHAT IS MEAN BY DEEP LEARNING** Deep learning is an artificial intelligence (AI) function that imitates the workings of the human brain in processing data and creating patterns for use in decision making. Also known as deep neural learning or deep neural network.

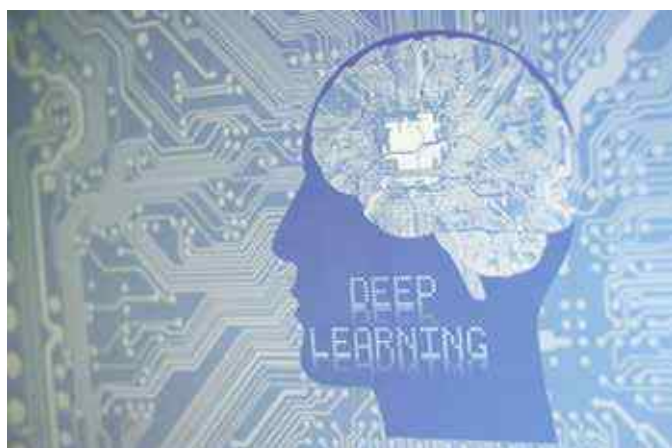
- **TYPES OF DEEP LEARNING**

Deep learning then can be defined as neural networks with a large number of parameters and layers in one of four fundamental network architectures:

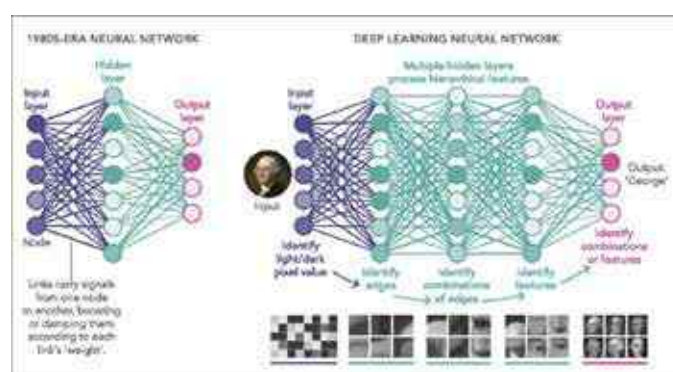
- Unsupervised Pre-trained Networks.
- Convolutional Neural Networks.
- Recurrent Neural Networks.
- Recursive Neural Networks.

- **WHY IT IS CALLED DEEP LEARNING**

Why is deep learning called deep? It is because of the structure of those ANNs. Four decades back,



neural networks were only two layers deep as it was not computationally feasible to build larger networks. Now, it is common to have neural networks with 10+ layers and even 100+ layer ANNs are being tried upon.



- **DEEP LEARNING MODELS**

In deep learning models, data is filtered through a cascade of multiple layers, with each successive layer using the output from the previous one to inform its results. ... Deep learning is loosely based on the way biological neurons connect with one another to process information in the brains of animals.

- **DEEP LEARNING GOOD** Deep learning networks can be successfully applied to big data for knowledge discovery, knowledge application, and knowledge-based prediction. In other words, deep learning can be a powerful engine for producing actionable results.

- **Why is Deep Learning Important?** The ability to process large numbers of features makes deep learning very powerful when dealing with unstructured data. However, deep learning algorithms can be overkill for less complex problems because they require access to a vast amount of data to be effective.

COMPUTER CLUSTER

Ananya Roshan P
2nd year
BSc Applied Physics



A computer cluster is a set of loosely or tightly connected computers that work together so that, in many respects, they can be viewed as a single system. Unlike grid computers, computer clusters have each node set to perform the same task, controlled and scheduled by software.

*What is clustering Computer Science? A cluster is a group of inter-connected computers that work together to perform computationally intensive tasks. In a cluster, each computer is referred to as a "node".

*What is meant by clustering? Cluster analysis or clustering is the task of grouping a set of objects in such a way that objects in the same group (called a cluster) are more similar (in some sense) to each other than to those in other groups (clusters). ... Clustering can therefore be formulated as a multi-objective optimization problem. *Why do we need cluster computing? Clusters provide the computational power through the use of parallel programming, a technique for coordinating the use of many processors for a single problem. Another reason for using clusters is to provide fault tolerance, that is, to ensure that computational power is always available.

*What is clustering and its purpose? Server clustering refers to a group of servers working together on one system to provide users with higher availability. These clusters are used to reduce



downtime and outages by allowing another server to take over in the event of an outage

*What is cluster computing example? A computer cluster is a set of loosely or tightly connected computers that work together so that, in many respects, they can be viewed as a single system. Unlike grid computers, computer clusters have each node set to perform the same task, controlled and scheduled by software *Where is clustering used? Clustering analysis is broadly used in many applications such as market research, pattern recognition, data analysis, and image processing. Clustering can also help marketers discover distinct groups in their customer base. And they can characterize their customer groups based on the purchasing patterns.

*What is cluster effect? Clustering effects may arise when there is a potential for correlation of outcomes among patients in similar groups, which can result in a loss of independence of observations.

Clustering may also occur by location.

*What is the benefit of clustering?

Increased performance: Multiple machines provide greater processing power.

Greater scalability: As your user base grows and report complexity increases, your resources can grow.

Simplified management: Clustering simplifies the management of large or rapidly growing systems.

*What is cluster and its types? Cluster analysis is the task of grouping a set of data points in such a way that they can be characterized by their relevancy to one another.

These types are Centroid Clustering, Density Clustering Distribution Clustering, and Connectivity Clustering.

SMART MIRROR

Devika T S

2nd year

BSc Polymer Chemistry



A smart mirror is a two way mirror with an electronic display behind the glass. The display can show the viewer different kinds of information in the form of widgets, such as weather, time, date, and news updates. This product would be useful for busy individuals that wants to multitask and stay informed while on the go. Instead of constantly pulling out a device, one could get informed while finished daily grooming tasks.



FUNCTIONAL WORKING PROCESS:

The basic design of design of a smart mirror starts with the glass that is to be used. Two- way glass is the recommended type as it lets the graphics on the display come through clearer. Vanity vision glass was used as it is an optimal choice for building smart mirrors. We used an Android tablets as a display to be mounted on the back of the mirror. The rest of the glass around the display was backed out by use of black cardboard to ensure that there was a good reflection. Upon uploading the code to the device from Android studio, the widgets of the time, date, real time, weather and news updates were visible through the front of the glass while reflecting the user's image on the mirror.

ADVANTAGE:

- Optical camouflage can be used on surgical globes or equipment so they don't block surgeon's view during delicate operations
- In aviation, cockpit floors could become invisible to 'invisible' pilots during landing.

DISADVANTAGES:

- The weak point of this technique is that the observer needs to look through a half- mirror. The current system needs a half-mirror and projectors, which were fixed on the ground.

CONCLUSION :

The product has great potential mostly in luxury markets due to current high costs. As of today, do-it-yourself electronic hobbyists produce most smart mirrors, aside from a few small companies. It is extremely interesting to people and that they would be interested in purchasing one for their own home. Smart mirrors can be produced quite easily depending on how complex one wants to make it.



PARASITIC COMPUTING

Anupama K V
2nd year
BSc Applied Physics



INTRODUCTION

- Parasitic computing is a concept by which one can use the resources of machines that are connected on the Internet. This technology exploits open Internet protocols to use the resources of remote machines. As the name suggests, the machine that requires the services of others does not need to be authorized by the latter. Any machine, which is connected to the Internet, has to carry out minimum processing of any packet they receive without any authorization

- This concept is exploited by parasitic computing in order to make use of computing powers of remote machines and web servers all around the globe. So one cannot really stop their machines from being utilized in this manner.

- Parasitic computing can be a very effective technique when it comes to solve NP complete problems such as Circuit SAT, 3 SAT, etc. These problems are currently considered as some of world's most complex and time consuming problems. These problems generally have a set of solutions which itself is a subset of a set of possible solutions.

How parasitic computing works

- Although any possible solution to such problems can be verified quickly, there is no known efficient way to identify a solution in the first place. In fact, the most notable characteristic for such problem is that there is no fast solution. The time required to solve such problem is exponentially proportional to the size of the problem. So, as the size of the problem grows, the time required to find all solutions of the problem grows exponentially. In fact, time required to solve a moderately large NP Complete problem can easily reach billions if not trillions of years using any kind of modern computing technology we have available today. For this reason, even just determining whether there is a fast solution to such problems or not is one of the



principal unsolved problems of computer science.

- The parasitic computer starts the process by transmitting specially generated messages to number of targeted web servers consisting of arithmetic and logic unit (ALU) and a network interface (NIF). The packet carrying one of possible solutions to the problem is inserted into the IP level bypassing the parasitic node's TCP.

- The parasitic computer generates a message in such a way that if the solution is not valid, it will fail the TCP checksum on the destination machine and the packet will be dropped. But in the case when the solution is correct, it will be propagated to the HTTP layer via TCP. Since it is a behavior of a web server to respond to any requests coming to an HTTP layer regardless of whether it understands the request or not, the web server will send a response back to the parasitic computer that it has received an HTTP request. Thus the parasitic computer sends out a message for each possible solution it only receives responses back from the server when the possible solution is a one of the actual solutions of the problem.

- Parasitic computing is programming technique where a program in normal authorized interactions

with another program manages to get the other program to perform computations of a complex nature. It is, in a sense, a security exploit in that the program implementing the parasitic computing has no authority to consume resources made available to the other program. Although as elegant and effective it proves to be, there are some major problems with this approach for computing. Since most of the computers connected to the network will be using TCP/IP, the resources available to the parasitic computer are virtually unlimited and almost all of the computer can be exploited. Furthermore, there is a very high possibility that servers can allocate their valuable CPU cycles to do the processing commanded by the parasitic node thus degrading overall performance of the applications running on the server and access efforts of the normal application.

Conclusion

- Parasitic computing moves computation onto what is logically the communication infrastructure of the Internet, blurring the distinction between computing and communication. The Notre Dame scientists have shown that the current Internet infrastructure permits one computer to instruct other computers to perform computational tasks that are beyond the target's immediate scope. Enabling all computers to swap information and services they are needed could lead to unparalleled emergent behavior, drastically altering the current use of the Internet.
- The implementation offered above represents only a proof of concept of parasitic computing. As such, the solution merely serves to illustrate the idea behind parasitic computing, and it is not efficient for practical purposes in its current form.

