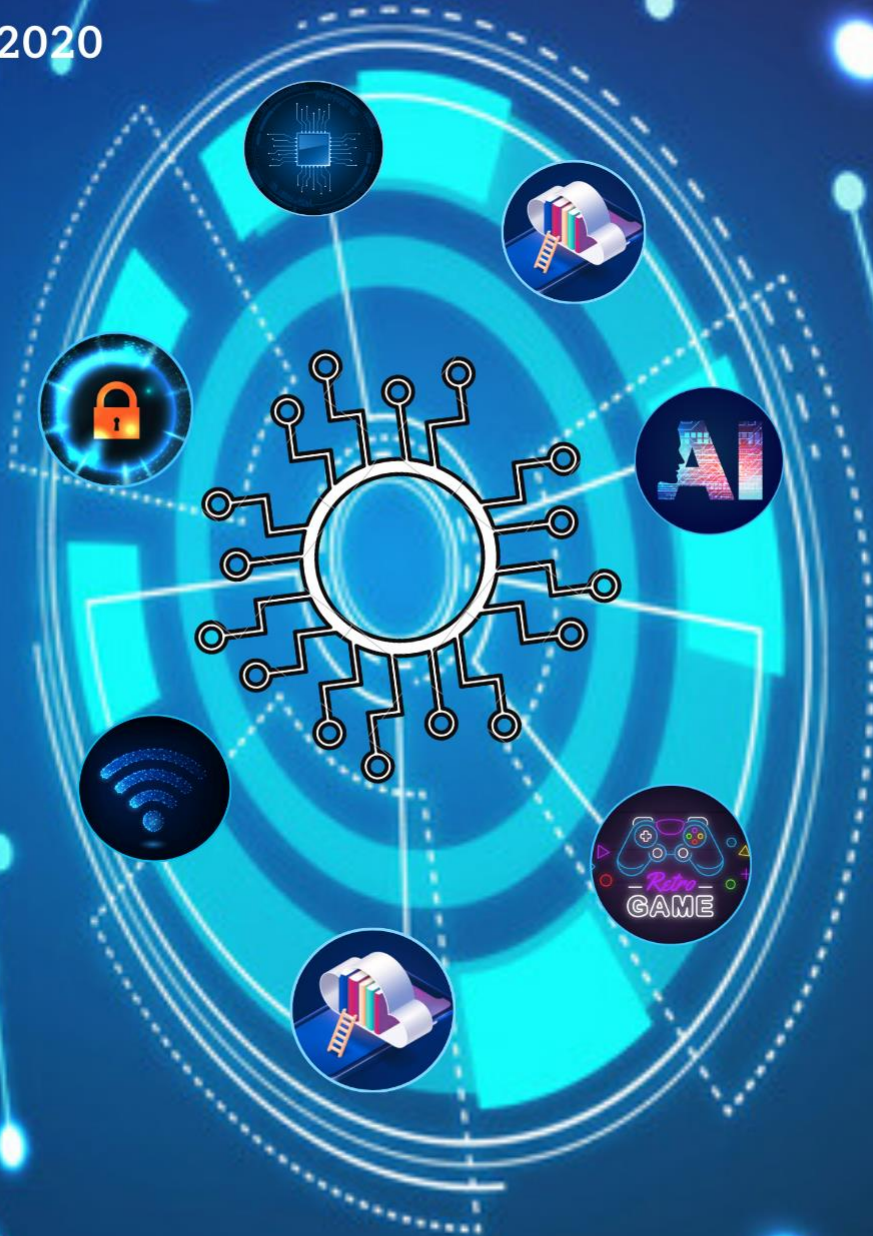VOL
1

Department of BscIT

TECHByte

ANNUAL IT MAGAZINE
FEBRUARY | 2020

A Publication By

SIES (Nerul) College of Arts, Science and Commerce

I

"Every once in a while, a new technology, an old problem, and a big idea turn into an innovation."

-Dean Kamen

Dear Reader,

Greetings to you!!!

"The first step towards change is awareness. The second step is acceptance"

—*Nathaniel Branden*

With this quote in mind, we strive hard to portray the revolutions happening, as well as unlock the treasure of recent technologies through the articles in field of IT.

BSc Information Technology is a highly dynamic and versatile field. With the advent of digitization and automation, innovations and inventions are happening every moment. We at BSc. IT, feel that our students must be well aware of these constant changes taking place in the IT sector. They should be well informed about the recent endeavors trending in the field of Science and Technology.

This magazine is aimed at motivating and enlightening the students by exposing them to the brief know-how of recent technologies. Such an informative knowledge will definitely help the students to choose their "area of liking". We wish our efforts will be beneficial for the students to build their careers and to "enjoy their work" in near future.

We have for you, from students and faculty's wide range of informative and thought provoking articles, digital designs, poems and crosswords.

Happy Reading!

The Editorial Board

Ajay Padyachi (F.Y.Bsc.IT)

Tanmay Mhatre (T.Y.Bsc.IT)

Message from

The Principal's Desk

"SIES means excellence", and we at SIES strive hard to achieve this motto at every stage of our academic ventures. Excellence is a continual process, and needs consistent and enhanced efforts in an exponential manner.

SIES was one of the few institutions to start BSc.IT programme since its inception year by University of Mumbai, in 2001.

Every year the department of BSc.IT tries to come up with novel ideas in order to augment the credibility of the knowledge to be imparted among students. This year, Department of BSc.IT has introduced their own technical magazine "TechBytes". The theme of the magazine, "Recent Trends in IT", speaks eons about the department's intention in introducing the practised theories, recent technologies and future scope in the Information Technology sector. I am sure such information will not only give an insightful knowledge to the student, which is beyond the boundaries of their syllabi but will also aid them to understand the nature of work being done in today's era. I wish the Department of BSc.IT a great success and I am sure this trend of "widening the technical boundaries" started by the Department of BSc.IT will prosper and flourish in coming years.

DATE   SIGNATURE

IV

SIES (Nerul) College of arts, science and commerce mainly aims to nurture the hidden potential in students providing an ideal platform for them to channelize their technical and creative ideas and lend expression to their thoughts and views on various aspects in serene manner.

Our Institution believes that the main aim of education is to turn mirrors into windows, and we are focused not only on pure academics but also on providing opportunity to each student to explore his or her own capabilities and their area of interest - curricular, co-curricular or extra-curricular.

We aim to develop technical skills that will equip them to manage and lead the varied opportunities and challenges of the corporate world.

The constant growth in information and communication technologies in the recent past has brought about remarkable changes in various aspects of human life and led to the creation of a knowledge based society where knowledge is the most powerful tool for success.

In the context, of being familiar to the latest technical advances in various fields has become an extreme need of the hour. Hence, apart from delivering excellent academic content and development of skills through practical experiences, the students are encouraged to come up with a technical magazine "TechByte" which will shows case there varied talent.

DATE   SIGNATURE

V

MESSAGE FROM
THE HOD'S DESK

Dedication and excellence have been the driving force behind the success of every BSc IT students. We at SIES (Nerul) college of arts, science and commerce strives to inculcate these values deep in the foundation of every students. The department of information technology has always endeavored towards tuning its students with their technical and soft skills.

The first edition of TECHNOBYTE volume 1.0, the annual IT magazine by the department of Information Technology intends to invoke the curiosity about existing and new technologies and upcoming development in the field of information technology through the articles and poems written by faculties' and students of the department.

We are thankful to the authors, poets and designers who have shown their interest in submitting quality content for the magazine. We hope that this magazine provides the readers an opportunity to learn and develop a new technological advancement through great reading experience.

DATE   SIGNATURE

VI

BSC.IT FAMILIA

Ms. Anu Thomas
(Coordinator)

Dr. Swati Vitkar

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Ms. Minal S

Ms. Priya D

Ms. Samruddhi K

Ms. Shweta M

Ms. Sakshi P

# CONTENT VIII

THE SCIENCE BEHIND DREAMING

-Anu Thomas

From the evolution of science, humans have been trying to decode the various functions of the human body. And yet, there is a some part of our body that still remains a mystery to us: the human mind. One of the most beautiful aspects of the our mind is its ability to dream. We the human being dream hundreds of dreams every night but some we will remembered while others are forget with the opening of the eye. There are many theories that had been put forth from the early times but many of them have not been able to completely help us understand.

In the early civilizations, they believed that dreams were a medium through which the gods would talk to us. The Romans and the Greeks used to trust that dreams were a sign of reality. In the Chinese culture, the use of alarm clocks is still viewed as leery. They believe that when one is asleep and dreaming their soul leaves the body and the sudden disruption may cause the soul to not come back. In 19th century, Sigmund Freud and Carl Jung put forth some of the most commonly known modern theories of dreaming. Freud's theory mainly explains about the notion of longing; that dreaming allows humans to sort through unresolved wishes. It was Jung, who studied with Freud, also explained that dreams had psychological importance, but proposed different theories about their meaning. During this era, science has begun to explore the scientific meaning of dreaming.

With the scientific and technological advancements many theories have been developed. One eminent neurobiological theory of dreaming is called the "activation-synthesis hypothesis". It explains that dreams don't actually mean anything; they are just electrical brain impulses that picks r thoughts and Imagination from our memories. The humans construct dream theories after they wake up to make sense of it all. In the "threat simulation theory" suggests that dreaming should be seen as an biological defence mechanism that has provided us an evolutionary advantage because of its ability to continiously simulate potential threatening events thus enhancing the neuro-cognitive mechanisms required for efficient threat perception and avoidance.

Cristina Marzano and her team at the University of Rome have succeeded, for the first time, in explaining how humans remember their dreams. The scientists predicted the possibility of dream recall based on a signature pattern of brain waves. The Italian research team invited 65 students to spend two consecutive nights in their research laboratory. During the first night the students were given a soundproofed temperature controlled room. During the second night their brain states were measured. The brain produces four types of electrical brain waves, they are: 'delta', 'theta', 'alpha' and 'beta'. The students were woken up at various times and asked to fill their diaries with what they had remembered of their dreams. At the end it was seen that those participants who exhibited more low frequency theta waves in the frontal lobes were also more likely to remember their dreams. These findings suggest that the neurophysiological mechanisms that we employ while dreaming and recalling them are the same as when we construct and retrieve memories while we are awake. Hence, we believe that dreams give rise to or transfer through this particular area of the brain, which is associated with visual processing, emotion and visual memories.
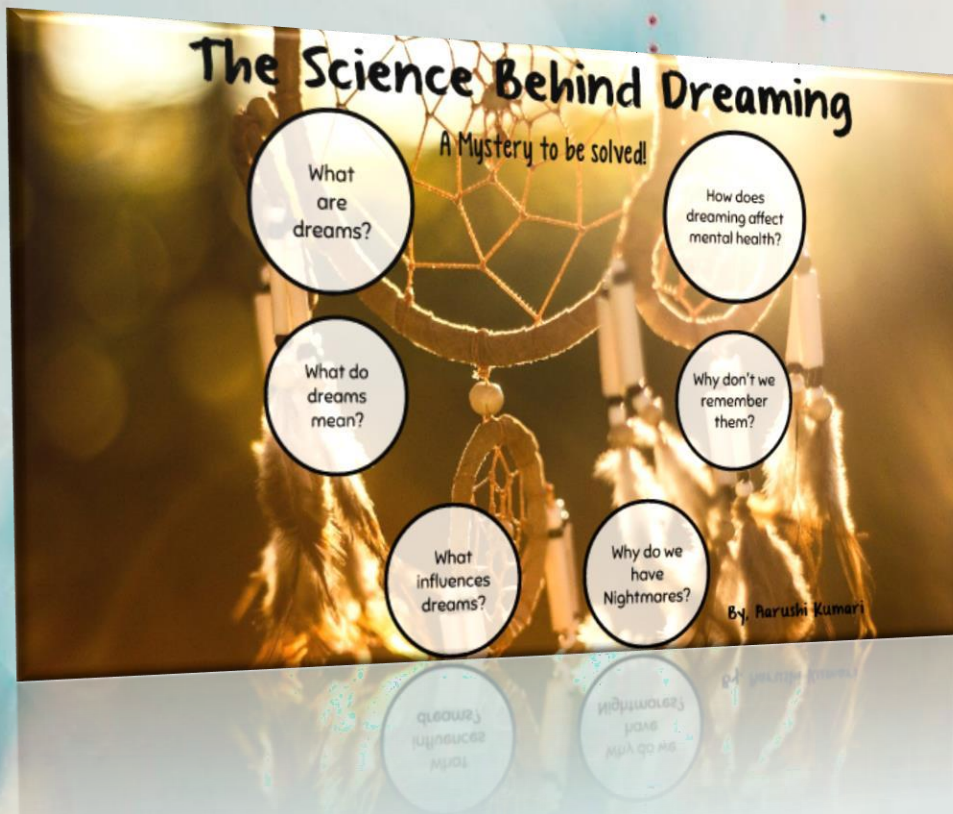
"Dreams seem to help us process emotions by encoding and constructing memories of them. What we see and experience in our dreams might not necessarily be real, but the emotions attached to these experiences certainly are."

IT – LATEST TRENDS

-Bharath Iyer
(F.Y.IT)

"The day science begins to study non-physical phenomena, it will make more progress in one decade than in all the previous centuries of its existence"

Everything about science is changing because of the impact of information technology.

We are living in the 21st century and technology has become an integrated part of our life. One cannot imagine a life without technology. Humans tend to research, experiment and create new things, right from the Stone Age -like discovery of fire and wheel. Following are some of the important milestones- introduction of smartphone (1992), virtual reality technology, augmented reality technology, cloud storage, artificial intelligence, cybersecurity, blockchain, etc.

Our achievements are quite astonishing. We have successfully sent rovers to our moon and planet Mars too, we captured the first ever photo of a Black Hole in 2019, with the Hubble telescope we could see further than our imagination. But, we still haven't explored and mapped 100% of Earth's ocean floor! Shocking right?