DIFFERENT ONLINE TOOLS FOR ONLINE LEARNING

Aghnash Gandhi K
2nd year
BSc Polymer Chemistry



What are Online Learning Tools?

It's difficult to provide a single definition of online learning tools, because of the variety of tools. Think about online learning tools in this way: online learning tools refer to any program, app, or technology that can be accessed via an Internet connection and enhance a teacher's ability to present information and a student's ability to access that information.

Following are three major types of online learning tools:

online classrooms, assistive technology, and apps.

Online Classrooms

Today's students are comfortable and familiar with using the Internet to gain information about unknown topics. In the past a person would have gone to the library and referred to an encyclopedia for information. Today we pull smartphones out of

our pockets and ask Google to tell us all about any topic. It is for that reason many students wish to facilitate some of their own learning rather than coming to school and waiting to learn at a teacher-led pace. There are three main types of online classrooms that teachers need to be aware of to meet their students' learning needs.

Blended Classrooms

Blended classrooms use a combination of face-to-face instruction with a teacher at school mixed with some online student-facilitated learning, using the online tools and resources that a teacher gathers and organizes for student usage.

Flipped Classrooms

A flipped classroom also involves students using online student-facilitated learning, but what is



different about a flipped classroom is that students are solely responsible for learning prior to coming into a physical classroom. Projects and activities are done in the classroom led by the teacher with the assumption students have already learned the online assigned content.

Distance Education Classrooms

Distance education classes, sometimes called virtual schools, consist of 100 percent of instruction via the Internet and teacher-provided online tools. In this type of classroom a teacher and student would never interact in the same physical space. Assistive Technology One of the greatest things about online learning tools is their ability to ease accessibility for students with physical and mental learning difficulties. Assistive technology tools are typically already built into programs and may require only a brief training on how to use.

Text-to-speech Programs Most programs have

text-to-speech features that help struggling readers by taking the written word and reading it aloud to them

Proofreading Tools in Software

Although the concept of spelling and grammar checkers in word processing programs may not be that new, it is important that teachers instructions students on how to use them to increase the readability of their writing.



Why Use Online Learning Tools?

With the rapid increase of technology over the last 20+ years, the way students learn and teachers teach have changed too. Luckily, today a wealth of online tools can supplement your ability to bring new information to students, while providing students with many different options for learning input and output. You may be able to teach more effectively and your students may enjoy learning more using a variety of tools like these.



M-COMMERCE

Gokul TV

2nd year
BSc Polymer Chemistry



M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as smartphones and tablets. As a form of e-commerce, m-commerce enables users to access online shopping platforms without needing to use a desktop computer. Examples of m-commerce include purchasing, mobile banking, virtual marketplace apps like the Amazon mobile app or a digital wallet such as Apple Pay, Android Pay and Samsung Pay.

Over time, content delivery over wireless devices has become faster, more secure and scalable. As of the use of m-commerce accounted for 34.5% of e-commerce sales. The industries affected most by m-commerce include:

- Financial services, which includes mobile banking (when customers use their handheld devices to access their accounts and pay their bills) as well as brokerage services, in which stock quotes can be displayed and trading conducted from the same handheld device.
- Telecommunications, in which service changes, bill payment account reviews can all be performed from the same handheld device.
- Service and retail, as consumers are given the ability to place and pay for orders on-the-fly.
- Information services, which include the delivery of financial news, sports figures and traffic updates to a single mobile device.

Types of m-commerce

M-commerce can be categorized by function as either mobile shopping, mobile banking or mobile payments. Mobile shopping allows for a customer to purchase a product from a mobile device, using an application such as Amazon, or over a web app. A subcategory of mobile shopping is app commerce, which is a transaction that takes place over a native app. Mobile banking includes any handheld technology that enables customers to conduct financial transactions. This is typically done through a secure, dedicated app provided by the banking institution. Mobile payments enable users to buy products in-person using a mobile device. Digital wallets, such as Apple Pay, allow a customer to buy a product without needing to swipe a card or pay with physical cash.

How mobile commerce works

With most m-commerce enabled platforms, the mobile device is connected to a wireless network that can be used to conduct online product purchases. For those in charge of developing an m-commerce application, important KPIs to monitor include the total mobile traffic, total amount of traffic on the application, average order value and the value of orders over time. Similarly, tracking the mobile add to cart rate will help developers see if



users are becoming customers. M-commerce developers may also be interested in logging average page loading times, mobile cart conversion rates and SMS subscriptions.

In terms of mobile payment products specifically, they operate through a form of peer-to-peer (P2P) sharing. Once a mobile device is paired with a bank card's information, the phone can be waved over a payment terminal to pay for a product. This contactless payment using a mobile device is possible due to the use of Near Field Communication (NFC).

Advantages and disadvantages of mobile commerce
The advantages of include:

- Added customer retention by being more easily accessible.

- More convenience for customers in comparing prices, reading reviews and making purchases without the need of a desktop computer.
- Wider variety of products and services.
- Automates a businesses' point of customer contact and sales. Disadvantages of include:
 - A poorly executed mobile experience can deter customers from making purchases.
 - Mobile payment options are not available in every geographic location and may not support every type of digital wallet.
 - Businesses must know and comply with tax laws and regulations of all countries they ship to (some businesses will avoid this by only allowing purchases and shipping from their country of origin).

BIG DATA ANALYTICS/ANALYSIS

Adithya KM

2nd year

BSc Polymer Chemistry



INTRODUCTION

Big data may well be the next big thing in the IT world. Big data burst upon the scene in the first decade of the 21st century. The first organizations to embrace it were online and startup firms. Firms like Google, eBay, Linked In, and Facebook were built around big data from the beginning. Like many new information technologies, big data can bring about dramatic cost reductions, substantial, improvements in the time required to perform a computing task, or new product and service offerings. How big data analytics work.

In some cases, Hadoop clusters and NoSQL systems are used primarily as landing pads and staging areas for data. This is before it gets loaded into a data warehouse or analytical database for analysis

usually in a summarized form that is more conducive to relational structures. More frequently, however, big data analytics us are adopting the concept of a Hadoop data lake that serves as the primary repository for incoming streams of raw data. In such architectures, data can be analyzed directly in a Hadoop cluster or run through a processing engine like spark. As in data warehousing, sound data management is a crucial first step in the big analytics process. Data being stored in the HDFS must be organized, configured and partitioned properly to get good performance out of both extract, transform and load (ETL) integration jobs and analytical queries.

ADVENTAGES

- Real-time big data isn't just a process for storing



petabytes or exabytes of data in a data warehouse, it's meaningful.

- Fast forward to the present and technologies like Hadoop give you the scale and flexibility to store data before you know you are going to process it.
- Technologies such as mapReduce, Hive and impala enable you to run queries without changing the data structures underneath.

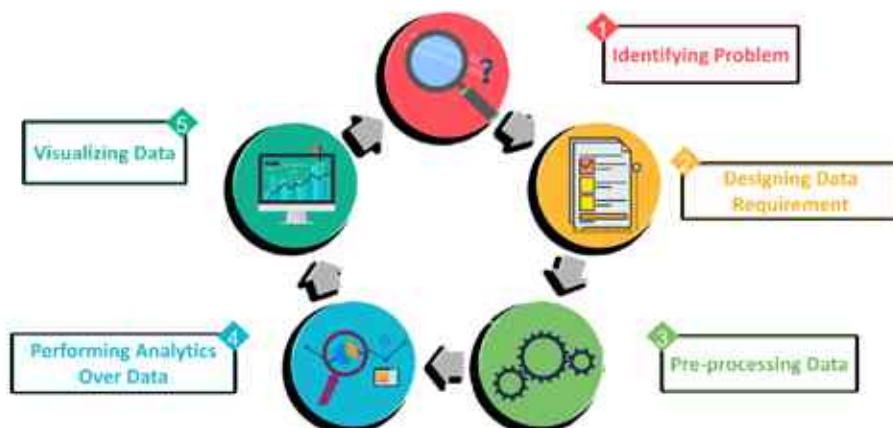
DISADVANTAGES

- Lots of big data is unstructured.
- Big data analysis violates principles of privacy
- It can be used for manipulation of customer records.
- It may increase social stratification.

CONCLUSION

Big data analytics is often complex process of examining big data to uncover information. Such as hidden patterns, correlations, market trends and customer preferences. That can help organizations make informed business decisions.

Submitted by Adithya k. M Roll no. 3 2nd year polymer chemistry.



INTERNET EXPLORER

Athul Venugopal

2nd year
BSc Polymer Chemistry



Internet Explorer was once the most widely used web browser, attaining a peak of about 95% usage share by 2003. This came after Microsoft used bundling to win the first browser war against Netscape, which was the dominant browser in the 1990s. Its usage share has since declined with the launch of Firefox (2004) and Google Chrome (2008), and with the growing popularity of operating systems such as Android and iOS that do not support. Estimates for Internet Explorer's market share are about 1.4% across all platforms, or by StatCounter's numbers ranked 8th. On traditional PCs, the only platform on which it has ever had significant share, it is ranked 5th at 3.26%, after Microsoft Edge, its successor. Edge first overtook Internet Explorer in terms of market share in August 2019. IE and Edge combined rank fourth, after Firefox, previously being second after Chrome.



Market adoption and usage share

The adoption rate of Internet Explorer seems to be closely related to that of Microsoft Windows, as it is the default web browser that comes with Windows. Since the integration of Internet Explorer 2.0 with Windows 95 OSR 1 in 1996, and especially after version 4.0's release in 1997, the adoption was greatly accelerated: from below 20% in 1996, to about 40% in 1998, and over 80% in 2000.

Security

Internet Explorer uses a zone-based security

framework that groups sites based on certain conditions, including whether it is an Internet- or intranet-based site as well as a user-editable whitelist. Security restrictions are applied per zone; all the sites in a zone are Subject to the restriction.

Advantages

Internet Explorer is available for free, It has reached all the nations with internet connectivity, It is also present by default with any version of Windows operating systems, Some sites can only be opened specifically for IE and now Internet Explorer is still the most widely used browser worldwide.

While a major upgrade of Internet Explorer can be uninstalled in a traditional way if the user has saved the original application files for installation, the matter of uninstalling the version of the browser that has shipped with an operating system remains a controversial one.

The idea of removing a stock install of Internet Explorer from a Windows system was proposed during the United States v. Microsoft Corp. case. One of Microsoft's arguments during the trial was that removing Internet Explorer from Windows may result in system instability. Indeed, programs that depend on libraries installed by IE, including Windows help and support system, fail to function without IE. Before Windows Vista, it was not possible to run Windows Update without IE because the service used ActiveX technology, which no other web browser supports.

SURFACE COMPUTING

Najiya Parveen
2nd year
BSc Polymer Chemistry



Surface computing is the use of a specialized computer GUI in which traditional GUI elements are replaced by intuitive, everyday objects. Instead of a keyboard and mouse, the user interacts with a surface. Typically the surface is a touch-sensitive screen, though other surface types like non-flat three-dimensional objects have been implemented as well. It has been said that this more closely replicates the familiar hands-on experience of everyday object manipulation.

Early work in this area was done at the University of Toronto, Alias Research, and MIT. Surface work has included customized solutions from vendors such as LM3LABS or GestureTek, Applied Minds for Northrop Grumman. Major computer vendor platforms are in various stages of release: the iTable by PQLabs, Linux MPX, the Ideum MT-50, interactive bar by spinTOUCH, and Microsoft PixelSense (formerly known as Microsoft Surface).

SURFACE TYPES

Surface computing employs the use of two broad categories of surface types, flat and non-flat. The distinction is made not only due to the physical dimensions of the surfaces, but also the methods of interaction.

FLAT

Flat surface types refer to two-dimensional surfaces such as tabletops. This is the most common form of surface computing in the commercial space as seen by products like Microsoft's PixelSense and iTable. The aforementioned commercial products utilize a multi-touch LCD screen as a display, but other implementations use projectors. Part of the appeal of two-dimensional surface computing is the ease and reliability of interaction. Since the advent of tablet computing, a set of intuitive gestural interactions have been developed to complement

two-dimensional surfaces. However, the two-dimensional plane limits the range of interactions a user is able to perform. Furthermore, interactions are only detected when making direct contact with the surface. In order to afford the user a wider range of interaction, research has been done to augment the interaction schemes for two-dimensional surfaces.

NON-FLAT

While most work with surface computing has been done with flat surfaces, non-flat surfaces have become an interest with researchers. The eventual goal of surface computing itself is tied to the notion of ubiquitous computing "where everyday surfaces in our environment are made interactive".[8] These everyday surfaces are often non-flat, so researchers have begun exploring curved and three-dimensional modes. Some of these include spherical, cylindrical and parabolic surfaces. Including a third dimension to surface computing presents both benefits and challenges.

APPLICATIONS

Surface computing is used in both research and commercial use. It is more widely known commercially in products such as the iPad. Although tablets like the iPad are among the most common types of surface computing other implementations exist, such as HP's Sprout computer. In research, surface computing has been used to help develop gestures for tabletop implementations.[9] Additionally, the exploration of other surface types has been done to help bring surface computing to many other surface types, like curved and spherical surfaces.

INTERACTION METHOD

Various methods of interaction exist in surface computing. The most common method of which is

touch based, this includes single and multi-touch interactions. Other interactions exist such as freehand 3D interactions that depth-aware cameras can sense.

Two dimensional

Typically, traditional surface types are two-dimensional and only require two-dimensional touch interactions. Depending on the system, multi-touch gestures, such as pinch to zoom, are supported. These gestures allow the user to manipulate what they see on the surface by physically touching it and moving their fingers across the surface. For sufficiently large surfaces, multi-touch gestures can extend to both hands, and even multiple sets of hands in multi-user applications.

Three dimensional

Using depth aware cameras it is possible to make three dimensional gestures. Such gestures allow the user to move in three dimensions of space without having to come into contact with the surface itself, such as the methods used in Depth perception.[8] DepthTouch makes use of a depth-sensing camera, a projector, desktop computer, and a vertical screen for the user to interact with. Instead of physically touching the screen, the user can manipulate the objects he or she sees displayed onto it by making freehand gestures in mid-air. The depth-aware camera can then detect the user's gestures and the computer processes them to show what the user is doing on the display.



POLYMER MEMORY

Devika TR
2nd year
BSc Polymer Chemistry



Polymer memory refers to a new memory technology that uses conductive polymers instead of silicon-based constructions to store information. Some of the advances in this new technology are promising even more efficient storage hardware and new methodologies for accessing stored data.

FEATURES OF POLYMER MEMORY

- Zero transistors per bit of storage
- Memory is Nonvolatile
- Microsecond initial reads. Write speed faster than NAND and NOR Flash.
- Simple processing, easy to integrate with other CMOS
- No cell standby power or refresh required
- Operational temperature between -40 and 110°C .

ADVANTAGES OF POLYMER MEMORY

- Polymer memory layers can be stacked to enable to achieve very high storage capacity.
- Memory is Nonvolatile
- Fast read and write speeds
- Very low cost/bit, high capacity per dollar
- Low power consumption
- Easy manufacture.

LIMITATIONS OF POLYMER MEMORY

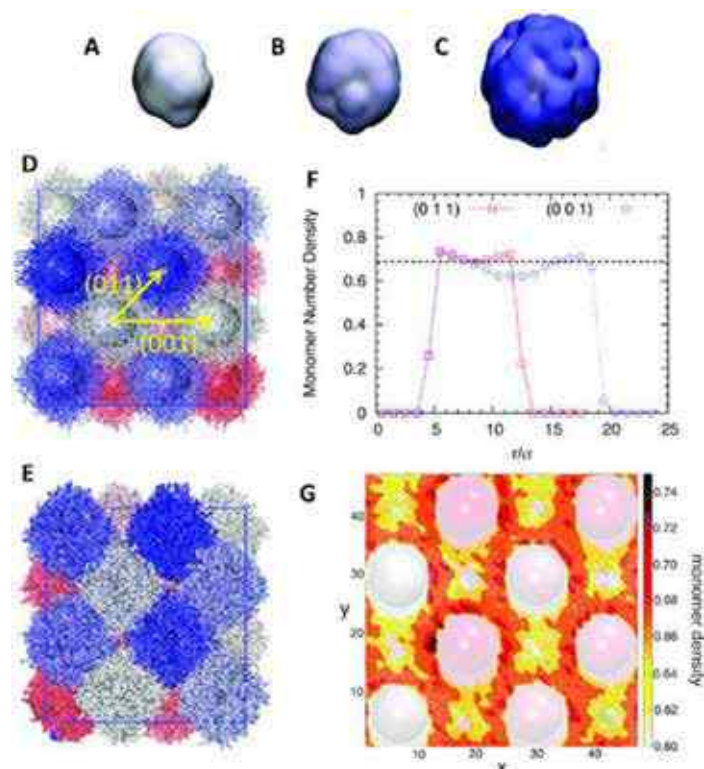
But turning polymer memory into a commercial product won't be easy. The difficulty is in meeting all the essentials of current silicon memory chips. One likely use is in disposable electronics, where cost, rather than performance, is the deciding factor.

WORKING

Polymer memory stores information in an entirely different manner than silicon devices. Rather than encoding zeroes and ones as the amount of charge stored in a cell.

CONCLUSION

The fundamental strength, i.e. the stacking of memory layers which yields maximum storage capacity in a given footprint is the main reason why Polymer memory is highly preferred. The nonvolatileness and other features are in built in molecular level and offers very high advantages in terms of cost.



HOLOGRAPHIC DATA STORAGE

Meenakshi Ramesh
2nd year
BSc Polymer Chemistry



Holographic storage is a mass storage technology that uses three-dimensional holographic images to enable more information to be stored in a much smaller space.

The technology uses holograms which are created when light from a single laser beam is split into two beams; the signal beam (which carries the data) and the reference beam. In holographic storage, at the point where the reference beam and the data-carrying signal beam intersect the hologram is recorded in the light-sensitive storage medium.

ADVANTAGES

*Storage capacity: Magnetic and traditional optical data storage use points of a particular recording surface to store information linearly. On the other hand, holographic storage stores data in three dimensions on the recording medium. This essentially allows a larger amount of information to be stored in a smaller space.

*Storage size: As more data can be stored on a smaller area holographic memory promises to dramatically reduce the amount of space needed to store vast amounts of data. This has significant consequences for both industry-grade and consumer mass-storage devices.

*Longevity: Holographic memory allows a user to write something to disc and have it be stable for up to 50 years. Magnetic storage degrades over time, and mechanical issues can lead to the failure of the disc itself. Magnetic storage requires contact between a reader and the recording surface which usually results in a break down in about 5 years. On the other hand, holographic storage requires no points of direct contact but instead uses lasers.

Faster data retrieval: Holographic data storage also allows for faster data retrieval as memory is stored multi-dimensionally rather than linearly (this allows

multiple points to be accessed simultaneously). For this reason, holographic data storage allows transfer speeds of up to 1GB per second. Holographic systems are able to do this as they retrieve whole pages of data, roughly 60,000 bits of data, with a single pulse of light whereas more traditional storage mediums such as DVDs can only transfer one bit of data per pulse.

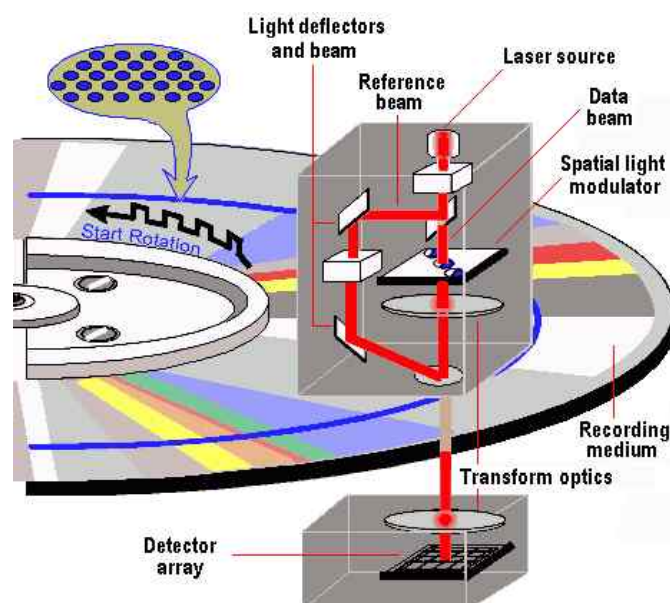
*Extremely useful for medical archiving. (Magnetic storage devices typically have a storage life of 5 years).