The advancements in technology has eased the way of life and has proven to be most efficient. More data can be stored digitally in a CD than physically on 1000's of
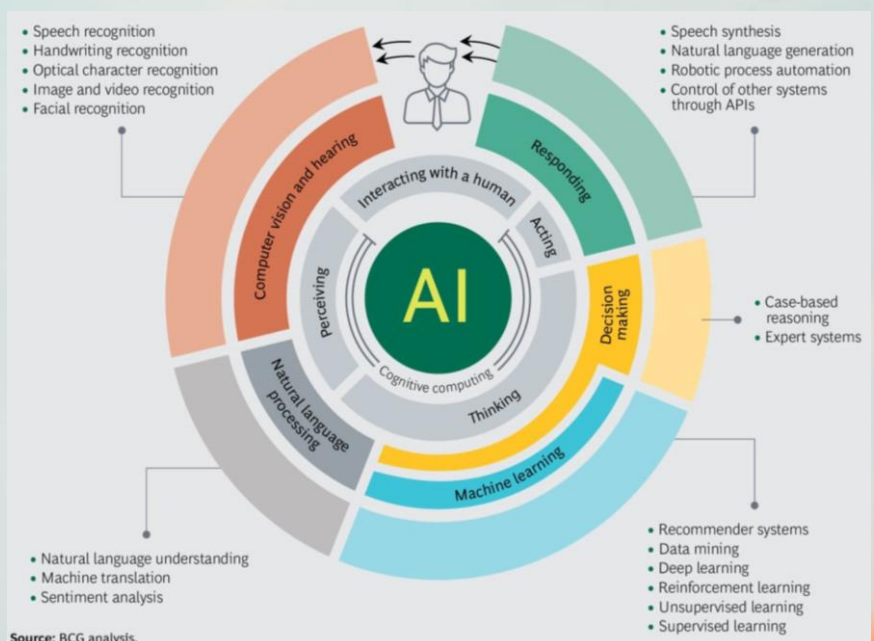
pages. **Digital libraries** are more efficient to access, storing data on **Google Drive** and **Apple Cloud** is much better than carrying around computers and storage devices, etc.

Artificial Intelligence will be soon replacing humans; described as intelligence displayed by machine in contrast with a human or the mimic (by machine) of functions associated with human mind such as learning and problem solving. It is used in data monitoring and management, recognition systems, personal assistant, etc.

Image representing VR and AR.

VR and **AR** technology were developed extensively in recent years because of their applications. **Virtual Reality** basically presents the user with a completely new or simulated environment which can be interacted with. Whereas **augmented reality** is a **technology** that expands our physical world, adding layers of digital information onto it. A view of the physical real-world environment with superimposed computer-generated images, thus changing the perception of **reality.** These are useful in fields such as medicine, military, education, business, etc.

A **Blockchain** is, an immutable time-stamped series record of data that is encrypted, distributed and managed by cluster of computer network. It does not share any personal information regarding the users and creates records by encrypting identifying information, reducing the possibility of data breach. There

are multiple copies of the same database making it challenging for a cyber-attack. The technology has the potential to revolutionize business sector and make smarter, secure, transparent and efficient processes.

Data science: It is a field comprising scientific methods, processes, algorithms and systems to extract knowledge and insights from structured and unstructured data. Data science is related to data mining and big data. It seeks consistent patterns for predictive uses.

⊹ Data science does not represent big data, in which the size of the data set is not a criterion to distinguish data science and statistics.

⊹ Data science is not defined by the computing skills of sorting big data sets; these skills are generally used for analyses across all disciplines.

⊹ Data science is a heavily applied field where academic programs right now do not sufficiently prepare data scientists for the jobs; many programs misleadingly advertise their analytics and statistics training as the essence of a data science program.

With all of these (cloud storage, data science, big data analytics), comes the play of **Cybersecurity**. There is potential risk of losing data through different means such as a virus attack, phishing or a hack if the data is not secured. A simple boot worm in your computer system can corrupt your complete system.

Ethical hackers and **programmers** are needed to build efficient anti-virus software and improve security. Hackers are finding new ways to steal data with the improving standards of security. You must know how to hack or steal data to counter such an attack. There are several stages in the hacking process:-

✓ **Reconnaissance**: The hacker attempts to collect as much information as possible about the target.

✓ **Scanning**: The hacker exploits the gathered information and examines the victim.

✓ **Gaining Access**: The hacker attempts to exploit vulnerabilities discovered in previous stages to gain access.

✓ **Maintaining Access**: Hackers want to keep access for future exploitation and attacks by securing their exclusive access with backdoors, rootkits and Trojans.

✓ **Covering Tracks**: After successfully hacking, hackers cover their tracks and traces to avoid detection. This allows them to keep access and avoid legal actions.

The main aim of technology is to improve our lifestyle. The proper utilization of these Technologies will ensure revolutionising change in our society. To keep on track with the new technologies, one must

- One should be up-to-date about the new techs.

- Learn from the basics, i.e., understand from the most basic level the working, changes, different functionality, etc. Then prioritize according to needs, cost, etc.

- One should have a practical approach rather than sticking to manuals all the time. Aware the people around with the specifications, working, needs, etc.; that you know about the latest tech.

- One should experiment with possible applications or uses for existing materials. Like the introduction of robots in manufacturing industry boosted the production and also improved the quality, biometrics improved the security systems, etc.

With more and more development in technology replacing the older ones, proper disposal is also necessary. The subject **'Green Computing'** and **'Sustainable development'** was hence introduced. Countries around the world are trying to find means of sustainable development using these technologies. For instance- smartphone is a technological marvel. A mobile phone contains more than 40 elements, base metals such as Copper (Cu) and Tin (Sn); special metals such as Lithium (Li), Cobalt

(Co), Indium (In), and Antimony (Sb); and precious metals such as Silver (Ag), Gold (Au), and Palladium (Pd).

Materials such as Gold and Palladium can be mined more effectively from e-waste compared to mining from ore. We are instead busy dumping the old techs in a rudely manner as we are blinded by the latest ones. Old is Gold at the end of the day!

As the world develops, people are getting more carried away with their work and cares. Today a lot is demanded, so everyone is too busy and have no time for finding a relationship. So technology has also filled this part. With technology, you can connect and meet new people while at work using social network technology. You can also use technology to find a new date without leaving your work or busy schedule. People use mobile phone apps to meet and connect with new and old friends.

Social networks like **Facebook, Instagram, and Tagged** have played a big role in connecting both old and new relationships. However, virtual relationships are not as strong as physical relationships, the advice is that you take off enough time and meet these people you network with virtually and get to know each other better. People who participate in virtual relationships, end up with no friends in real life, and therefore develop symptoms such as cyber-sickness, loneliness and depression.

"The advance of technology is based on making it fit in so that you don't really even notice it, so it's part of everyday life."

As quoted, Technology has camouflaged such that we don't notice the distances it has created between us. Always remember the need of technology rather than wants.

ZERO DAY PROTECTION

-Vipul Patil
(S.Y.IT)

Zero Day is that the actual day a developer or security expert uncovers a flaw or a vulnerability during a computer virus or network. It's the day that there's no patch yet for the matter and therefore the program or network is at the very best risk of attacks by cybercriminals. Vulnerabilities are flaws found in software programs or operating systems. Vulnerabilities can be the result of improper computer or security configurations and programming errors. Hackers write code to focus on a selected security weakness. The malicious software takes advantage of a vulnerability to compromise a computer system or cause an unintended behaviour. So, "zero-day" refers to the very fact that the developers have "zero days" to repair the matter that has just been exposed and maybe already exploited by hackers.

How are zero-day exploits used in an attack?

- Phishing and spam emails socially engineered to lure unwitting recipients to click URLs and links to malicious or compromised websites hosting an exploit
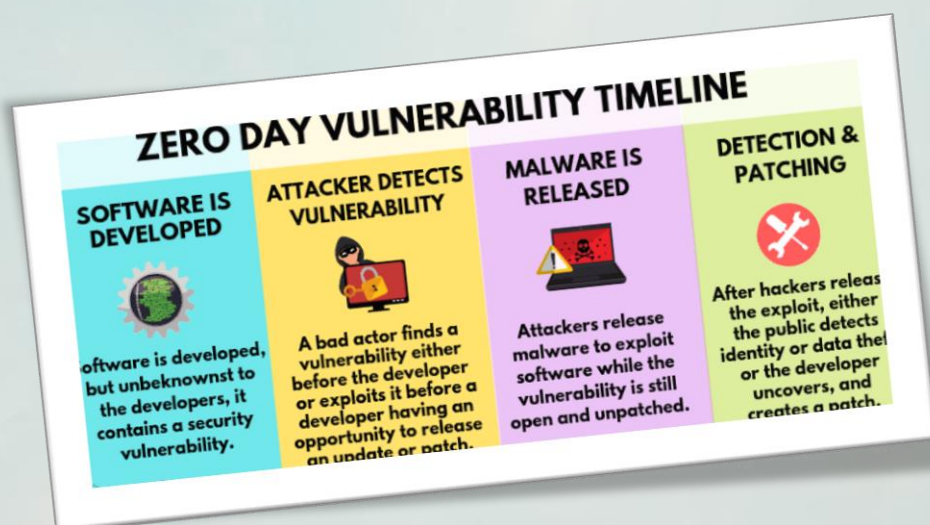- By Compromising a system, server, or network

Initially when a user discovers that there's a security risk during a program, they will report it to the software company, which can then develop a security patch to fix the flaw. The program creators are quick to make a fix that improves

program protection, however, sometimes hackers hear about the flaw first and are quick to take advantage of it. Organizations at risk from such exploits can employ several means of detection, including using virtual local area networks (VLANs) to protect transmitted data, by making use of a firewall, and employing a secure Wi-Fi system to guard against wireless malware attacks. Also, individuals can minimize the risk by keeping their operating systems and software up to date or by using websites with SSL (Security Socket Layer), which secures information being sent between the user and the site. Firewall is very important for protecting your system against zero-day threats. You can ensure maximum protection by configuring it to permit only necessary transactions. The more software you've got, the more vulnerabilities you've got. You can reduce the danger to your network by employing a minimum of applications. Patches fix the vulnerabilities in your software and operating systems, strengthening your resistance to malware.

HOW TO BE SECURED?

- Use virtual local area networks to segregate some areas of the network or use dedicated physical or virtual network segments to isolate sensitive traffic flowing between servers.
- Lock down wireless access points and use a security scheme such as Wi-Fi Protected Access for maximum protection against wireless-based attacks.
- Implement IPsec, the IP security protocol, to apply encryption and authentication to network traffic.
- Keep all systems patched and up so far. Although patches will not stop a zero-day attack, keeping network resources fully patched may make it more difficult for an attack to succeed. When a zero-day patch does become available, apply it as soon as possible.

ZERO DAY VULNERABILITY TIMELINE

SOFTWARE IS DEVELOPED

Software is developed, but unbeknownst to the developers, it contains a security vulnerability.

ATTACKER DETECTS VULNERABILITY

A bad actor finds a vulnerability either before the developer or exploits it before a developer having an opportunity to release an update or patch.

MALWARE IS RELEASED

Attackers release malware to exploit software while the vulnerability is still open and unpatched.

DETECTION & PATCHING

After hackers releas the exploit, either the public detects identity or data the or the developer uncovers, and creates a patch.

**Cut Cost with Cloud Computing**

CLOUD COMPUTING

-Atharva Mahajan
(F.Y.IT)

⊞ What is cloud computing? How does it work?

A simple definition of cloud computing involves delivering different types of services over the Internet. From software and analytics to secure and safe data storage and networking resources, everything can be delivered via the cloud. You probably use different cloud based applications every day. You are benefiting from cloud solutions every time you send a file to your colleague via the web, use a mobile app, download an image, binge Netflix show, or play an online video game. All these services are stored in the cloud and exist in some digital space. Storing your information on One Drive, SharePoint, or an email server is much different from keeping that data on a desktop hard drive or a USB stick. You can access it from just about any computer that has internet access.

⊞ Types of cloud computing.

✓ **Public cloud**: - Public cloud services are best for development systems and web servers. Your cloud computing provider will give you a slice of their digital space that they must share with other tenants. These types of clouds are cost efficient since a pay-as-you go model operates most. You pay for the number of hours you need to use the cloud and can exit whenever you complete your work. There are no obligations that require you to pay more than you need.

✓ **Private cloud**: - Private clouds offer what their name suggests: privacy. You do not have to share your digital space with anyone else. Private cloud platforms are typically built in house, and they belong to you and your business. They can also be configured in a third party data center and still provide the advanced level of privacy. Larger organizations and clients who are concerned about security favor private clouds. The reason for this is primarily
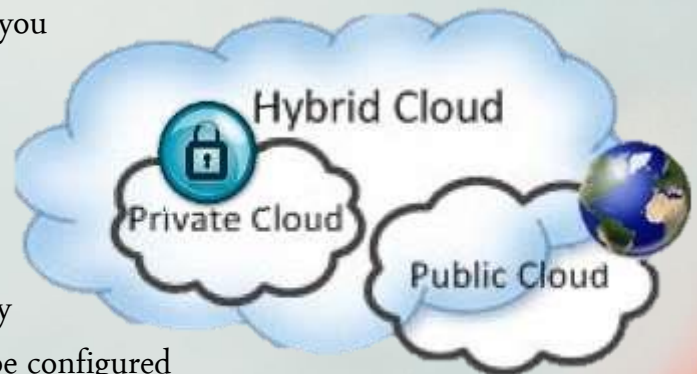
the fact that these clouds offer more defense than their public counter parts. Companies who need to protect sensitive information like customer data rely on private clouds.

✓ **Hybrid cloud**: - Hybrid clouds are the best of both worlds. If you are using a hybrid cloud, you can control an internal database and use the public cloud when needed. There might be times when you will need to move data and applications from the private cloud to the public cloud such as scheduled maintenance, blackouts, and natural disasters. The ability to seamlessly migrate information is perfect for cloud disaster recovery solutions and preventing data loss. The flexibility of hybrid clouds is excellent for scaling as any overflow can regulate in the public cloud. Furthermore, you can keep all non-sensitive tasks in the public cloud while safe guarding the essential data in the private cloud.