*Extremely optimum for small portable devices because of low power consumption (10GB/Watt) and high data storage capacity.

DISADVANTAGES

*Current data storage options on the market such as 'Blu-ray' discs can compete with projected storage capacities of holographic data storage. This makes companies less eager to invest in holographic data storage if current technologies can compete.

*There are already emerging storage devices such as 3D optical data storage, similar to holography but can store more data, specifically up to petabytes (1000 TB) of data.



SMART SENSORS

Aiswarya K
2nd year
BSc Polymer Chemistry



Smart sensors are the next revolutionary tool which senses the data from the real world. Smart sensors are capable of prediction, interpretation and communication. For this purpose the system must be reconfigured and perform the necessary data interpretation, fusion of data from multiple sensors. These sensors also provide functions that perform computation of complex sensing and actuating task with high level application.

Its function can be classified in three terms of compensation, it provide the ability to system to detect and changes in the network environment and second one is information processing, which aims the data processing and interpret the collected data and third one is communication and integration in which communication standardized the network protocol and integrated one does the coupling of sensing and computation of chip level. Another one is validation sensors in which required to avoid the potential disastrous effect of the propagation of erroneous data. Data fusion is another one in which combine information from different sensors.

Smart sensor network: – A sensor network is a collection of sensors interconnected with each other by a communication network. A sensor network is made up of individual multifunctional sensor nodes. It has much significance like sensing accuracy, area coverage, connectivity, minimal human interaction



Application of smart sensors:- It uses in tire pressure monitoring in this information is wirelessly transmitted to the driver and another one is, bush wire response, intelligent transportation, health monitoring, water management and eco system monitoring and robotic landmine detection, in it sensors are used to detect and deactivation of mines.

Advantages:-

- Easy to design
- High Reliability
- Scalable Flexible system
- Minimum interconnecting cables
- High performance
- Small rugged packing

Disadvantages:-

- In wired smart sensors, complexity is much higher as a consequence the cost is also high.
- Required use of predefined embedded function during the design of the smart sensor.
- It requires both actuators and sensors.
- Sensor calibration has to be managed by an external processor



NANO MATERIALS

Praveena P P

2nd year

BSc Polymer Chemistry



Nanomaterial is defined as the "material with any external dimension in the nanoscale or having internal structure or surface structure in the nanoscale", with nanoscale defined as the "length range approximately from 1 nm to 100 nm". This includes both nano-objects, which are discrete pieces of material, and nanostructured materials, which have internal or surface structure on the nanoscale; a nanomaterial may be a member of both these categories.

Types of Nanomaterials

- Carbon Based Materials
- Metal Based Materials
- Dendrimers
- Composites



1:Carbon Based Materials

These nanomaterials are composed mostly of carbon, most commonly taking the form of a hollow spheres, ellipsoids, or tubes. Spherical and ellipsoidal carbon nanomaterials are referred to as fullerenes, while cylindrical ones are called nanotubes. These particles have many potential applications, including improved films and coatings, stronger and lighter materials, and applications in electronics.

2:Metal Based Materials

These nanomaterials include quantum dots, nanogold, nanosilver and metal oxides, such as

titanium dioxide. A quantum dot is a closely packed semiconductor crystal comprised of hundreds or thousands of atoms, and whose size is on the order of a few nanometers to a few hundred nanometers. Changing the size of quantum dots changes their optical properties.

3:Dendrimers

These nanomaterials are nanosized polymers built from branched units. The surface of a dendrimer has numerous chain ends, which can be tailored to perform specific chemical functions. This property could also be useful for catalysis. Also, because three-dimensional dendrimers contain interior cavities into which other molecules could be placed, they may be useful for drug delivery.

4:Composites

Composites combine nanoparticles with other nanoparticles or with larger, bulk-type materials. Nanoparticles, such as nanosized clays, are already being added to products ranging from auto parts to packaging materials, to enhance mechanical, thermal, barrier, and flame-retardant properties.

Applications of Nanomaterials in Biomedicine:

Tissue Engineering (replacement of damaged tissues including the skin, bones, cartilage, lymph nodes, blood vessels, muscle, and other tissues)

Drug Delivery (biodegradable or non-biodegradable nanomaterials can be used to control the release of drugs either through diffusion alone or through diffusion and degradation)

Scaffolds (sufficient surface and various surface chemical properties facilitating cell adhesion, growth, migration and differentiation can be achieved using biocompatible nanofibers)

Wound Healing (novel dressing materials made from spun biopolymers containing various active components beneficial for wound healing with fiber segment sizes ranging from tens of nanometres to several microns)

Advantages of Nanomaterials

The very large surface-to-volume ratio of nanomaterials is especially useful in their use in the medical field, which permits the bonding of cells and active ingredients. This results in the obvious advantage of an increase in the likelihood of successfully combatting various diseases.

Disadvantages of Nanomaterials

Nanoparticles have the potential to cross the blood brain barrier, which makes them extremely useful as a way to deliver drugs directly to the brain. On the other hand, this is also a major drawback because nanoparticles used to carry drugs may be toxic to the brain.

ARTIFICIAL NEURAL NETWORKS OR NEURAL NETWORKS

Sangeeth P U
2nd year
BSc Polymer Chemistry



INTRODUCTION

You might have heard the terms Machine Learning, Artificial Intelligence and even Artificial Neural Networks in the recent times. All these are different ways of answering the good old question of whether we can develop a new form of intelligence that can solve natural tasks.

Computers have superior processing power and memory and can perform a severely complex numerical problem in a short time with ease. But when a real-world intelligent task associated with vision, speech, pattern recognition and natural language processing is presented, it falls short and shows its inadequacies.

This is because, computers, with or without Artificial Intelligence, need an algorithmic approach i.e. the problem must be presented as an algorithm and when a real-world problem task cannot be formulated as an algorithm, then the computers cannot do the same thing as our brains: learn and adapt.

Human brains are fascinating things and even the fastest computers cannot compete with the brain in one thing: our brains learn, analyzed and explore the problem and finally adapt to the situation.

Keeping this biological aspect in mind, scientists are developing a several computer models that are inspired by Biological Neural Networks that can provide a path to solve the problems of natural tasks. This approach is known as Artificial Neural Networks or ANN.

WHAT ARE ARTIFICIAL NEURAL NETWORKS?

Artificial Neural Networks are software implementations of the neural structures of human brain. ANN is a computational system influenced from the structure, processing capability and learning ability of a human brain.

Not diving deep into the complex biology of it, let us take a look at the structure of our brain. Human brain contains billions of neurons that act as organic switches. All these neurons are interconnected to form a huge and complex structure called Neural Network. The output of a single neuron is dependent on inputs from thousands of interconnected neurons. The “Learning” of a human brain is simply repeated activation of certain neural connections and this repetition strengthens the connection. So, for a specified input, the neural connections make sure that output is always a desired one. A simple feedback from the outcome helps the learning process as it strengthens the neural connections.

This behaviour of the brain is key to Artificial Neural Networks as they simply try to replicate this action of the brain. This can be achieved in two ways:

Supervised ANN

Unsupervised ANN

Supervised Artificial Neural Networks

In Supervised Artificial Neural Networks, a matched input and output samples of data is provided to the network for training. The aim of this approach is to get a desired output for a specified input.

One of the best examples of a Supervised ANN is the spam filters of our e-mails. At training level, the input to the Artificial Neural Network engine would be a set of words in the body of the e-mail. The output is flagging the e-mail as either spam or not spam.

Unsupervised Artificial Neural Networks

The Unsupervised Artificial Neural Network is more complex than the supervised counter part as it attempts to make the ANN understand the data structure provided as input on its own.

Characteristics of Artificial Neural Networks

Any Artificial Neural Network, irrespective of the style and logic of implementation, has a few basic characteristics. These are mentioned below.

An Artificial Neural Network consists of large number of “neuron” like processing elements.

All these processing elements have a large number of weighted connections between them.

The connections between the elements provide a distributed representation of data.

A Learning Process is implemented to acquire knowledge.

Elements of Artificial Neural Networks

Keeping the above characteristics in mind, we can derive the basic elements of any Artificial Neural Network as follows:

Processing Elements

Topology

Learning Algorithm

Different Types of Artificial Neural Networks

There are many different flavors of Artificial Neural Networks. Some of them are listed here.

Feed forward Neural Networks

Feedback Neural Networks

Competitive Learning Neural Networks

Advantages

The main advantage of ANN is parallel processing. This makes it more useful than linear programs.

Due to their parallel processing structure, any failure in one neural element will not affect the rest of the process.

Neural networks can be applied to any application and they can solve any complex problem.

By implementing appropriate learning algorithms, an ANN can be made to learn without reprogramming.

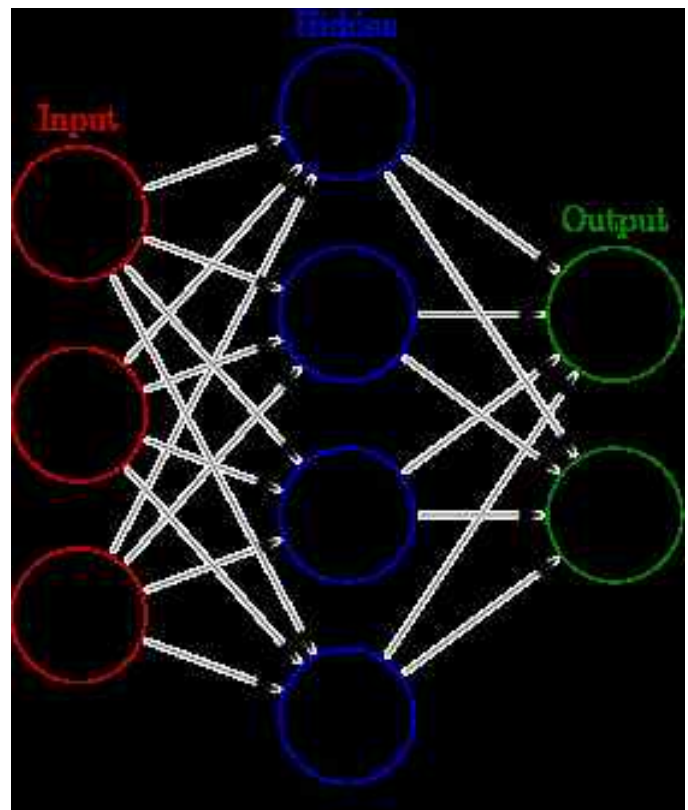
Disadvantages

All the parallel processing requires a huge amount of processing power and time.