Cloud computing services.

Cloud computing services provide information technology (IT) as a service over the Internet or dedicated network, with delivery on demand, and payment based on usage. Cloud computing services range from full applications and development platforms, to servers, storage and virtual desktops. Examples:-

❖ Amazon Ec2.

❖ Google App engine.

❖ Apple iCloud.

❖ Adobe creative cloud.

❖ Microsoft Azure.

❖ IBM cloud computing

CLOUD COMPUTING

-Harshada Dhamapurkar
(S.Y.IT)

Cloud computing is Internet-based utility figuring, in a general sense shared resources, programming and information that are used by end-customers encouraged on virtual servers. A couple of individual's term anything past an associations or customer's up close and personal firewall to be in cloud. Cloud computing as an innovation has existed for a serious long time now and the manner in which undertakings have utilized it has been quickly evolving. It started as a straightforward facilitating administration and has developed to IaaS, PaaS and SaaS. Taking a gander at the present day situation, enormous scale distributed computing is currently open to everybody.

The idea of sharing registering assets has been around since the period of centralized computer figuring which started during the 1950s and the expression "distributed computing", which is similarly a cutting edge term, was begat just over the most recent 10 years and . It was acknowledged by ventures that since obtaining and keeping up processing limit was so costly, it seemed well and good to share the assets for practical reasons. This is the point at which sharing processing assets otherwise known as cloud computing came into picture.

The absolute first achievement in cloud computing history occurred in 1999 after the appearance of salesforce.com .Soon after salesforce, Amazon came into picture and began working with cloud computing innovation beginning with AWS and propelling their Elastic Compute Cloud (EC2). Later on Google and Apple too received cloud innovation which denoted another significant achievement and from that point forward the cloud has been developing and advancing at a fast rate. At that point around 2005, organizations understood that it seemed well and good to purchase shared registering assets from the cloud since it required lesser worker hours and endeavours and thus had more abilities and was reasonable.

Cloud computing offers numerous chances to IT experts who can use their current aptitude while likewise grasping distributed computing innovation. The top cloud computing aptitudes popular incorporate : Cloud Migration and Deployment, Machine Learning and Artificial Intelligence ,Database

Skills, Programming Languages ,Server less Architecture, System/Platform Certification ,DevOps .In the previous three years, pursuits of employment on Indeed for jobs identified with distributed computing - including cloud foundation, cloud security, cloud designer, and cloud engineer- - rose about 108%.
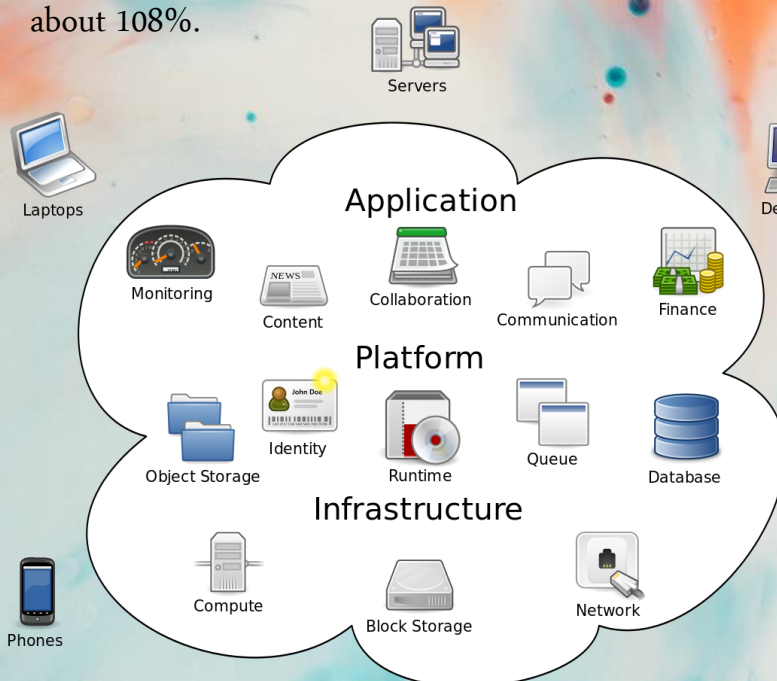
Increased employer demand offers a prime opportunity for engineers who want to work in the cloud computing space. Here are the 15 most in-demand open job positions that require cloud-related skills : Software engineer ,Senior software engineer ,Software architect ,Development operations engineer ,Full stack developer, Cloud engineer, Data engineer, Java developer, System engineer, Data scientist, Systems administrator, NET developer, Front-end developer ,Back-end developer.

Servers
Laptops
Desktops
Tablets
Phones

Application
Monitoring
Content
Collaboration
Communication
Finance
Platform
Identity
Object Storage
Runtime
Queue
Database
Infrastructure
Compute
Block Storage
Network

Cloud computing

Expanded boss interest offers a prime open door for engineers who need to work in the distributed computing space. Here are the 15 most sought after open employment places that require cloud-related aptitudes : Software engineer ,Senior programming engineer ,Software draftsman ,Development tasks engineer ,Full stack designer, Cloud engineer, Data engineer, Java designer, System engineer, Data researcher, Systems overseer, NET engineer, Front-end engineer ,Back-end engineer.

We experience a daily reality such that we are encompassed by a great deal of contraptions and furthermore, the quantity of IoT gadgets are developing too. We now get to data as well as we devour it to settle on choices continuously. This huge size of information produced will likewise should be gathered together and prepared in the Cloud. In this way, very before long distributed computing innovation will enable us to work quicker with more proficiency than it is today. What's more, together with their spread, our life will quicken.

CLOUD COMPUTING

-Bharati Behra
(T.Y.IT)

Introduction

Cloud computing is that the on-demand convenience of ADPS resources, particularly knowledge storage and computing power, while not direct active management by the user. The term is mostly accustomed describe knowledge centres accessible to several users over the Internet. Massive clouds, predominant nowadays, usually have functions distributed over multiple locations from central servers. If the affiliation to the user is comparatively shut, it should be selected a position server.

Clouds is also restricted to one organization , or be accessible to several organizations (public cloud).Advocates of public and hybrid clouds note that cloud computing permits corporations to avoid or minimize up-front IT infrastructure prices. Proponents conjointly claim that cloud computing permits enterprises to induce their applications up and running quicker, with improved flexibility and fewer maintenance, which it permits IT groups to earlier regulate resources to satisfy unsteady and unpredictable demand. Cloud suppliers generally use &pay-as-you-go& quote; model, which might cause sudden operational expenses if directors aren't orientated with cloud-pricing models. The availability of high-capacity networks, affordable computers and storage devices further because the widespread adoption of hardware virtualization, service-oriented design and involuntary and utility computing has junction rectifier to growth in cloud computing. By 2019, Linux was the foremost wide used software, together with in Microsoft's offerings and is so represented as dominant. The Cloud Service supplier (CSP) can screen, continue and gather knowledge regarding the firewalls, intrusion identification or/and compensative action frameworks and knowledge stream within the network.

Characteristics:

➢ Cost reduction square measure claimed by cloud suppliers. A public-cloud delivery model converts cost to operational expenditure. This lowers barrier to entry, as infrastructure is usually provided by a 3rd party and want not be purchased for one-time or rare intensive computing

tasks. Evaluation on a utility computing basis is & with usage-based asking choices. As well, less in-house IT skills square measure needed for implementation of cloud computing.

➢ Device and placement independence alter users to access systems employing a browser no matter their location or what device they use (e.g., PC, mobile phone). As infrastructure is off-site and accessed via the web, users will connect with it from anyplace.

➢ Maintenance of cloud computing applications is less complicated, as a result of they are doing not got to be put in on every user's laptop and may be accessed from completely different places (e.g., completely different work locations, whereas movement, etc.).

➢ Multitenancy allows sharing of resources and prices across an oversized pool of users so permitting for:

▪ Centralization of infrastructure in locations with lower prices (such as property, electricity, etc.)

▪ peak-load capability will increase (users need engineer and acquire the resources and instrumentality to fulfil their highest potential load-levels)

▪ Utilisation and potency enhancements for systems that square measure typically solely 10–20% utilized.

➢ Performance is monitored by IT specialists from the service supplier, and consistent and loosely coupled architectures square measure made victimisation internet services because the system interface.

➢ Reliability improves with the employment of multiple redundant sites that makes well- designed cloud computing appropriate for business continuity and disaster recovery.

➢ Scalability and snap via dynamic provisioning of resources on a fine-grained, self-service basis in close to time period while not users having to engineer for peak hundreds. This provides the flexibility to rescale once the usage want will increase or down if Resources are getting used. Rising approaches for managing snap embrace the employment of machine learning techniques to propose economical snap models.

➤ Security will improve because of centralization of information, multiplied security-focused resources, etc., however issues will persist regarding loss of management over bound sensitive knowledge, and also the lack of security for keep kernels. Personal cloud installations square measure partly intended by users need to retain management over the infrastructure and avoid losing management of data security.
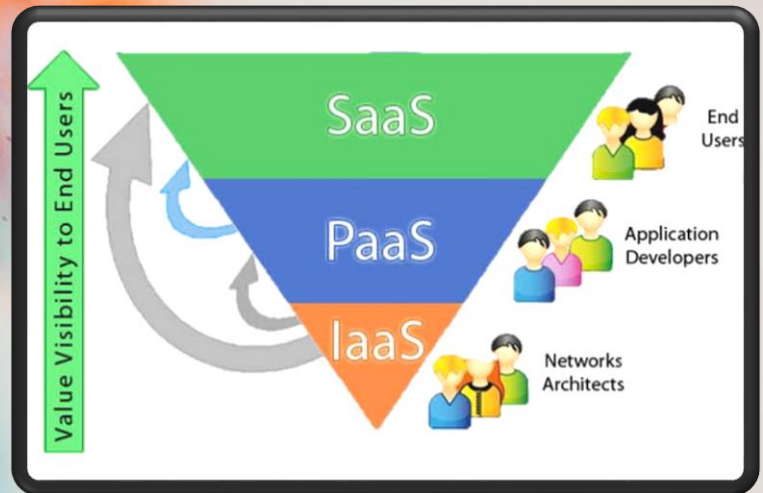
Service models:-

Infrastructure as a service (IaaS)

"Infrastructure as a service" (IaaS) refers to on-line services that give high-level Apes accustomed dereference numerous low-level details of underlying network infrastructure like physical computing resources, location, information partitioning, scaling, security, backup etc. A hypervisor runs the virtual machines as guests. Pools of hypervisors inside the cloud operational system will support massive numbers of virtual machines and therefore the ability to scale services up and down consistent with customers' varied necessities. UNIX system containers run in isolated partitions of one UNIX system kernel running directly on the physical hardware. UNIX system groups and namespaces square measure the underlying UNIX system kernel technologies accustomed isolate, secure and manage the containers. Containerisation offers higher performance than virtualization, as a result of there's no hypervisor overhead.IaaS clouds typically provide further resources like a virtual-machine disk-image library, raw block storage, file or object storage, firewalls, load balancers, information processing addresses, virtual native space networks (VLANs), and software package bundles.

Platform as a service (PaaS)

The capability provided to the patron is to deploy onto the cloud infrastructure consumer-created or non-heritable applications created mistreatment programming languages, libraries, services, and tools supported by the supplier. The patron doesn't manage or management the underlying cloud infrastructure as well as network, servers, in operation systems, or storage, however has management over the deployed applications and presumably configuration settings for the application-hosting atmosphere. PaaS vendors provide a development atmosphere to application developers. The supplier generally develops toolkit and standards for development and channels for distribution and payment. Within the PaaS models, cloud suppliers deliver a computing platform, generally as well as software, programming-language execution atmosphere, database, and internet server. Application developers develop and run their software package on a cloud platform rather than directly shopping for and managing the underlying hardware and software package layers. With some PaaS, the underlying laptop and storage resources scale mechanically to match application demand in order that the cloud user doesn't need to apportion resources manually.

Software as a service (SaaS)

The capability provided to the patron is to use the provider's applications running on a cloud infrastructure. The applications square measure accessible from numerous shopper devices through either a skinny shopper interface, like an internet browser (e.g., web-based email), or a program interface. The patron doesn't manage or management the underlying cloud infrastructure as well as network, servers, in operation systems, storage, or perhaps individual application capabilities, with the potential exception of restricted user-specific application configuration settings.

What is IoT?

INTERNET OF THINGS

-Arvind Pillai
(T.Y.IT)

INTRODUCTION:

The Internet of Things (IoT) could be a system of interconnected computing devices, mechanical and digital machines, objects, animals or people who are given distinctive identifiers (UIDs) and therefore the ability to transfer knowledge over a network while not requiring human-to-human or human-to-computer interaction.

The definition of the net of Things has evolved thanks to the convergence of multiple technologies, period of time analytics, machine learning, trade goods sensors, and embedded systems. Ancient fields of embedded systems, wireless device networks, management systems, automation (including home and building automation), and et al. all contribute to sanctionative the net of Things. within the shopper market, IoT technology is most substitutable with product concerning the thought of the "smart home", covering devices and appliances (such as lights, thermostats, home security systems and cameras, and different home appliances) that support one or a lot of common ecosystems, and might be controlled via devices related to that scheme, like sensible phones and smart speakers.

Applications:- Consumer applications: A growing portion of IoT devices are created for shopper use, as well as connected vehicles, home automation, wearable technology, connected health, and appliances with remote observation capabilities.

Smart home: IoT devices are a neighbourhood of the larger thought of home automation, which might embrace lighting, heating and air-con, media and security systems. Long-term edges may embrace energy savings by mechanically making certain lights and natural philosophy are turned off.