There is a requirement for a “training” period before real-world implementation.

Applications of ANN

The two important areas where ANNs have a huge potential of applications are Speech and Image Processing.



HOW WE USE INFORMATION TECHNOLOGY IN THIS PATRIOTIC SITUATION



Abhishek KM
2nd year
BSc Polymer Chemistry

Patriotic situation mean by our country is facing a problem. That is corona or covid -19.

What is the meaning of COVID-19?

COVID-19 is a disease caused by a new strain of coronavirus. 'CO' stands for corona, 'VI' for virus, and 'D' for disease. Formerly, this disease was referred to as '2019 novel coronavirus' or '2019-nCoV.'

Information Technology

Information technology (IT) is the use of computers to store, retrieve, transmit, and manipulate data or information. ... The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones.

Introduction :

Now a days it is very important in our livelihood. Because we can't go for any job or school . We can't reach any place in this situation. So work at house and study at home are very essential. Information technology is very important in daily life.

Use of information technology in the condition

Mobile applications as one of the manifestations of information technology can also be successfully used in patriotic education. Nowadays, next to the

traditional concept of patriotism, there is economic patriotism, the essence of which is to support Polish products and companies with Polish capital.

Advantages

- Speed, Efficiency, and Agility. The goal for any new office technology is to speed up workflow processes, giving your employees the ultimate resource – more time – to focus on the important work. ...
- Storage and Sharing. ...
- Mobility and Remote Connectivity. ...
- Automation. ...
- Communication

Disadvantages

- Data Security. ...
- Data Security. Digital technology means that vast amounts of data can be collected and stored. ...
- Crime and Terrorism. ...
- Complexity. ...
- Privacy Concerns. ...
- Social Disconnect

Conclusion

It is very important and very useful, timeless. But it has some problems. We can uses it in good manner.



CYBER-PHYSICAL SYSTEM



Adithyan P J

2nd year

BSc Polymer Chemistry

A cyberphysical system (CPS) is a computer system in which a mechanism is controlled or monitored by computer-based algorithms. In cyber-physical systems, physical and software components are deeply intertwined, able to operate on different spatial and temporal scales, exhibit multiple and distinct behavioral modalities, and interact with each other in ways that change with context. Examples of CPS include smart grid, autonomous automobile systems, medical monitoring, industrial control systems, robotics systems, and automatic pilot avionics. CPS involves transdisciplinary approaches, merging theory of cybernetics, mechatronics, design and process science. The process control is often referred to as embedded systems. In embedded systems, the emphasis tends to be more on the computational elements, and less on an intense link between the computational and physical elements. CPS is also similar to the Internet of Things (IoT), sharing the same basic architecture; nevertheless, CPS presents a higher combination and coordination between physical and computational elements.

Precursors of cyber-physical systems can be found in areas as diverse as aerospace, automotive, chemical processes, civil infrastructure, energy, healthcare, manufacturing, transportation, entertainment, and consumer appliances.

Mobile cyber-physical systems, in which the physical system under study has inherent mobility, are a prominent subcategory of cyber-physical systems. Examples of mobile physical systems include mobile robotics and electronics transported by humans or animals. The rise in popularity of smart phones has increased interest in the area of mobile cyber-physical systems. Smartphone platforms make ideal mobile cyber-physical systems for a number of reasons, including:

- Significant computational resources, such as processing capability, local storage

- Multiple sensory input/output devices, such as touch screens, cameras, GPS chips, speakers, microphone, light sensors, proximity sensors
- Multiple communication mechanisms, such as WiFi, 4G, EDGE, Bluetooth for interconnecting devices to either the Internet, or to other devices
- High-level programming languages that enable rapid development of mobile CPS node software, such as Java, C#, or JavaScript
- Readily available application distribution mechanisms, such as Google Play Store and Apple App Store
- End-user maintenance and up keep, including frequent re-charging of the battery

For tasks that require more resources than are locally available, one common mechanism for rapid implementation of smartphone-based mobile cyber-physical system nodes utilizes the network connectivity to link the mobile system with either a server or a cloud environment, enabling complex processing tasks that are impossible under local resource constraints. Examples of mobile cyber-physical systems include applications to track and analyze CO₂ emissions, detect traffic accidents, insurance telemetries and provide situational awareness services to first responders, measure traffic, and monitor cardiac patients.

Common applications of CPS typically fall under sensor-based communication-enabled autonomous systems. For example, many wireless sensor networks monitor some aspect of the environment and relay the processed information to a central node. Other types of CPS include smart grid, autonomous automotive systems, medical monitoring, process control systems, distributed robotics, and automatic pilot avionics.



A real-world example of such a system is the Distributed Robot Garden at MIT in which a team of robots tend a garden of tomato plants. This system combines distributed sensing (each plant is equipped with a sensor node monitoring its status), navigation, manipulation and wireless networking.

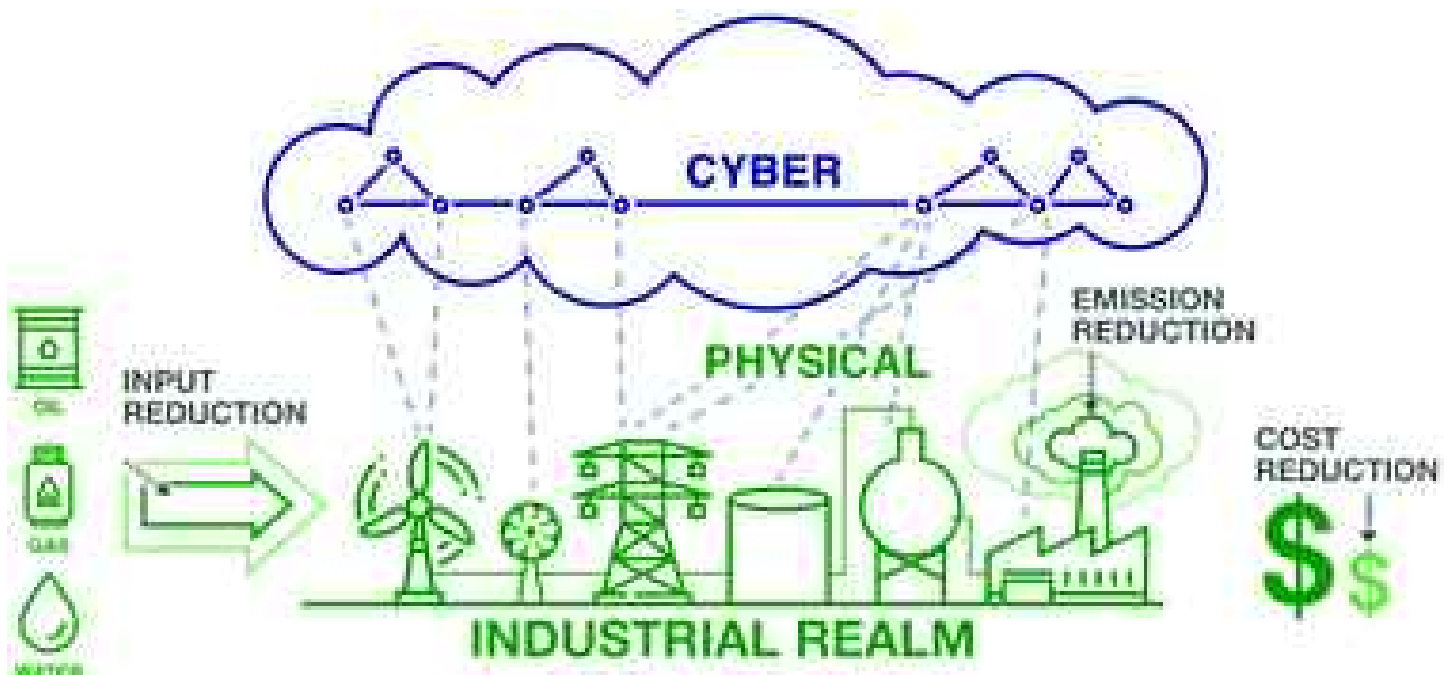
A focus on the control system aspects of CPS that pervade critical infrastructure can be found in the efforts of the Idaho National Laboratory and

collaborators researching resilient control systems. This effort takes a holistic approach to next generation design, and considers the resilience aspects that are not well quantified, such as cyber security, human interaction and complex interdependencies.

Another example is MIT's ongoing CarTel project where a fleet of taxis work by collecting real-time traffic information in the Boston area. Together with historical data, this information is then used for calculating fastest routes for a given time of the day.

CPS are also used in electric grids to perform advanced control, especially in the smart grids context to enhance the integration of distributed renewable generation. Special remedial action scheme are needed to limit the current flows in the grid when wind farm generation is too high. Distributed CPS are a key solution for this type of issues

In industry domain, the cyber-physical systems empowered by Cloud technologies have led to novel approaches that paved the path to Industry 4.0 as the European Commission IMC-AESOP project with partners such as Schneider Electric, SAP, Honeywell, Microsoft etc. demonstrated.



WEB TECHNOLOGY

Anupriya K M
2nd year
BSc Applied physics



You know that the way computers communicate each other is different from that the people do. For that, computers need codes, directions etc... These codes and commands allow computer to process the needed information. The methods by which computers communicate with each other through the use of markup languages and multimedia packages is known as web technology. In the past few decades, web technology has undergone a dramatic transition, from a few marked up web pages to the ability to do very specific work on a network without interruption.

It may be easier to think of web technology as a gradual process of evolution, some stages of which are still in use today.



Using a variety of markup language like hypertext markup language (HTML) and cascading style sheets (CSS), our capabilities can range from delivering text to producing incredible graphics.

The top website technologies are,

HTML5 : This recent addition to HTML family is very equipped and potent in assisting in web development activities.

JavaScript : This programming language lets you make communication for your website. It was developed by Netscape and borrows a lot of its syntax from the C language. Using JavaScript, you can manage your browser, edit content on a document, let client-side scripts interact with users, and also enable asynchronous communication.

Java : This is the top programming language in the industry and is currently the perfect language for web development.

Python : This is an advanced programming language and is used for creating websites and mobile apps. It is very flexible and has a broad range of applications.