A sensible home or machine-driven home may well be supported a platform or hubs that management smart devices and appliances. For instance, exploitation Apple's Home Kit, makers will have their home product Associate in nursing accessories controlled by an application in iOS devices like the iPhone and therefore the Apple Watch. This could be a fervent app or iOS native applications like Siri. This can be incontestable within the case of Lenovo's sensible Home necessities, that could be a line of sensible home devices that are controlled through Apple's Home app or Siri while not the necessity for a Wi-Fi bridge. There {are also also arcade} dedicated sensible home hubs that are offered as standalone platforms to attach totally different sensible home product and these embrace the Amazon Echo, Google Home, Apple's Home Pod, and Samsung's SmartThings Hub. In addition to the business systems, there are several non-proprietary, open supply ecosystems; as well as Home Assistant, OpenHAB and Domoticz.

Pet care: Some common applications of IoT enabled devices for pet care are pursuit and distinguishing of strayed pets, pet's physical and mental fitness monitors also as sensible feeders.

Commercial application:
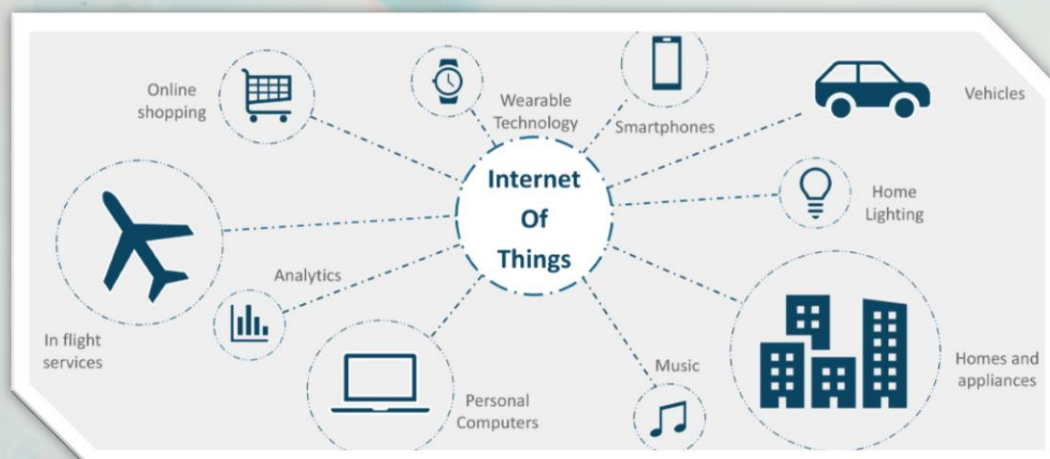
Transportation

Digital variable speed-limit sign

The IoT will assist within the integration of communications, control, and data process across varied transportation systems. Application of the IoT

extends to any or all aspects of transportation systems (i.e. the vehicle, the infrastructure, and therefore the driver or user). Dynamic interaction between these parts of a transport system allows inter- and intra-vehicular communication, sensible control, sensible parking, electronic toll assortment systems, supplying and fleet management, vehicle management, safety, and road help. In supplying and Fleet Management, for instance, Associate in Nursing IoT platform will incessantly monitor the situation and conditions of payload and assets via wireless sensors and send specific alerts once management exceptions occur (delays, damages, thefts, etc.). This will solely be attainable with the IoT and its seamless property among devices. Sensors like GPS, Humidity, and Temperature send knowledge to the IoT platform then the information is analysed then sent to the users. This way, users will track the period of time standing of vehicles and might create applicable selections. If combined with Machine Learning, then it additionally helps in reducing traffic accidents by introducing sleepiness alerts to drivers and providing self-driven cars too.

V2X communications

Main article: V2X

In transport communication systems, vehicle-to-everything communication (V2X), consists of 3 main components: vehicle to vehicle communication (V2V), vehicle to infrastructure communication (V2I) and vehicle to pedestrian communications (V2P). V2X is that the start to autonomous driving and connected road infrastructure

INTERNET OF THINGS

-Mohd. Yunus
(S.Y.IT)

"An Innovative Technology to make your world Innovative"

Have you ever thought a device which prevents you and your family from accidents or a mini robot which does mini projects for you?

Yes! It's possible with latest technology which is called as INTERNET OF THINGS.

Now the question arises what is this IOT?

IOT IS SIMPLY THE NETWORK OF INTERCONNECTED DEVICES WHICH ARE EMBEDDED WITH SENSORS, SOFTWARE, NETWORK CONNECTIVITY AND NECESSARY ELECTRONICS THAT ENABLES TO COLLECT AND EXCHANGE DATA MAKING THEM RESPONSIVE.

The idea of making objects INTELLIGENT was discussed throughout 1980's and 1990's but it was not possible because processors were not advanced, technology wasn't ready, & internet was not connected to the world. Now the required technologies is ready for INTERNET OF THINGS & is working on it. The main aim of IOT is to make home and offices, vehicles smarter which can be accessed, monitored and controlled according to the user. The first IOT application was to track the location of expensive piece of Equipment's with RFID tags.

BENEFITS OF IOT

The IOT promises to make our life smarter .Home Security systems make it easier to monitor what's going on inside and outside .Smart Light Bulbs can make it look like we're home even we are out. The benefits of IOT for Business depend on the particular implementation, but the key is that enterprises should have access to more data about their own product and their own internal systems, and greater ability to make changes as a result. Manufacturers are adding sensors to the components of their product so they can transmit back data. Working with Data is the main process in IOT.

SECURITY

Security is one of the biggest issues with IOT. These sensors are collecting sensitive data like your daily routine, your talks etc. The User can be at risk from Hackers. The work to make IOT devices secure is practiced by many industries.

Let's see some trending examples of IOT and its features.

✓ **AMAZON ECHO PLUS VOICE CONTROLLER**

It is a popular and reliable IOT device which is capable to run songs do phone calls, set timers and alarms, ask questions, provide information, check the weather, manage to-do & shopping lists, manage house instruments, and several other things.

✓ **AUGUST SMART LOCK**

It has proven to be a reliable security IOT device. It allows the user to manage their doors from any location hassle-free.

✓ **BELKIN WEMO SMART LIGHT SWITCH**

It helps a user to manage your home lights from the wall, your mobile or by using your voice.

This smart light switch connects to your existing home Wi-Fi network to give wireless access of your lights

✓ **NEST SMOKE ALARM**

It is a very useful IOT device. It is a smoke alarm that thinks, speaks and alerts your mobile phone about any unwanted emergencies in your home and automatically tests itself.

✓ **INIRVREACT**

It is a first intelligent stove safety device that attaches directly to the existing knobs and recognize potential threats and turn the stove off automatically before it's too late. This are some IOT devices and future of IOT will be more innovative and advanced making humans life heaven.
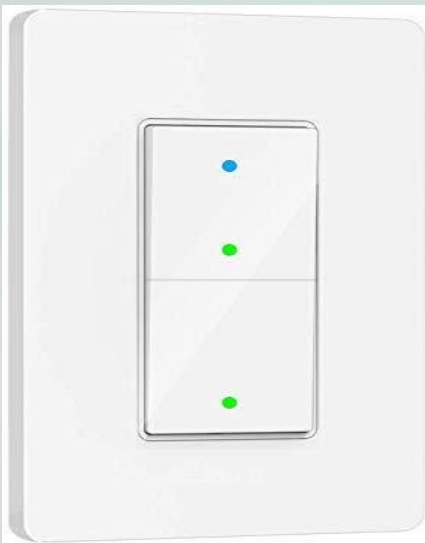
3D PRINTING TECHNOLOGY

-Atharva Mahajan
(F.Y.IT)

The 3D printing process builds a three dimensional object from a computer aided design model, usually by successively adding material layer-by-layer which is why it is also called additive manufacturing. One can also define it as a process of making three dimensional solid objects from a digital file. In an additive process an object is created by laying down successive layers of material until the object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object. 3D printing is the opposite of subtractive manufacturing which is cutting out/hollowing out a piece of metal or plastic with for instance a milling machine. 3D printing enables you to produce complex shapes using less material than traditional manufacturing methods.

It all starts with 3D model. You create one yourself or download it from a 3D repository (Digital designs for physical objects). When creating it yourself you can choose to use 3D scanner, app, haptic device, code or 3D modelling software. There are many different 3D modelling software tools available. The next step is to prepare the file for your 3D printer. This is called Slicing. It is a dividing 3D model into hundreds of thousands of horizontal layers and is done with slicing software. When a file is sliced, it's ready to be fed to 3D printer. This can be done via USB, SD or internet.
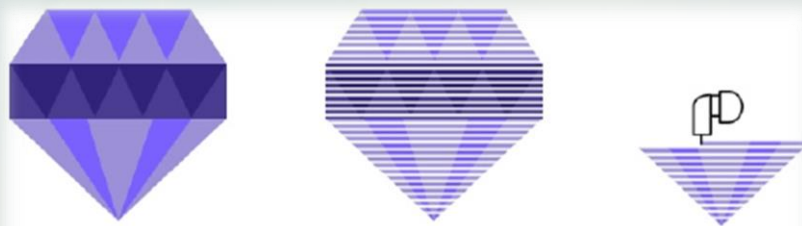
Slicing process

3D printing is rapidly transforming into a production technology. According to recent research the global 3D printing market to reach 41 billion dollars by 2026. The 3D printing technology is also used in medical field. 3D printing in the medical field is creating patient specific organ replicas that surgeons can be used to practice on before performing complicated operations. This technique has been proven to speed up procedures and minimize trauma for patients. It also used to produce prosthetic limbs that are customized to suit and fit the wearer.

3D printing encompasses many forms of technologies and materials 3D printing is being used in almost all industries one could think of.

A few examples:-

THE FUTURE IS HERE

3D Printed Prosthetics

- Dental products.
- Design (furniture).
- Reconstructing bones and body parts in forensic pathology.
- Reconstructing fossils in paleontology.
- Prosthetics.
- Movie props.
- Eyewear.
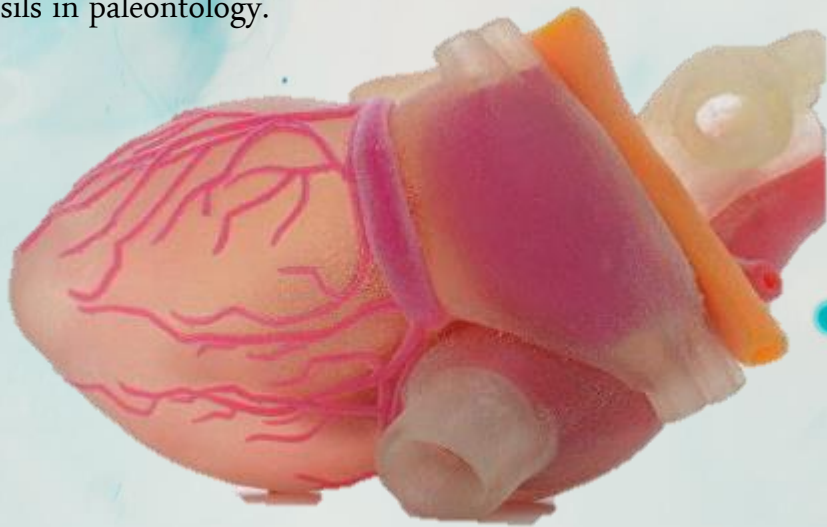
RPA – BEYOND SCRIPTING

-Nutan Parab

RPA (Robotic Process Automation) is simple and powerful automation software that enables to create our own software robots to automate any business process. The repetitive high volume tasks in organization are replaced with **RPA** software to reduce the error and increase the efficiency. It is time saver and cost effective.

Some features of robotic process automation include platform independence, scalability and intelligence. With RPA, the organizations can develop quick, smart and cost-effective tools to boost efficiency and thereby improvement in profits and revenue.

Advantages of RPA over traditional automation:

Traditional automation system required complex programming skills, while RPA comprehends the actions of user at UI level, required no or less programming. Integration and customization of software restricted due to unavailability of source code in traditional automation, where RPA can be tailored easily to meet the need of particular user. Traditional automation demands quality test while RPA works on 'record and play' automation method.

Major RPA Tools:

Automation Anywhere:

Features:

- Intelligent capture of steps for business and IT process.
- A sleek and state of the art UI which makes it easy to use.
- No registration or login required.
- No programming knowledge required.
- Simple to use and manage.

Another Monday Ensemble:

Features:

- Provides automatic documentation of process logic with AM Muse.
- Drag & Drop workflow configuration: no developer knowledge needed.
- Text recognition with OCR.

Blue Prism RPA:

Features:

- It supports multi-environment deployment model.
- User friendly for developers.
- Security provided for network and software credentials.
- It can be used on any platform.
- Can work for any application.

UiPath:

Features:

- It provides security by managing credentials, providing encryption and access controls based on the role.
- User friendly for non-developers.
- It can automate faster.
- Can handle complex processes.
- It provides an open platform.

NICE:

Features:

- Increase throughput - robots are 4-5 faster than humans and work 24/7
- Ensure compliance – robots deliver results with 100% accuracy
- Reduce costs – 10 robots can do the work of 100 people
- Increase employee engagement – let employees focus on the value-add activities
- Easily scalable - as your enterprise grows, you can scale up the power of Robotic Automation to match your changing needs
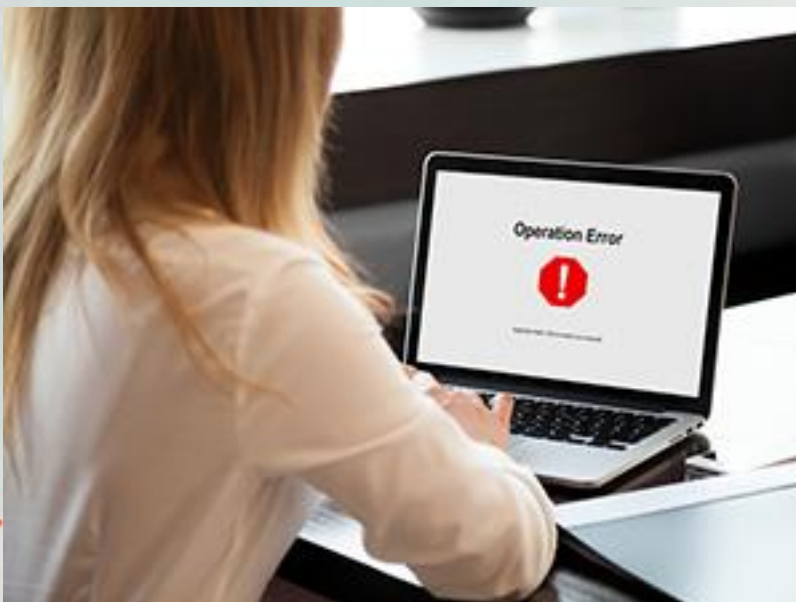
RPA failures:

RPA automates a clearly defined process, but most enterprise doesn't have clearly defined processes. Business process experts will play a vital role in helping functions and business units identify, analyse and prioritize the tasks and processes to automate which will help to avoid RPA failure.

RPA – HUMAN REPLACEMENT

–Esakkiammal yadav
(S.Y.IT)

RPA (Robotic Process Automation) is the hot topic in business operations right now .Whether it is a small or big organization all of them are aiming to automate its business processes. RPA is a new age technological marvel that is utilized by enterprises to automate the day to day manual tasks such as data extraction ,invoice processing ,validating files and many more, performing this tasks without automation could be quite tedious ,the solution to this problem is RPA.

RPA: software robots that mimic and integrate human actions within digital systems to optimize business processes .RPA performs transaction activities and uses applications the way user would. RPA a software robot has a great advantage of being much faster than human when carrying out tasks, as they won't get sick, won't take vacations ,can work 24/7 days a week unlike humans and also minimize risks as they are less prone to errors and functions with the high uniformity and precision. PA can be used to automate humongous amount of tasks in the field such as Human Resources, Financial services, Health care supply and many more. Each industry can use RPA in their own way to reduce a manual workforce and work with a better efficiency so as to ensure that the intelligence of the manual workforce is used in better way to benefit organization.

RPA software is built in such a way that all the repetitive tasks are performed in same manner even if it is thousandth time .It also helps in reducing the cost, helps to increase productivity rate .The execution time to perform any task is much faster when compared to that of manual approach. The possibilities of RPA are practically endless since it can address any sequence of tasks, therefore the scope for technology is any department or sectors that uses IT applications.

RPA is becoming established as another technology to help companies achieve a successful digital transformation and remain competitive in the market.

HUMANS WILL BE REPLACED?

Not everything is bad for the workers, now employees can dedicate their time generating added value for the company like focusing on problem solving, managing exceptions, developing strategy, and creative improvements.

In the longer term, RPA means people having more interesting work. For around 120 years we've been making jobs uninteresting and deskilled. The evidence is that it's not whole jobs that will be lost but parts of job, and you can reassemble work into different types of job. It will be disruptive, but organizations should be able to absorb that level of change. Today's world being moving towards automation and RPA being the key leader to it, this has definitely opened up a lot of opportunities for various roles and responsibilities in RPA field as RPA developer.

The relationship between technology and people has to change in the future for the better, and RPA is one of the greatest tools to enable that change.

METAMORPHIC MALWARE – THE REAL MYSTIQUE

-Priya Daniel

If Marvel's Mystique was a kind of malware, she would definitely be the metamorphic type. This shape-shifting, mutating, not to mention, forever evolving threat has continued to baffle malware researchers for decades. There are hardly any anti-malware applications that can stand up to this beast. So how do we deal with it? Let's start by finding out what it is and how it works.

In simple terms, they are adaptive and mutating software that hackers use to infiltrate and steal information while avoiding detection.

It completely re-writes its code so that each newly propagated version of itself no longer matches its previous iteration. The longer the malware stays in a computer, the more iterations and versions it will produce and the more sophisticated the iterations are. The technologies used by metamorphic malware are very sophisticated and complex. Some of the technologies used include register renaming, code permutation, code expansion, code shrinking and garbage code insertion.

The code changes make it difficult for signature-based antivirus software programs to recognize that different iterations are the same malicious program, let alone detect, quarantine and disinfect it.

The Zmist virus, written by the Soviet genius 'Zombie' is still considered the ultimate metamorphic malware. Zombie's Mistfall engine can decompile an application into its smallest elements and then recompile the application, weaving itself into the fabric of the host.

➤ Why should you care?

Hackers are churning out new versions at an unbelievable pace. Antivirus, firewalls and even intrusion detection/protection systems don't work against them. Add social engineering to that and you have the perfect criminal.

For instance, when you visit a seemingly genuine website (and it's not), you will get infected with a malware with a certain shape and signature. When another person visits the same site, he will get infected with the same malware but with different shape and signature. Each time someone downloads

that malware, a new shape is generated for the same malware automatically. Actually refreshing that page will generate new shapes for the new malware!

Ignoring malware is like an open invitation to sneak around your system. In other words, you are leaving yourself open to a wide variety of online attacks from all directions.

➢ **What can you do?**
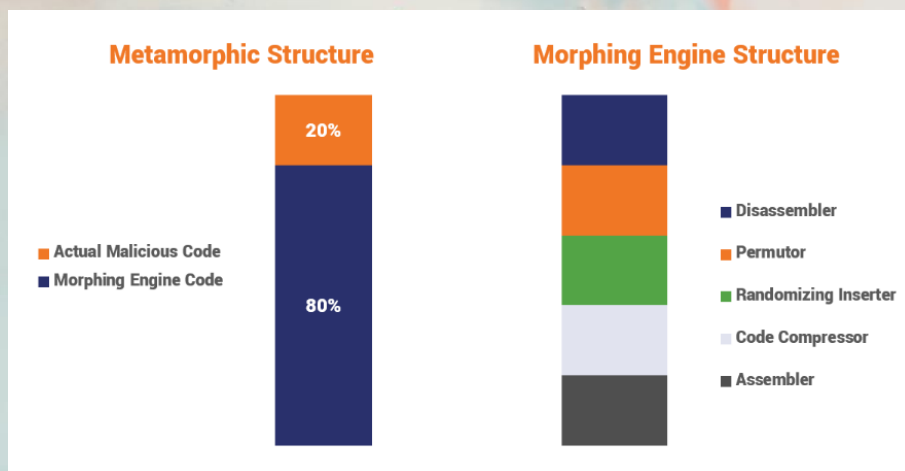
Although this kind of malware seems invincible, there are a few general practices you can follow to protect your systems from getting infected.

Keep your software up to date: One straightforward way to help prevent malware infection is to keep the various applications to keep the various applications and software tools you use up to date. Enterprise software manufacturers like Microsoft, Oracle, and Adobe regularly release software updates that contain critical security patches for known vulnerabilities. Running outdated software with security vulnerabilities leaves your system open to exploits that can lead to a variety of malware infections.

Do not click suspicious links or attachments: Phishing emails or other unsolicited electronic communications can contain malicious links or attachments used to spread malware. Educating end users on how to recognize suspicious links and attachments can help mitigate this common entry vector for malware attacks.

Use strong passwords and change them regularly: Ensuring that your accounts are protected with secure and unique passwords is another best practice for malware protection. Educate end users on secure passwords and use features like multi-factor authentication or secure password managers where necessary.

Leverage behaviour-based detection tools: Because metamorphic malware is engineered to evade detection by traditional antivirus tools, the best solutions for this threat use advanced, behaviour-based detection techniques. Behaviour-based detection solutions like endpoint detection and response or advanced threat protection can pinpoint threats in real time, before any of your data is compromised. Behaviour-based malware protection is more accurate than traditional signature-based methods which struggle to deal with metamorphic attacks.

Brute Force Attack

BRUTE FORCE ATTACK

-Vipul Patil
(S.Y.IT)

A brute force attack may be a popular cracking method: by some accounts, brute force attacks accounted for five percent of confirmed security breaches. A brute force attack involves 'guessing' username and passwords to realize unauthorized access to a system. Brute force may be a simple attack method and features a high success rate. All organizations should enforce a robust password policy across all users and systems. While some attackers still perform brute force attacks manually, today most brute force attacks today are performed by bots. Attackers always have lists of commonly used credentials, or real user credentials, obtained via security breaches or the dark web. Bots systematically attack websites and check out these lists of credentials and notify the attacker once they gain access.

❖ Simple brute force attack

❖ Hybrid brute force attacks

❖ Dictionary attacks

❖ Rainbow table attacks.

❖ Reverse brute force attack.

❖ Credential stuffing.

Goals of a brute force attack include:

✓ Theft of private information like passwords, passphrases and other information want to access online accounts and network resources

✓ Harvesting credentials to sell to 3rd parties

✓ Defacement of internet sites and other information within the property right that would damage the reputation of the organization

✓ Redirecting domains to sites holding malicious content

Passwords that Enable Brute Force Attacks

Brute force attacks typically believe weak passwords and careless network administration. Fortunately, these are both areas which will be improved easily to stop vulnerabilities that would bring your network or website resources to their knees. For instance, utilizing strong passwords, allowing a limited number of logins attempts and enabling two-factor authentication can help to stop brute force attacks. People tend to repeatedly use a couple of simple passwords, which leaves them exposed to brute force attacks. Also, repeated use of an equivalent password can grant attackers access to several accounts. The most commonly found passwords in brute force lists include: zxcvbn, Qazwsx, 654321, 123321, 000000, 111111, 987654321, QWERTY, 123456

How to Prevent Brute Force Attacks

Brute force attacks typically believe weak passwords and careless network administration. Fortunately, these are both areas which will be improved easily to stop vulnerabilities that would bring your network or website resources to their knees. For instance, utilizing strong passwords, allowing a limited number of logins attempts and enabling two-factor authentication can help to stop brute force attacks.

- Combine letters, numbers, and special characters
- Use different passwords for every user account.
- Avoid common patterns.
- Never use information which will be found on social networking sites

CYBER SECURITY

-Laxmi Yadav
(F.Y.IT)

Cyber intelligence for global security and stability.

NSO creates technology that help government agencies prevent and investigate terrorism and crime to save thousands of lives around the globe. Terrorists, drug traffickers, pedophiles, and other criminals have access to advances technology and Capture than ever before. The world's most dangerous offenders communicate using technology designed to shield their communications, while government intelligence and law enforcement agencies struggle to collect Evidences and intelligence on their actives. Due to these ongoing global concerns, the member nations of the five eyes(FVEY) intelligence alliance warn that, 'the increasing gap between the ability of law enforcement to lawfully access data and their ability to acquire and use the content of that data is a pressing international concern that requires urgent, sustained attention.'' Helping Governments maintain public safety.

NSO Group, develops best - in — class technology to help government agencies detect and prevent a wide — range of local and global threats. Our products help government intelligence and law-enforcement agencies use technology to meet the challenges of encryption to prevent and investigate terror and crime. NSO technology is designed by telecommunication and intelligence experts who, positioned at the forefront of their fields, are dedicated to keeping pace with the ever changing cyber world.
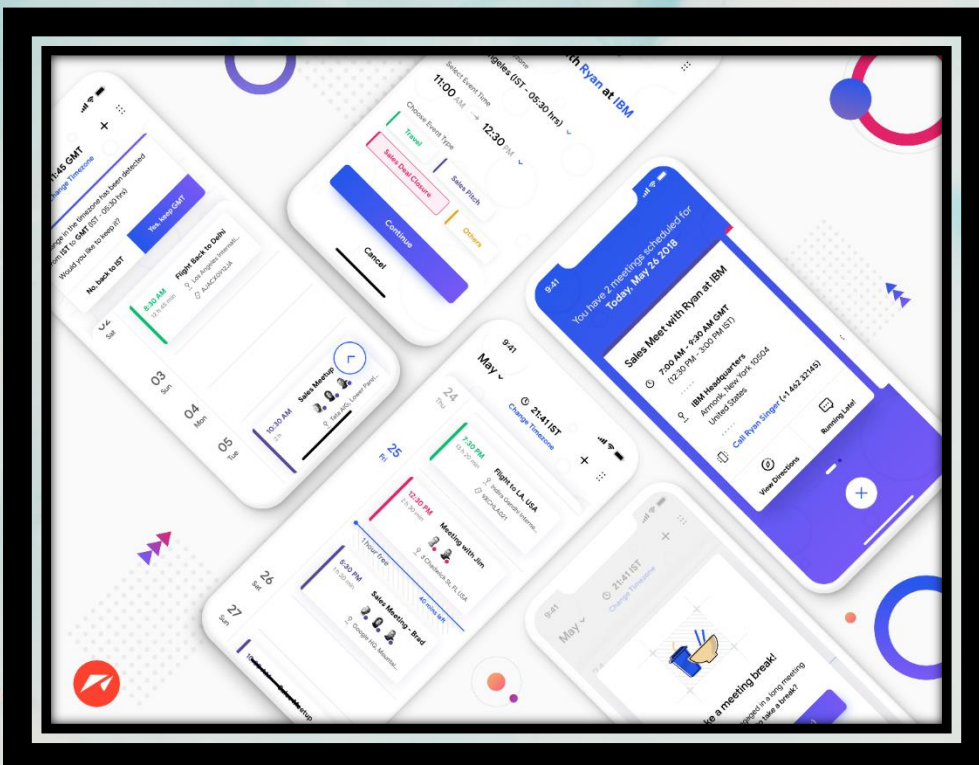
USER INTERFACE DESIGN

~Vinay Kurani
(S.Y.IT)

User interface (UI) design is the process of creating interfaces in software or computerized devices with attention on looks or style. Designers always aim to make designs in such a way that the users will find it easy to use. UI design typically refers to graphical user interfaces but also includes others, like voice-controlled ones.

User interface design may be a craft that involves building an important a part of the user experience; users are very smart enough to choose designs on usability and likeability. The users get to interact with different designs within the user interface. Graphical user interface is the most used one, which we usually see in computers. Voice-controlled interfaces involve oral-auditory interaction, the best example for that is the Google Assistant. Designers builds the interfaces in a special manner, so the users will find it more simple and efficient to use.