NET : This was created by Microsoft in the year 2000. Though it is used primarily in systems running on Windows, this language is used in scientific research and academic fields, thereby more than making up for this feature.

C : This is a standard programming language created in the 1970s. It is appreciated for its efficiency and is known for writing system software. It is also used for writing applications.

C++ : This is an intermediary programming language, initially designed to boost the C language.

SQL : This stands for Structured Query Language and is a necessary part of web development. Using this language, web developers can obtain data from large and multifaceted databases.

These are the top website programming languages and technologies. Mobile technology will become increasingly popular, with more and more websites becoming responsive and mobile-enabled. With website technologies evolving by the day, the field is increasingly becoming not only more popular but also more exciting, with newer websites being created all the time. Here's to a seamless World Wide Web experience for everyone!



PLASMA ANTENNA



Sruthy K.S
2nd year
BSc Applied Physics

INTRODUCTION

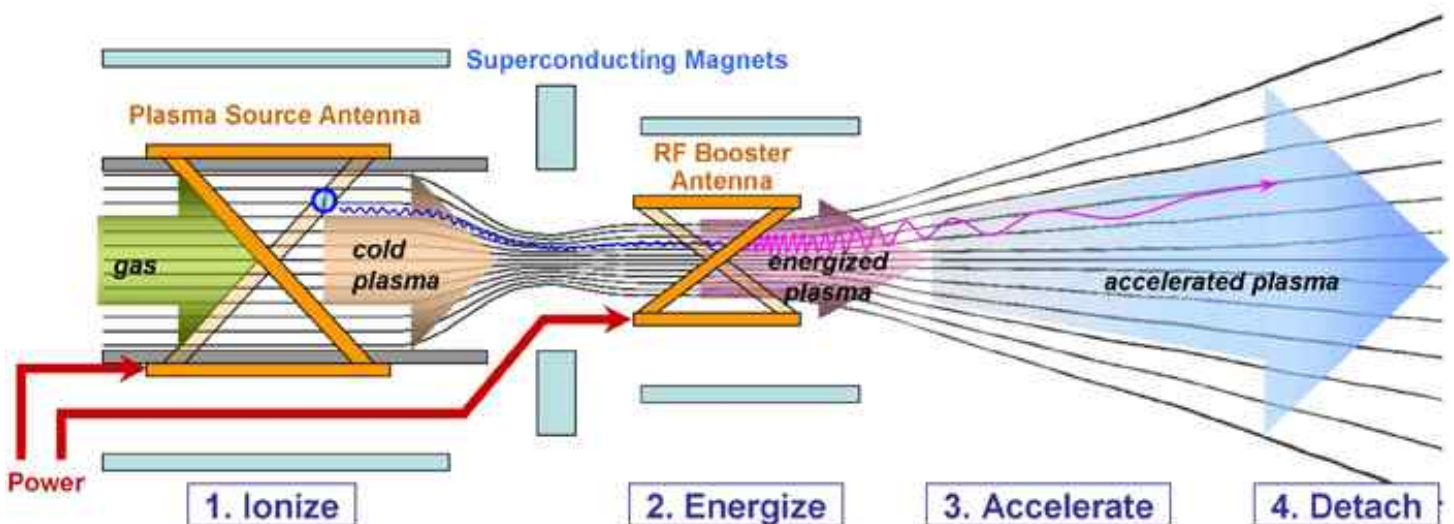
- A plasma antenna is a type of radio antenna currently in development in which plasma is used instead of the metal elements of a traditional antenna. A plasma antenna can be used for both transmission and reception. Although plasma antennas have only become practical in recent years. The idea is not new ; a patent for an antenna using the concept was granted to J. Hettinger in 1999
- Early Practical examples of the technology used discharge tubes to contain the plasma and are referred to as ionized gas plasma antennas. Unlike gases, plasma has very high electrical conductivity so it is possible for radio frequency signals to travel through them so that they act as a driven element to radiate radio waves, or to receive them. Alternatively the plasma can be used as a reflector or a lens to guide and focus radio waves from another source.

Advantages

- Plasma antennas possess a number of advantages over metal antennas, including :
- As soon as the plasma generator is switched off, the plasma returns to a non-conductive gas and therefore becomes effectively invisible to radar.
- They can be dynamically tuned and reconfigured for frequency, direction, bandwidth, gain and beam width, so replacing the need for multiple antennas.
- They are resistant to electronic warfare.

Conclusion

- The type of plasma antenna under investigation is constructed using a hollow glass column which is filled with an inert gas. Plasma antenna technology offers the possibility of building completely novel antenna arrays. Demonstrated using plasma antennas for both base and mobile stations. Current research is working towards a robust plasma antenna for field demonstration to Defence Force Personnel.



THE JAVA RING

Hari Krishnan P S
2nd year
BSc Polymer Chemistry



The Java Ring is an extremely secure Java-powered electronic token with a continuously running, unalterable real time clock and rugged packaging, suitable for many applications. The jewel of the Java Ring is the Java iButton -- a one-million transistor, single-chip trusted microcomputer with a powerful Java virtual machine (JVM) housed in a rugged and secure stainless-steel case. Designed to be fully compatible with the Java Card 2.0 standard (for more on Java Card 2.0, see last month's Java Developer column, "Understanding Java Card 2.0 ") the processor features a high-speed 1024-bit modular exponentiator for RSA encryption, large RAM and ROM memory capacity, and an unalterable realtime clock. The packaged module has only a single electrical contact and a ground return, conforming to the specifications of the Dallas Semiconductor 1-Wire bus. Lithium-backed non-volatile SRAM offers high read/write speed and unparalleled tamper resistance through near-instantaneous clearing of all memory when tempering is detected, a feature known as rapid zeroization. Data integrity and clock function are maintained for more than 10 years. The 16-millimeter diameter stainless steel enclosure accommodates the larger chip sizes needed for up to 128 kilobytes of high-speed nonvolatile static RAM. The small and extremely rugged packaging of the module allows it to attach to the accessory of your choice to match individual lifestyles, such as a key fob, wallet, watch, necklace, bracelet, or finger ring

Historical background

In the summer of 1989, Dallas Semiconductor Corp. produced the first stainless-steel-encapsulated memory devices utilizing the Dallas Semiconductor 1-Wire communication protocol. By 1990, this protocol had been refined and employed in a variety of self-contained memory devices. Originally called "touch memory" devices, they were later renamed "iButtons." Packaged like batteries, iButtons have only a single active electrical contact on the top surface, with the stainless steel shell serving as

ground.

Data can be read from or written to the memory serially through a simple and inexpensive RS232C serial port adapter, which also supplies the power required to perform the I/O. The iButton memory can be read or written with a momentary contact to the "Blue Dot" receptor provided by the adapter. When not connected to the serial port adapter, memory data is maintained in non-volatile random access memory (NVRAM) by a lifetime lithium energy supply that will maintain the memory content for at least 10 years. Unlike electrically erasable programmable read-only memory (EEPROM), the NVRAM iButton memory can be erased and rewritten as often as necessary without wearing out. It can also be erased or rewritten at the high speeds typical of complementary metal oxide semiconductor (CMOS) memory, without requiring the time-consuming programming of EEPROM. Since their introduction, iButton memory devices have been deployed in vast quantities as rugged portable data carriers, often in harsh environmental conditions. Among the large-scale uses are as transit fare carriers in Istanbul, Turkey; as maintenance record carriers on the sides of Ryder trucks; and as mailbox identifiers inside the mail compartments of the U.S. Postal Service's outdoor mailboxes. They are worn as earrings by cows in Canada to hold vaccination records, and they are used by agricultural workers in many areas as rugged substitutes for timecards

The iButton product line and its many applications are described at Dallas Semiconductor's iButton Web site, which is listed in the Resources section. Every iButton product is manufactured with a unique 8-byte serial number and carries a guarantee that no two parts will ever have the same number. Among the simplest iButtons are memory devices that can hold files and subdirectories and can be read and written like small floppy disks. In addition to these, there are iButtons with password-protected



file areas for security applications, iButtons that count the number of times they have been rewritten for securing financial transactions, iButtons with temperature sensors, iButtons with continuously running date/time clocks, and even iButtons containing powerful microprocessors.

The postal security device

For over 10 years, Dallas Semiconductor also has been designing, making, and selling a line of highly secure microprocessors that are used in satellite TV descramblers, automatic teller machines, point-of-sale terminals, and other similar applications requiring cryptographic security and high resistance to attack by hackers. The U.S. Postal Service's (USPS) Information Based Indicia Program Postal Security Device Specification, intended to permit printing of valid U.S. postage on any PC, provided the first opportunity to combine two areas of expertise when a secure microprocessor was designed into an iButton.