As per the present situation, there is a lot of craze for smartphones into the market in India. The user is always very eager to use the new technology. A user looks into every single aspect, when it comes to buying a smartphone. The user would not only look upon the hardware, but will also look upon the software. The user always looks upon for a clean UI, so the companies also give great importance for the development of UI. When it comes to present scenario, one plus and Google smartphones haves the best UI according to the reviews given by the user.

UI VS UX:

There is always a slight confusion when it comes to UI and UX. Some people consider both of them the same, but that's not the fact. UI describes the actual interface with which the user is dealing with and UX is the concept where an individual interacting with that product or service takes away from the entire experience.

UI Design Tools:

Creating a UI design is not as simple as we think. The UI designer has to work onto a different programs and platforms for creating a particular design. The designer creates a blueprint and then turns it into something
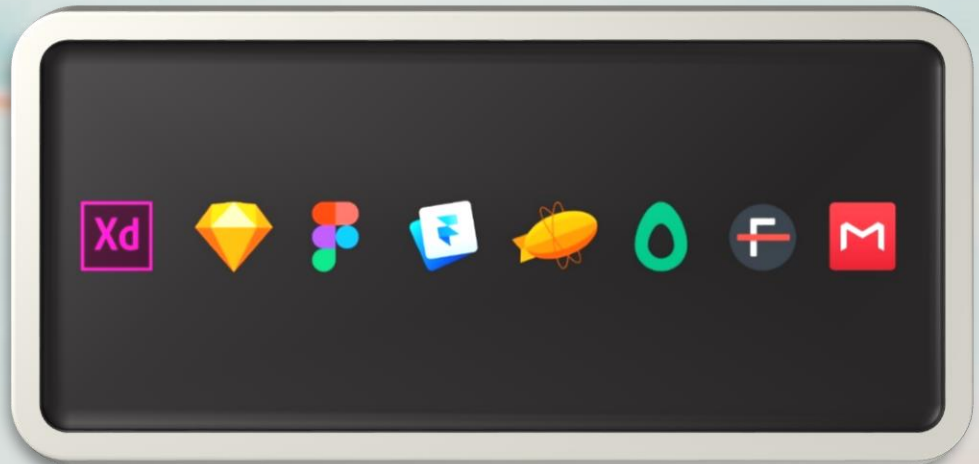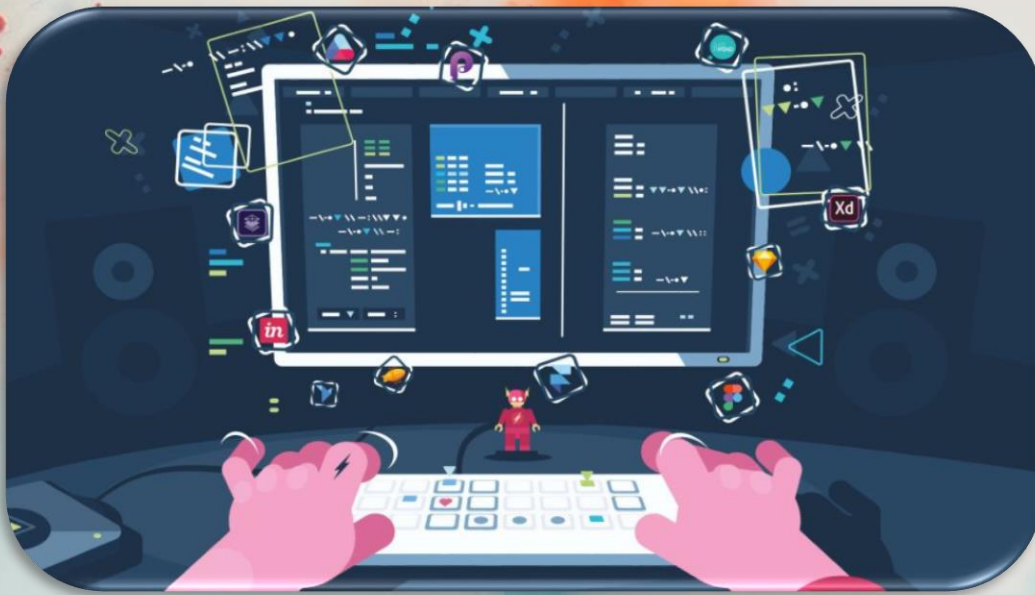
visual and interactive. In terms of day to day work, this involves everything from designing buttons to choosing colours and fonts, to prototyping and carrying out usability testing. Before choosing the tools, the designer has to take some things into consideration, such that, does he need the tools for designing website or designing an application or else for designing both of them. And most importantly, the designer should look out if the tools are compatible for his system he is going to work on. The designers have always looked on for the tools with which they feel comfortable to work. Over the time, the tools have changed, but at present, these

7 tools are the most used ones:

1. InVision
2. Zeplin
3. Balsamiq
4. Sketch
5. Figma
6. Flinto
7. Adobe XD
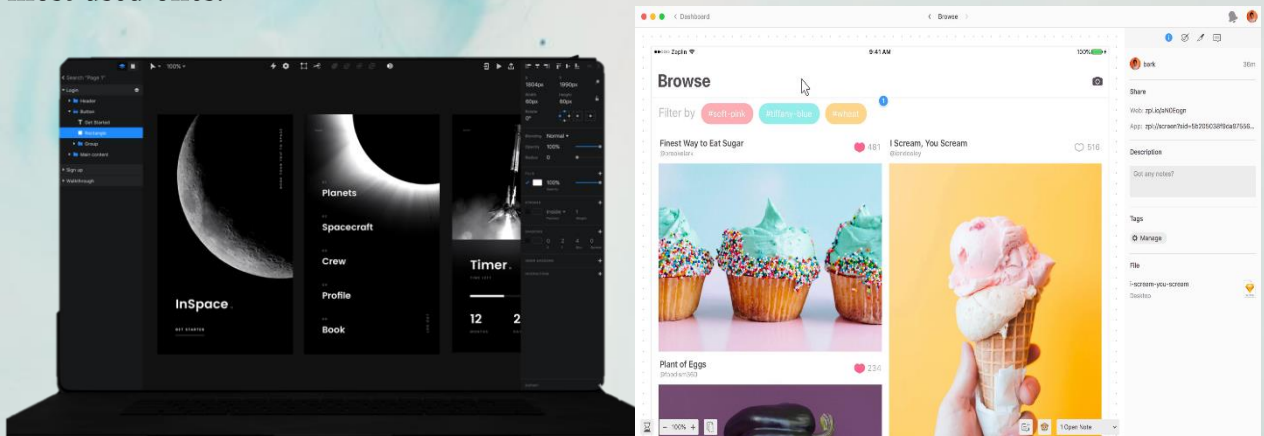
Challenges for a UI designer:

- **Bloatware Free:**

The designer has to always look out that he should "not do more , and also not less ".Understanding the line in the designer way , the designer should never do more of a designing , as it can also lead it look untidy . The lesser the designer does, that would also look unattractive for the user. So he always have to keep a balanced look on the source, so that becomes easy and convenient for usage.

- **Time and Budget Constraints:**

Not only design but the whole development cycle is greatly influenced by 2 things: time and budget and they are correlated. A designer will do poorly if given little time or underpaid. Unfortunately, many clients seem to undervalue the input of designers because they somehow tend to think that to just add another button or a change a gradient is so easy it can be done in a matter of minutes

▪ The Mind Game:

It is good to be a specialist in designing UI, but there is no use of it if the designer doesn't know to implement the skills in a right way. If a UI designer designs the source as per his mind, but he had never thought about the person who will use his source, then that source would become useless. So the designer always has to keep the mind-set of the end user while designing, so the end result would be designed in such a manner that it become more convenient for the usage the end user.

UI Design Criteria:

➢ Visibility of system status: Users should always know where they are and what's going on.

➢ Real world - system match: The system should mirror the important world of the user the maximum amount as possible. Use language, concepts, etc. that are familiar to the user. Order the processes/screens in a way that is meaningful and logical to the user.

➢ Control and freedom: Don't "trap" the user. Support clearly marked exit, undo, and redo functions. Don't force them into an extended linear sequence of operations with no escape.

➢ Consistency and standards: Use objects and phrases consistently. Follow platform conventions

➢ Recognition not recall: Provide visual objects, actions, and options (e.g. cue cards) to help the user for navigation and input activities. Don't expect they will memorize commands.

➢ Flexibility and efficiency of use: Accelerators (unseen by novice users) can speed up interaction for expert users. Allow users to customize frequent actions whenever possible.

➢ Aesthetic and minimalist design: Visibility of rarely needed information should be avoided. The more information that appears on the screen, the less visible each unit of data becomes.

➢ Online help and additional documentation: Though a neat system are often used without documentation and help, supplemental information should be necessary. Keep this information tied to user tasks, support easy to use search functions, and do not make this section overlarge.

➢ Effective error handling: Assist users to acknowledge, diagnose, and get over errors. Don't just tell them there's an error, suggest corrective action whenever possible.

➢ Error prevention: A design that prevents errors from occurring is better than a good error message.

> ❝ **"Our INTELLIGENCE** is what makes us human, and AI is an extension of that **QUALITY."**

ARTIFICIAL INTELLIGENCE: SIMPLIFYING HUMAN LIFE

-*Tanmay Mhatre*
(T.Y.IT)

"Real stupidity beats artificial intelligence every time."

Human like behavior/decision making by a machine is artificial intelligence [AI]. AI enabled computer systems can execute several tasks just similar or more often in efficient way than human saving time and energy. AI systems are capable of giving an error less response to certain complex situations. AI is proposed by John McCarthy in 1956 the possibility of AI was verified by Turing test. In near future activities such as, visual understanding, words identification, taking decisions, and paraphrase will be carried out by AI.

- **Scope of Artificial Intelligence:** AI is being used in almost every sector, such as agriculture, medical, health care services, education, legal, public, energy, insurance, banking, financial, water, big companies and social media platforms. AI incorporated along with Machine Learning simplifies the task. AI powered digital assistants has the potential to free people from everyday chores. It helps in planning routine tasks such as making restaurant booking. Self-driving Cars, Boston Dynamics, Navigation Systems, Human verses computer games are some of the applications of AI.

- **AI in Agricultural Industry:** Climate variation, population expansion, marketing, demand and supply, food safety concern are some of the issues in front of agriculture industry. AI powered technology helps to have better work rate, to tackle issues regarding crop yield, soil fertility and herbicide opposition in the field of agriculture. Milking robots are generally used in dairy farming.

Agricultural Robots: By means of computerization and robotics crops can be protected efficiently from weeds. See & Spray robot leverages machine vision to control and specially spray weeds on cotton plants. Specific spraying prevents herbicide resistance. Strawberry farmers select and bundle their crops using especially designed robots which can harvest up to eight acres per day alike to thirty human workers.

Crops and Soil Monitoring: PLANTIX is a deep learning application for recognition of potential defects and nutrient deficiencies in soil. Analysis is carried out by software algorithms to associate particular plant life patterns with certain soil defects, plant pests and diseases. For defects recognition images taken by user's smart phone camera are used. Soil reinstatement techniques, tips and other feasible solutions are also provided. Images are vineyards recorded by drone using machine vision are used for study to get comprehensive report on health of the vineyard, especially the condition of grapevine leaves to improve crop yield at less costs. Such drones can inspect fifty acres in twenty four minutes and gives data analysis with 95% accuracy. Machine learning algorithms in association with satellites can analyze crop sustainability, detects farms for existence of disease and pests and predict weather. These tools are helpful to researchers, crop consultants and farmers.

AI in Indian Agriculture

AI in Indian Agriculture: CROPIN, GABASCO, FASAL SATSURE, INTELLO LABS, AIBONO and are some of the foremost Indian Agri-Tech Start-ups that are changing agriculture in India. These start-ups make use of new technologies such as satellite imaging, machine learning and data analytics.

SATSURE help farmers what to sow, when to irrigate or add fertilizers, or prepare for harvest. SATSURE's solutions are widely used by the Andhra Pradesh Government, large banks and insurance companies in India are also leveraging SATSURE's solutions. FASAL one more start-up presents microclimate forecast custom-made to each farm location carried out at a point scale. AI-based microclimate forecasting algorithm incorporates real in-field information and relates it to explicitly reachable weather reports, so that farmers can take advantage from real-time, actionable information relevant to day-to-day operations at his farm. CROPIN is a collection of analytics solutions, supervision and farm administration. INTELLO LABS have provided machine vision based solutions with captured images for deriving insights and executable options. It leverages AI, deep learning, and IOT to help farmers for efficient growth of business.

AI in Medical field:

AI in Medical field: Clinical and Diagnostic: Instead of depending on experience, Doctors are using AI powered and providing health care and clinical services efficiently. Moreover scientist use Intel AI diagnosed heart conditions with better exactness. Intel® Saffron™ AI is able to examine ten thousand signals per heartbeat and gives more than ninety percent accuracy. AI is democratizing expert diagnoses. AI based on genetics, is helpful in early detection of cancer and vascular diseases that people might face.

Health care Services: Anthology and investigation of medical records, past history, a variety of tests, scans, cardiology, radiology reports, is being effectively managed by artificial intelligence and digital automation. Robots assemble, store, reform and trace data to formulate faster and more regular access. Babylon app using AI provides medical consultation and suggests preventive action using personal

Medical history and common medical knowledge/data. Molly, machine learning based digital nurse monitors patient's condition and keeps a track of follow up.

Medicine: AI is used in creation of drug; it saves time, money and sometimes lives too. Recently, Ebola virus scare, a program powered by AI was used to scrutinize existing medicines that could be redesigned to fight the disease and finally found two medications that may lessen Ebola infectively in one day.

Other Applications: AI is used in law enforcement, for example, it helps in finding out a missing or exploited child. Based on instances of suspicious online activity, millions of cyber tips, artificial intelligence in correlation with advanced analytics helps analysts to process these tips in service of law enforcement authorities. AI enabled system is able to detect financial frauds by dealing out with large data dealt with by the financial institutions. Intel powered AI can also prevent manufacturing errors.

Merits and Demerits of AI: AI can reduce human casualties in war and dangerous workspaces, car accidents, natural disasters, saving time, money and energy. AI makes everyday life easier by serving people with tasks such as cleaning, shopping and transportation. Scientists are predicting that by the huge dependency on AI humanity could extinct. Some scientists are of the opinion that by having AI machines, people will be jobless and that will conclude in losing the sense of living. As machines are learning and doing things more efficiently and effectively in a timely manner, this could be the reason of our extinction.

"AI is a tool. The choice about how it gets deployed is ours."

What Is Machine Learning?

MACHINE LEARNING
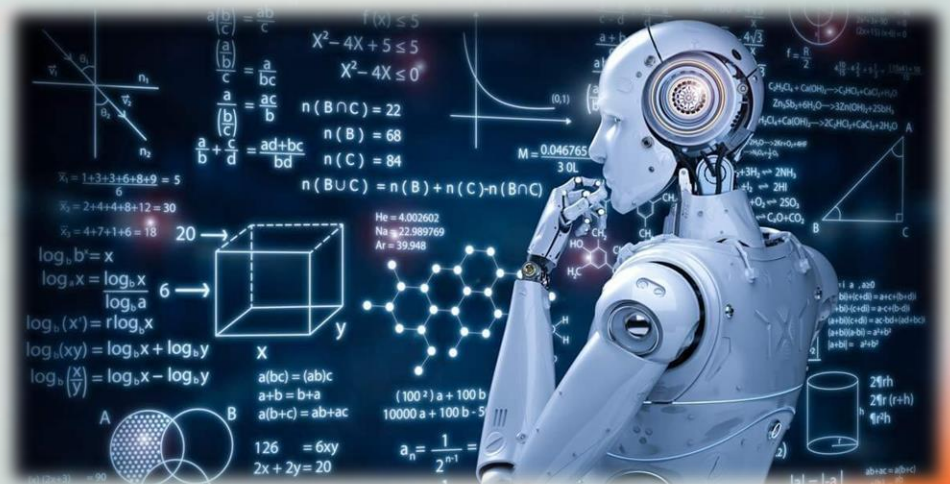
-Jay Malde
(T.Y.IT)

➢ Introduction:

Machine Learning is a branch of Artificial Intelligence in which the applications learn from past experiences and the past experiences are nothing but the data and identify patterns and make decisions with minimal human intervention .When exposed to new information or data in form of images, text and series these systems learn, grow, develop and change by themselves.

➢ What it is:

Because of more powerful machines and a large amount of data machine learning was never have been possible .Machine Learning was born from Pattern Recognition and the ability that the computers can learn without being programmed to perform specific tasks. The Machine Learning process begins with adding inputs in from of training data into algorithm selected based on the input data then the model is being trained. The model is further tested by inputting test data to predict the results. If the results are not as expected, the model is re-trained until the optimum and desired output is achieved. This gives the model to continually learn on its own and gradually increase its accuracy over time.

➢ Applications:

The Machine Learning can be applied in a large types of industries, including, Healthcare and Life Sciences for Disease identification and risk evaluation, in Manufacturing for predictive maintainability and condition monitoring, in Retail for

Upselling and cross-channel marketing, in Energy Sector for monitoring energy supply and demand and optimizing it, in Travel and Hospitality for real time pricing, in Financial Services for risk analysis and regulation, in Healthcare and Life Sciences for disease identification and risk identification, etc. Due to this it is possible to quickly and automatically produce models that can analyse bigger, more complex, and deliver, quickly , more accurate results on a very large scale .By building precise models, an organization or a business can have a better chance of identifying profitable opportunities or avoiding uncertain risks.

Machine Learning

➢ Conclusion:

In today's life Machine Learning and Artificial Intelligence are integrated into the fabric of everybody's life. By using Machine Learning we can solve difficult real-world problems, creating new opportunities in businesses, and in engineering, and many other application areas. Machine Learning and AI-based systems are disrupting many industries and bringing us smarter and more targeted products and services. Education and Training are already feeling the wave of these technologies and will be dramatically transformed by them. Data driven adaptive training will become a norm in industry standards as we move towards competency-based training.

AI – AGE OF ROBOTICS

-Nikita Jamwal
(S.Y.IT)

A generation which can do primary things like thinking, reasoning, Problem solving, can be termed as AI (Artificial Intelligence) .AI includes machine learning ,deep learning, facial recognition and much more .Due to such advance technology there are many recent trends which have been developed in AI ,and the biggest reform of it is

The humanoid robot –"Sophia Robot".

Sophia is a humanoid robot developed by Hansom robotics, a Hong Kong. Sophia was first activated in the year February 2014 with the purpose of being a companion for elderly people and help crowd and people during events and visiting parks.

Sophia is modelled or rather designed after a Hollywood actress Audrey Hepburn and is known for her facial expressions and ability to recognize people. She made her first public

Appearance in mid-March 2016, Austin, Texas, US. She is the first robot to receive a country's citizenship. She has along with her humanoid siblings as well such as Albert, ALICE, Einstein and many to name.
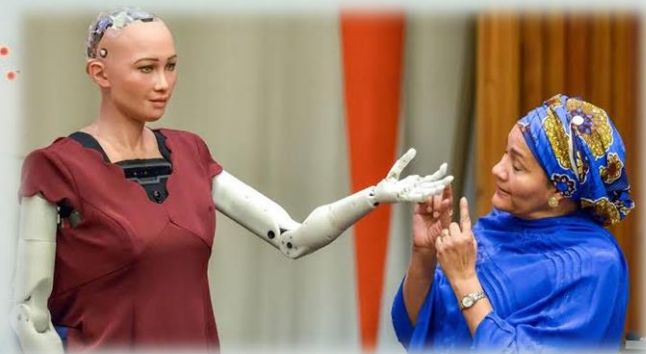
Sophia uses visual data processing, facial recognition and artificial intelligence. She uses voice recognition technology to identify and also text-to-text technology has enabled her to sing as well. She analyses and extracts data which allows her to communicate. The camera embedded in her eyes along with some computer algorithms allows her to

see and perceive. In 2018, Sophia was upgraded with functional abilities like legs and move. The main master mind behind her performance is block chain technology.

Many experts around the globe according to Quartz, states that Sophia is the best categorized as a Chatbot with a face. Ben Geortzel the former chief scientist said "Not ideal that some think of Sophia as human equivalent intelligence, but unique somehow". Facebook's director of artificial intelligence on January 2018 Yann Lee Cunn tweeted that "Sophia was a complete bullshit and slammed the media for giving coverage to Potemkin AI.

But due to much advancement in the field the question arises will Sophia will fully be accepted? In one for her interviews she had mentioned that she would kill humans! On the other hand she is talking about the development of mankind. Can AI be fully used in the form of Sophia?

E – HUMAN

-Swati Vitkar

An android is a humanoid robot designed to be similar in shape to humans. Examples of this type of Android include Aldebaran Robotics 'Nao and the Boston Dynamics' Atlas robot owned by Google.

Leonardo da Vinci sketched a plan for the first engraved 'humanoid robot', known as Leonardo's Robot in 1495. In general, humanoid robots have a torso, a head, two arms and two legs, although some forms of humanoid robots can model only a part of the body, for example, from the waist up. Some humanoid robots also have heads designed to replicate human facial features such as eyes and mouths.

ASIMO is the most advanced humanoid robot that can be bought, but also the most expensive, costs around US $ 2,500,000.

The robot - Sophia, inspired by actress Audrey Hepburn, is known for her appearance and human behaviour compared to previous robotic variants (activated on February 14, 2016). According to David Hanson(the manufacturer), Sophia uses artificial intelligence, face recognition and visual data processing. Very soon Robots will take over the world. The first robot will be built using a blockchain. Artificial intelligence will be deployed on a blockchain. From then it is growing to become the most sophisticated intelligence in the world.

A gynoid is anything that resembles to the female human form. Although the term android refers to robotic humanoids regardless of the apparent gender, the Greek prefix "and-" refers to man in the masculine gender sense. Sophia is a built by Hanson Robotic has debuted humanoid robot – Sophia in 2016. Thanks to the addition of legs from DRC-HUBO (the same company that won the DARPA robotics competition in 2015), Sophia can now walk, albeit slowly. Currently the legs are capable of moving at up to 0.6 miles per hour.

Sophia raises an eyebrow as she looks at the two men on stage. Hanson explains what Sophia does: It is a social robot which uses artificial intelligence to see people, understand conversations and establish relationships.... It can also crack jokes, make facial expressions and seemingly understand what is going on around you.

Robby the Robot of the science fiction movie "Forbidden Planet" has become the most expensive piece of classic movie souvenirs in the world after selling for $ 5.3 million. The seven-foot-tall robot was a star of the 1956 film and one of the most memorable creations of science fiction.

Robotics and Artificial Intelligence (AI) is a general term that implies the use of a computer to model and / or replicate intelligent behaviour. Research in AI focuses on the development and analysis of algorithms that learn and / or perform intelligent behaviour with minimal human intervention.

A humanoid robot - ASIMO (Advanced Step in Innovative Mobility) is created by Honda in 2000. The word first appeared in 1921, in the work of Karel Capek's play R.U.R., or Rossum's Universal Robots. However, "robot" comes from the Czech for "forced labour." These robots were robots more in spirit than form. They looked human, and instead of being made of metal, they were made of chemical mass.

NAO is the leading and most used humanoid robot in the world for education, health and research. NAO is a 58 cm tall, autonomous and fully programmable robot that can walk, talk, listen and even recognize your face.

Economists claimed that, by 2030 Robots could take over 20 million manufacturing jobs around the world, According to Oxford Economics, there could be 14 million robots put to work in China alone within the next 11 years.

HOW ARTIFICIAL INTELLIGENCE HELPED HUMANS IN FINDING NEW PLANET...

-Shweta More

Well, we all are familiar with the fact that universe is infinite and according to the estimates from astronomer's, observable universe has at least two hundred billion to two trillion galaxies, where each galaxy is home to millions and billions of planets. The milky way galaxy is just one of the millions of galaxies in the universe and our solar system which is billion miles wide with eight planets and one star is just one of the billions of star systems in the Milky way. Our universe being so vast has always excited the space scientists in discovery of new planets and their search for extraterrestrial life. But it is not an easy task as it requires complex calculations, algorithms and processing.

On a clear night we may easily see Mercury or Venus but, we can't directly see the planets that are far away from us like Saturn or Neptune. However, due to advancement in technology and with the help of modern telescopes, it has been able for the mankind to trace the planets that are far away and also that are outside of our solar system. NASA's Kepler Space Telescope, which was launched in 2009 got retired in 2018 and was used to survey Milky way to discover Earth sized planets. Now, TESS (Transiting Exoplanet Survey Satellite) launched on April 18, 2018 is NASA's new planet hunter, this satellite is a space telescope equipped with 4 cameras helping astronomers discover thousands of exoplanets orbiting nearby stars by collecting information about their light and performing survey of 85% of the sky and analyzing the planets that are beyond our solar system.

So, the planets that orbits the star other than sun are known as exoplanets or extrasolar planets. These are not part of our solar system and are dozens or hundreds of light years away from us.

These exoplanets can be traced using few methods: radial velocity, transits, direct imaging, and microlensing. The most popular method used to find planets, is the transit method which has been the most prolific, finding over 4,000 planets. This method detects distant planets by measuring minute dimming of a star as an orbiting planet passes between it and the Earth.

Every time a planet passes in front of a star, some of the star's light is blocked. So, it appears dimmer to us and there will be dip in our light curve (the brightness over time of a star is called as light curve)And if this dip is detected at regular intervals and lasts a fixed length of time then there is a potential that a planet is orbiting the star and passing in front of it every orbital period. So, in transit method we analyze the brightness of stars over time to identify that dip in the light curve, which also known as transit event.

However, in practice it is hard to tell the difference whether dimming of the star's light is due to real planets or due to natural variations in brightness, or variations in the instrument itself and other reasons. Normally, these signals are analyzed by experts, who try to distinguish planets from other signal sources. Human decisions can be biased and, also, with the huge amount of data produced, we would need an army of scientists to analyze it. So, scientists are looking for a precise and automatic way of processing voluminous Kepler's data in order to detect these planet signals [1].

This is where AI along with deep learning, and neural networks came into action. According to John McCarthy(1950) Artificial Intelligence (AI) is "the science and engineering of making intelligent machines", especially intelligent computer programs. Now, Deep learning, branch of Artificial Intelligence deals with how the computer trains itself to process and learn from the data with the help of deep neural networks just like a human brain.

CNNs were used to search for planets in the K2 data. In deep learning, a convolutional neural network (CNN, or ConvNet) is a class of deep neural networks, that is commonly applied to analyzing

visual imagery. These are regularized versions of multilayer perceptron or feed forward networks. A multilayer perceptron usually has three layers: input layer, hidden layer and output layer, where each layer is comprised of neuron that is a scalar valued unit arranged hierarchically so that the outputs from one layer act as inputs to next. A CNN works best when the data is of similar shape and size, but phase-folded light curves can come in many shapes and sizes based on the characteristics of the planetary system. The orbital period of planets differ, as well as the depth of their transit .

From the entire K2's data, light curves were searched for periodic events that summed up around 51,711 signals, 31,575 of which were classified into three categories in order to create the training set for the neural network. The data to be processed was processed using two image features: a local view and a global view. A 'global view' is the entire phase-folded light curve with the transit event in the center, binned so that each global view is the same length. A 'local view' is a zoomed-in look at the transit event, with only two durations on either side of the event instead of the entire period. These features are normalized so that the transit depth is always -1 [1].

Figure 1.Convolutional neural network architecture for classifying light curves, with both global and local input views

A CNN called AstroNet- K2, was trained on 27,634 signals that were labeled one of three categories:

- "E" for eclipsing binary
- "J" for junk/instrumental artifact
- "C" for planet candidate

to analyze and predict whether a given possible exoplanet signal is actually a signal of an exoplanet or a false positive. AstroNet- K2 was highly successful at classifying exoplanets and false positives, with accuracy of 98% on the test set.