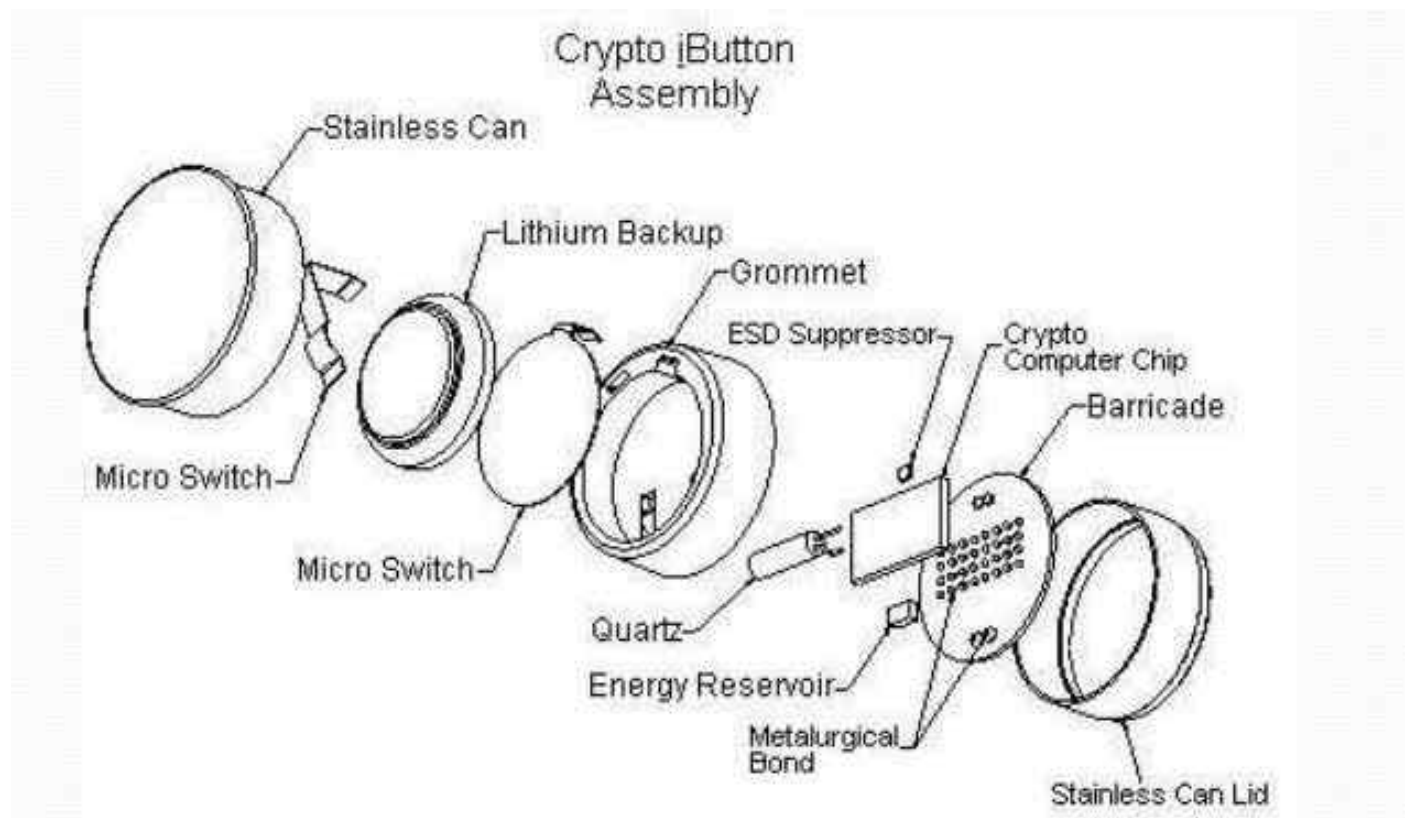
The resulting product, named the Crypto iButton, combines high processor performance, high-speed cryptographic primitives, and exceptional protection against physical and cryptographic attack. For example, the large integer modular exponentiation engine can perform 1024-bit modular exponentiations with a 1024-bit exponent in significantly less than a second. The ability to perform large integer modular exponentiations at high speed is central to RSA encryption, Diffie-Hellman key exchange, Digital Signature Standard (FIPS 186), and many other modern cryptographic operations.

An agreement between Dallas Semiconductor and RSA Data Security Inc. provides a paid-up license for anyone using the Crypto iButton to perform RSA encryption and digital signatures so that no further licensing of the RSA encryption technology is required. High security is afforded by the ability to erase the contents of NVRAM extremely quickly. This feature, rapid zeroization, is a requirement for high security devices that may be subjected to attacks by hackers. As a result of its high security, the Crypto iButton is expected to win the FIPS 140-1 security certification by the National Institute of Standards and Technology (NIST).

A special operating system was designed and stored in the ROM of the Crypto iButton to support cryptography and general-purpose financial transactions -- such as those required by the Postal Service program. While not a Java virtual machine, the E-Commerce firmware designed for this application had several points of similarity with Java, including an object-oriented design and a bytecode interpreter to interpret and execute Dallas Semiconductor's custom-designed E-Commerce Script Language. A compiler was also written to compile the high-level language representation of the Script Language to a bytecode form that could be interpreted by the E-Commerce VM. Although the E-Commerce firmware was intended primarily for the USPS application, the firmware supports a variety of general electronic commerce models that are suitable for many different applications. The E-Commerce firmware also supports cryptographic protocols for secure information exchange such as the Simple Key-Management for Internet Protocol (SKIP) developed by Sun Microsystems Inc. The E-Commerce iButton and the SDK for programming it are described in detail on the Crypto iButton home page (see Resources).

The Java connection

With experience designing the E-Commerce operating system and VM for the Crypto iButton hardware platform, the firmware design team at Dallas Semiconductor could readily appreciate the advantages of a new operating system for the Crypto iButton based on Java. With a Java iButton, a vast number of existing Java programmers could easily learn to write applets that could be compiled with the standard tools available from Sun Microsystems,



loaded into the Java iButton, and run on demand to support a wide variety of financial applications. The Java Card 2.0 specification provided the opportunity to implement a useful version of the JVM and runtime environment with the limited resources available to a small processor.

Java Ring

The Crypto iButton also provides an excellent hardware platform for executing Java because it utilizes NVRAM for program and data storage. With 6 kilobytes of existing NVRAM and the potential to expand the NVRAM capacity to as much as 128 kilobytes in the existing iButton form factor, the Crypto iButton can execute Java with a relatively large Java stack situated in NVRAM. This memory acts as conventional high-speed RAM when the processor is executing, and the lithium energy preserves the complete state of the machine while the Java Ring is disconnected from the reader. There is therefore no requirement to deal with persistent objects in a special way -- objects persist or not depending on their scope so the programmer has complete control over object persistence. As in standard Java, the Java iButton contains a garbage collector that collects any objects that are out of

scope and recycles the memory for future use. Applets can be loaded and unloaded from the Java iButton as often as needed. All the applets currently loaded in a Java iButton are effectively executing at zero speed any time the iButton is not in contact with a Blue Dot receptor.

As the Java Card 2.0 specification was proposed, Dallas Semiconductor became a JavaSoft licensee. The agreement called for the development of a Java Card 2.0 implementation and also for the design of "plus portions" that take advantage of the unique capabilities afforded by the Crypto iButtons NVRAM, such as the ability to support a true Java stack and garbage collection. With the addition of the continuously running lithium-powered time-of-day clock and the high-speed, large-integer modular exponentiation engine, the Java iButton implementation of Java Card 2.0 with plus portions promises an exciting new feature set for advanced Java Card applications

Conclusion

Dallas Semiconductor has produced more than 20 million physically-secure memories and computers with hard-shell packaging optimized for personal possession. The Java iButton, therefore, is simply

the latest and most complex descendant of a long line of products that have proven themselves to be highly successful in the marketplace. With its stainless steel armor, it offers the most durable packaging for a class of products that likely will suffer heavy use and abuse as personal possessions. The iButton form factor permits attachment to a wide variety of personal accessories that includes rings, watchbands, keyfobs, wallets, bracelets, and necklaces, so the user can select a variation that suits his or her lifestyle.

With a 32-kilobyte Java Card Environment (JCE) and I/O subsystem in mask-programmed ROM, a continuously running true-time clock, and 6 kilobytes of NVRAM memory with expansion potential up to 128 kilobytes, the Java iButton supports a true Java stack, full-length 32-bit Java integers, and garbage collection. This feature mix provides support for relatively high-end Java applets with substantial computing requirements.

MOBILE OPERATING SYSTEMS

Fathima Nazrin
2nd year
BSc Applied Physics



What is operating systems? ◦

Much like the Linux or windows operating systems controls your desktop or laptop computer, a mobile operating system is a software platform on top of which other programs can run on mobile devices. The operating systems is responsible for determining the functions and features available on your device, such a thing wheel, keyboard, WAP, synchronisation with application, e-mail, text messaging and more. The mobile OS is also determines which third party applications can be used on your device.

. Types of mobile operating systems

◦ When you purchase a mobile device the manufacturer will have chosen the operating systems for that specific device. Often you will want to learn about the mobile operating system before you purchase a device to ensure compatibility and support for the mobile applications you want to use

Android OS

◦ The android mobile operating system is Google's open and free software that stack that includes the

operating systems, middle ware and also key applications for use on mobile devices, including smartphones. Updates for the open source Android mobile operating system have been developed under "desset inspired" version names eith each new version arriving in alphabetical order with new enhancement and improvements

Bada(Samsung electronics)

◦ Bada is a proprietary samsung mobile OS that was first launched in 2010. The Samsung wave was first smartphone to use this mobile OS. Bada provides the mobile features such that multi point touch ,3D graphics, and ofcourse, application downloads and installation.

Blackberry OS

◦ The blackberry OS is a proprietary mobile operating system devoleped by Research In motion for use on the company's popular handheld devices. The blackberry platform is popular with corporate users as it offers Synchronisation with Microsoft exchange, Lotus Domino, Novell group wise email and other business software, when used with the Blackberry enterprise server.

iphone OS

◦ Apple's iPhone OS was originally developed for use on its iPhone devices. Now the mobile operating system is referred to as iOS and is supported on a number of Apple devices including iPhone, iPad, iPad2 and iPad touch. The iOS mobile operating system is available only on Apple's own manufactured devices. Apple iOS is derived from Apple's Mac OS X operating system.

Windows mobile

◦ Windows mobile is Microsoft mobile operating system used in smartphone and mobile devices- with or without touch screen. The mobile OS is based on the Windows CE 5.2 kernel. In 2010 Microsoft announced a new smartphone platform called Windows Phone 7.



TYPES OF NETWORKS



Shahida A S
2nd year
BSc Applied Physics

PAN :- Personal Area Network

PAN is a network communicating device in proximity of an individual . A typical PAN would include one or more comuters, telephones, periheral devices, vedio game consoles and other personal entertainment devices. It can cover on area of a radius with few meters.

MAN :- Metropolitan Area Network

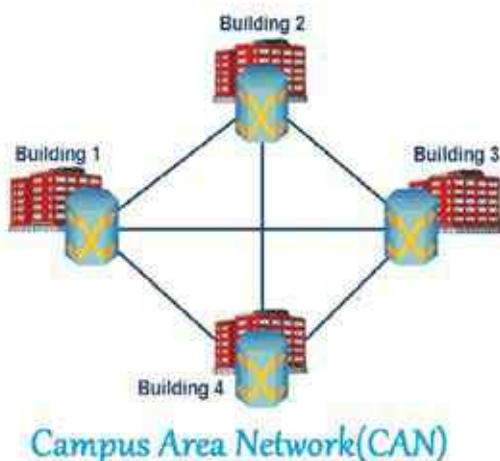
MAN is network of computing and communicating device within a city . It can cover an area of a few kilometers to a few hundred Kilometers radius . MAN is usually formed by interconnecting a number of LANS and individual computers. All type of communication media are used to setup a MAN

LAN :- Local Area Network

LAN network is network of comutind and communicating devices in a room, building, or campus . It can cover an area of radius with a few meters to a few Kilometers. A networked office building, school or home usually contains a single LAN

WAN :- Wide Area Network

WAN is a network of computing and communicating devices crossing the limits of a city, country or a continent.It can cover an area of over hundreds of Kilometers of radius. WAN is usually contain a number of interconnectef individual computers LANs, MANs, and maybe other WANs.



Best known example of a WAN is the Internet.

SAN :- Storage Area Network

SAN is a specialized high speed network that provides block-level network access to storage. SAN are typically composed of hosts, switches, storage elements, and storage devices that are interconnected using a variety of technologies, topologies and protocols.

CAN :- Campus Area Network

CAN is a network of multiple interconnected local area networks in a limited geographical area. A CAN is smaller than a wide area network or metropolitan area network. A CAN is also known as corporate area network.

ALGORITHM

An algorithm is a predefined self-contained set of instructions required to execute diverse functions. In other words it is a finite sequence of well defined, computer implementable instruction typically to solve a class of problems or to perform a computation.

Basic algorithm were making scheme that the ancient folks used to keep tracks of their grain and cattle. This was followed by the advent of numeric, algebra, and variables followed, given rise to symbols and rules involved in formulating evaluation system. The origin of the term is attributed to Persian scientist, astronomer, mathematician, Abu Abdullah Muhammad Bin Musa al Khwarizmi (c.850AD). He introduced the decimal positioning within numeric system to the western world, along with the first ever systematic solution of linear and quadratic equations.

It is a step-wise representation of a solution, which makes the problem to solve easily. It uses definite procedure. It is not depended on any

programming language so it is easy to understand for anyone even without programming knowledge. Each step has its own logical sequence so it is easy to debug. By using this, the problem is broken down into smaller pieces or steps hence, it is easier for programmer to convert it into an actual program.

Though it has many advantages, also have some disadvantages. It takes so many time. Difficult to show branching and looping in algorithms. Precision, uniqueness, finiteness, input, output, generality are some of the characteristic properties of algorithm. Each and every instructions should be precise and unambiguous and can be performed in a finite time. On or more instructions should not be repeated infinitely as the algorithm has to be terminated ultimately. It have zero or more inputs, which is externally supplied. After performing instructions the desired results should be obtained. For describing the program it can use English, pseudocode, real programming language and flowchart.

Sreelekshia Mohandas

2nd year

BSc Applied Physics



E-BALL TECHNOLOGY

Athira K.S
2nd year
BSc Applied Physics



E-ball contains wireless optical mouse and laser keyboard, and LCD projector. It has many advantages such as it is portable and easy to use. It has large memory.

● E-BALL is efficient and useful for making video presentation. But there are some limitations like the cost of E-Ball is very high and it is difficult to understand if any problems occur in hardware components.

Components of E-Ball

- Dual core processor
- 2GB RAM
- 350-500GB hi-Tech virtual keyboard drive
- Integrated graphics and sound card
- Speakers ● Wireless optical mouse
- LAN & WAN card
- Modem
- Web cam
- LCD projector
- Paper holder

Features of E-BALL

● It has wireless optical mouse and laser keyboard, LCD projector.

- It has around 350-600GB of Hard Disk Drive
- It contains 5GB RAM
- It has two 50W speakers.
- It has LAN and WAN card and a Web cam
- I-tech virtual keyboard
- Dual core processor integrated graphics and sound card.
- LCD projector Paper holder

Disadvantages of E-Ball technology

- Normal operating systems cannot work in these computers.
- Cost of E-BALL is very high.
- It is difficult to understand if any problems occur in hardware part.

E-Ball Technology

E-Ball is a sphere-shaped computer system that comes with all features of traditional computer but has a very smaller size. It even comes with a large screen display along with mouse and keyboard. It is designed in such a way that portability gets a great boost.



BLACKBERRY TECHNOLOGY



Hefseba Stephen
2nd year
BSc Applied Physics

What is black berry technology?

- The most commonly known smart phone black berry supports, push email, mobile telephone, text msg.
- An example of a convergent device.
- It has a built in keyboard, optimized for "thumbing", the use of only the thumbs to type.

Components of blackberry technology

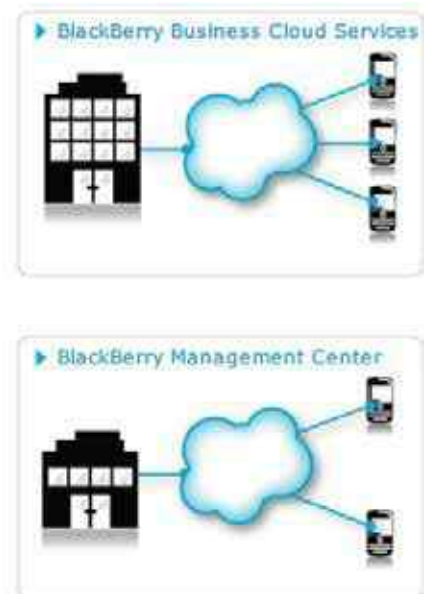
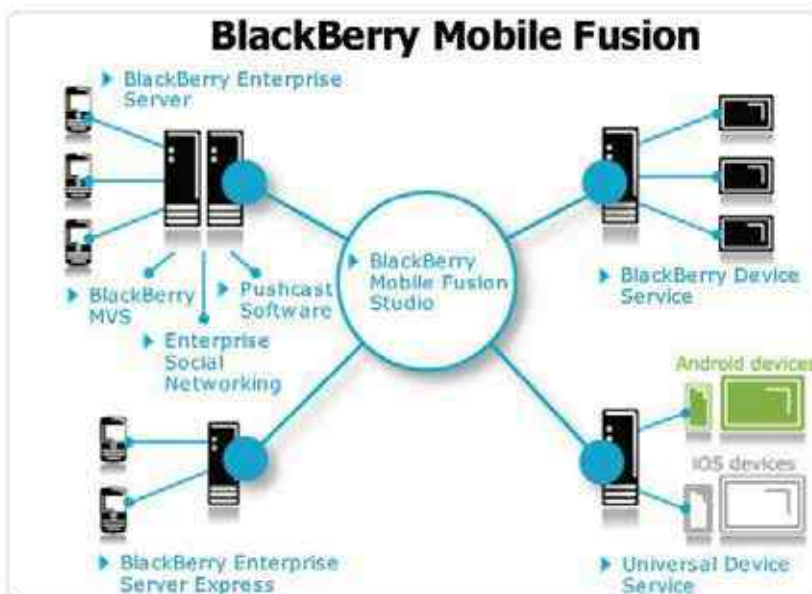
- Operating system
- CPU
- database
- Supporting software
- Blackberry PIN

Working

- Black berry professional softwares
- Black berry enterprise server

Advantages

- Email
- Phone
- Wireless internet
- Organizer
- SMS
- paging
- Black berry messenger



Supporting softwares

- Microsoft exchange
- Push email
- MDS
- BBM

Conclusion

- A black berry is an end-end wireless email solution that allows access to our outlook inbox ,calendar,contacts& tasks with full wireless synchronization
- The strict adherence to black berry security has made the platform very popular with governments and corporation world wide
- Provides the instant synchronization to the calender,messaging,web,docs to go ,evernote ,blackberry blend,etc

ELECTRONIC COMMERCE

Asmath P A
2nd year
BSc Polymer Chemistry



INDRODUCTION

E-commerce is a means of conducting business, where the buying or selling of goods and services or the transmitting of funds or data, occur via electronic medium. There are no physical market places and the entire process of marketing and selling of goods, takes place on-line or electronically.

• WHAT IS E COMMERCE

E-commerce is the activity of buying or selling of products on online services or over the Internet. Electronic commerce draws on technologies such as mobile commerce, velectronic funds. transfer, supply chain management, Internet marketing, online transaction processing, electronic.

• 3 TYPES OF E COMMERCE

- Business-to-Business (B2B) B2B e-commerce refers to all electronic transactions of goods and sales that are conducted between two companies. ...
- Business-to-Consumer (B2C) ...
- Consumer-to-Business (C2B) ...
- Business-to-Administration (B2A) ...
- Consumer-to-Administration (C2A)

▪ E COMMERCE EASSY

In the e – commerce internet provides information about goods and services “It is” a way of conducting imaging and executing business transactions and services through electronic media and net working in computers and communication net work, websites, e-mail are resorted.

▪ E COMMERCE SCOPE

E-commerce, which emerged in the early 90s, stands for purchasing, selling, and exchanging goods or services using internet-enabled electronic devices. E-Commerce enabled websites and the Internet have become part of today's business.

• E COMMERCE OF USE

E-commerce (electronic commerce) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet.

These business transactions occur either as



business-to- business (B2B), business-to-consumer (B2C), consumer-to- consumer or consumer-to-business.

• E COMMERCE OF BISSNESS

Ecommerce, also known as electronic commerce or internet commerce, refers to the buying and selling of goods or services using the internet, and the transfer of money and data to execute these transactions. ... Global retail ecommerce sales are projected to reach \$27 trillion by 2020.

• E COMMERCE OF EXAMPLE

The standard definition of E-commerce is a commercial transaction which is happened over the internet. Online stores like Amazon, Flipkart, Shopify, Myntra, Ebay, Quikr, Olx are examples of E-commerce websites. By 2020, global retail e-commerce can reach up to \$27 Trillion.



THANKS..

Dhanya Mohan O

Assistant Professor

Dept. of Computer Science



It's my pleasure to give the appraisal for your IT Magazine **TECHREPOS2020**. I am congratulating each and every one of you on your fabulous work. This magazine covers all the latest topics of Computer Science and Applications such as Artificial Intelligence, Data mining, Deep learning, Data Analytics etc. Covering a whole variety of topics, the magazine is full of interesting facts with pictures. I really found the magazine **TECHREPOS2020** is extremely interesting, informative and very professional. Thank you very much for producing and organizing the valuable materials with outstanding qualities in this journal.

On the whole, the magazine is a great treasure-trove for the student community. I am so overwhelmed for this opportunity to share my views for appreciating your journal.

With Regards!

Dhanya Mohan O

Assistant Professor

Dept. of Computer Science

MAGAZINE EDITORS



AKARSH M H

2nd year

BSc Applied Physics

ABHISEKH K M

2nd year

BSc Polymer Chemistry