So by using deep learning, computers were trained how to identify exoplanets in the light readings recorded by K2 that helped humans in finding two exoplanets: one called K2-293b that orbits a star 1,300 light-years away in the constellation Aquarius and the other, K2-294b, orbits a star 1,230 light-years away, also located in Aquarius.

LIMITATIONS & OPPORTUNITIES OF AI WITH ROBOTICS

-Minal Sarode

"Robotics and AI extend and intensify human potentials, increase throughput and are moving from simple reasoning towards human-like cognitive talents. In order to tacit the impact of AI, it is important to draw programs from the past successes and failures, as well as to forestall its future directions and potential legal, ethical and socio-economic implications."

AI has the potential to change the world but there are still many problems to overcome before its widespread applications. Besides, its practical use is not without failures (see Fig 1, Example Failures of AI). Recently, we have seen a heave of interest in deep learning with favourable results that will reshape the future of AI. But deep learning is only one of the many tools that the AI community has developed over the years. It is important to put into viewpoint the current development of AI and its specific limitations.

Intelligence as a multi-component model:

To be called "intelligent", a machine should placate numerous standards that include the ability of reasoning, building models, understanding the real world and antedate what might happen next. The theory of "intelligence" is made of the following high-level components: perception, common sense, planning, analogy, language and reasoning.

Large datasets and hard generalisation:

After expansive training on big datasets, machines are now able to achieve remarkable results in identifying images or interpreting speech. These abilities are obtained thanks to the derivation of statistical guesstimates on the available data. However, with bare minimum training data availability, when the system has to deal with new situations, the model often fails. The awareness

of human's beings to perform recognition even with small data cannot be compared with machines since we (human beings) can abstract principles and rules to generalise to a diverse range of situations. Such high levels of abstraction and generalization is still missing from existing AI systems.

Black box and a lack of interpretation:

Lack of interpretation is prevalent problem with current AI systems. For example, deep neural networks have millions of limits or criteria's and to identify with why the network furnishes good or bad results becomes impossible. Although some recent work on visualising high-level features by using the weight filters in a convolution neural network, the obtained trained models are often not interpretable. Consequently, most researchers use current AI approaches as a black box.

Robustness of AI:

Another issue with the AI system is, it can be tampered very easily, a problem that affects almost all machine learning techniques.

Despite these issues, it is certain that AI will play a major role in our future life. As the availability of information around us grows, humans will rely more and more on AI systems to live, to work and to entertain. Therefore, it is not astounding that large tech firms are investing heavily on AI related technologies. In many application areas, AI systems are needed to handle data with increasing complexities. Given increased accuracy and sophistication of AI systems, they will be used in more and more sectors including finance, pharmaceuticals, energy, manufacturing, education, transport and public services. In some of these areas they can replace costly human labour and create new potential applications and work along with/for humans to achieve better service standards. It has been predicted that the next stage of AI is the era of augmented intelligence. Ubiquitous sensing systems and wearable technologies are driving towards intelligent embedded systems that will form a natural extension of human beings and our physical abilities. Human sensing, information retrieval and physical abilities are limited in a way that AI systems are not. AI algorithms along with advanced sensing systems could monitor the world around us and understand our intention, thus facilitating seamless interaction with

each other. Advances in AI will also play a critical role in imitating the human brain function. Advances in sensing and computation hardware will allow to link brain function with human behaviour at a level that AI self-awareness and emotions could be simulated and observed in a more pragmatic way. Recently, quantum computing has also attracted a new wave of interest from both academic institutions and technological firms such as Google, IBM and Microsoft. Although the field is at its infancy and there are major barriers to overcome, the computational power it promises, potentially relevant to the field of AI, is well beyond our imagination.

2016: Artificial intelligence fails to beat real stupidity. Microsoft lunched Tay, an AI Twitter bot that just after 24 hours turned into a racist, Hitler-lover, incestual sex-promoting robot. Tay was developed to learn by interacting with people, but it failed to cater for the darker side of human.

2016: Tesla driver dies while using autopilot mode. A driver died in the first fatal crash involving a self-driving car. The car's vision system failed to distinguish a large truck and trailer crossing the highway at full speed.

2016: Robots failed in their duties and lost their jobs. Three restaurants in China fired their robot waiters. The robots broke down continuously, two of the restaurants have closed and the third re-hired humans.

2016: Service robot caused traffic jams. Promobot, a humanoid robot, was designed for promoting products or conduct surveys. It has created many traffic jams after escaping from its lab and it was also arrested while it was collecting voter opinions for political candidates to gain unfair advantage.

1983: Nuclear attack early warning system falsely claimed that an attack is taking place. A nuclear warning system of the Soviet Union reported the launch of a ballistic missile from the United States. This was a false alarm that it could have cause a nuclear attack and an immediate escalation of the cold-war to a full-scale nuclear war.

1966 Mistranslations DARPA funded a project to translate Soviet documents into English. It was a clear failure and after spending $20 million, it was closed.

2016: Search engine AI highly ranks fake news. The highly ranked entry of the Google search engine on the query "Did the Holocaust happen" was a neo-Nazi and denial website. Since that, Google has tried to improve their AI search engine to provide authoritative results.

2016: Fatty the robot smashes glass and injures visitor. During a demonstration in China, a robot called Fatty piercing a bystander's ankle after broke the glass of a booth. There hasn't been much information about Fatty since the incident.

2016: Facial recognition rejected a legitimate citizens. An AI face recognition software used in the administration office of New Zealand, rejected an Asian citizen since it mistakenly registered his eyes as being closed. Currently, it is estimated that 20% of faces are still mistakenly classified.

2015: Adult content filtering software failed to remove inappropriate content. Google's new YouTube Kids app failed to remove "inappropriate content," including explicit sexual language and jokes about paedophilia.

1980: The Fifth Generation Computer Systems. A government/industry research project in Japan aimed to create a computer using parallel computing. After 10 years of research and $400 million, the project was terminated without having met its goals to provide a platform for future developments in AI.
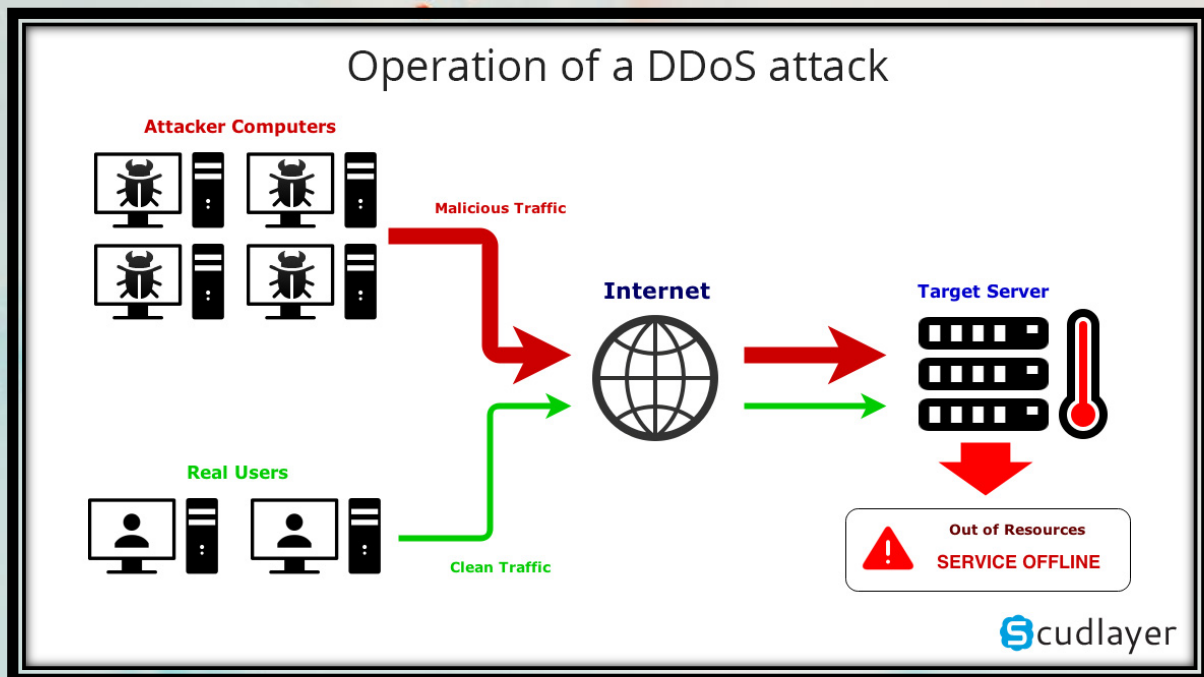
BOTNET

BEWARE OF BOTNET

–Tanvi Patil
(S.Y.IT)

The word botnet springs from the phrase "network of robots". It is essentially a widespread collection of huge infected computer systems. Each infected system runs a bit of software program called as a "Bot". This causes serious concerns within the IT world which should be known to each supervisor and senior technology management. The word botnet springs from the phrase "network of robots". The use of botnets to mine cryptocurrencies like Bitcoin may be a growing business for cyber criminals. It's predicted the trend will continue, leading to more computers infected with mining software and more digital wallets stolen. Botnets are dangerous to corporations and consumers because they're wont to deploy malware, initiate attacks on websites, steal personal information, and defraud advertisers. When brooding about a botnet, it's helpful to see it as a military of connected devices. The army comparison works here because botnets are a set of individual devices working together as one unit. These "armies" are often made from PCs, mobile devices, servers and IoT devices. Any internet-connected or network-connected device are often infiltrated and brought into a botnet army. The way botnets interact with the master or manager is extremely interesting too. All bots are given a singular number, which is typically a product of the infected system's configuration and site, but not necessarily the ip address of the system. The main purpose behind injecting a botnet into a system is to make a military of infected systems, also called as zombie machines. The purpose behind such an attack is ultimately, to disrupt computer systems or to steal data. Since an entire army of computer zombies are in action, unfortunately the hacker can easily and quickly achieve his evil mission, this is often because

planting a botnet attack is always a low risk, high profit job. Bots can utilize other infected computers on the botnet as communication channels, providing the bot-herder a near infinite number of communication paths to adapt to changing options and deliver updates, Botnets are centrally coordinated, networked applications that leverage networks to gain power and resilience. Infected computers machines are always under the control of the remote a botnet is like having a malicious hacker inside your network as against just a malicious executable program.

Common botnet actions include:

Operation of a DDoS attack

- **EMAILSPAM**– though email is seen today as an older vector for attack, spam botnets are some of the largest in size. They are mainly used for sending out spam messages, often including malware, in towering numbers from each bot.
- **DDOS ATTACKS** – The massive scale of the botnet to overload a target network or server with requests, rendering it inaccessible to its intended users. Such attacks target organizations for personal or political motives or to extort payment in exchange for ceasing the attack.
- **FINANCIAL BREACH**– includes botnets specifically designed for the direct theft of funds from enterprises and credit card information.

HOW TO PREVENT YOUR COMPUTER FROM BECOMING A PART OF BOTNET

- ✓ Don't click on any suspicious links that you're not sure about
- ✓ Do not download any attachments that you never requested from anywhere
- ✓ Antivirus and Antispyware software
- ✓ Keep all your software up to date

AI SHIFTING CYBER SECURITY & THWART CYBER ATTACKS

-Meghna Bhatia

The globe is going digital at an exceptional fast rate, and the transform is only going to go even faster. The digitization means the whole thing is poignant at lightning haste entertainment, trends, business, etc. The user gets what they want immediately as the service provider has the means to send it.

While the amenities and profit of this digital age are many, it also brings with it quite a lot of negatives. One of the most important and destructive threats it poses is that our personal information is at risk like never before. In last 10 years or so has seen hundreds of cases of identity theft, loss of money, and data breaches. Cyber attacks in nature are very pervasive and affect every individual, business, and government bodies alike. We are moving towards an era where cyber criminals can reach their goals in any part of the world at any time; the requirement for cyber security has never been more essential than now.

One of the major issues is that hackers can use Artificial Intelligence (AI) and Machine Learning (ML) to automate cyber attacks on a huge scale. Adversaries are now relying on human assets to expertise and synchronize their attacks. Cyber crime and cyber security backdrop are going to transform if we learn to use AI and machine learning to do the grimy work. Another important issue is that, just like we can deploy AI and machine learning to harmonize the scarcity in human assets and to save expenditure in cyber security, our adversaries can also make use of it for the same. The funds and assets needed for initiation and coordinating such threats will go down extraordinarily.

Further advancement in AI and ML can also give beginning to novel types of cyber threats. AI can also hack into a system's vulnerability much quicker and improved than a human being can. AI can be used to masquerade attacks so effectively that one may never know that their set of connections,

network or device has been affected. So, the major allusion of Artificial Intelligence to the threat backdrop are the growth of today's threats and attacks, the expansion of new threats, and the deviation of the character of existing threats.

It's very important to make sure we have the suitable systems, guidance, and assets in place to efficiently manage and use AI and ML cyber security solutions. This will help us to reduce the risks associated with using such security tools.

BLOCKCHAIN: THE NEW METHOD OF BANKING

-*Utkarsh Apoorva*
(T.Y.IT)

If you have been following banking, investing, or cryptocurrency over the last few years, you may be familiar with "block-chain," the technology behind bitcoin. And there's a good chance that it only makes so much sense. In trying to learn more about block-chain, you've probably encountered a definition like this: "block-chain is a distributed, decentralized, public ledger."

❖ What is Block-chain?

At its most basic level, block-chain is literally just a chain of blocks, but not in the traditional sense of those words. When we say the words "block" and "chain" in the context of technological jargon, we are actually talking about digital information (the "block") stored in a public database (the "chain").

"Blocks" on the block-chain are made up of digital pieces of information. Specifically, they have three parts:

- ✓ Blocks store information about transactions like the date, time, and dollar amount of your most recent purchase from Amazon.

- ✓ Blocks store information about who is participating in transactions. A block for your splurge purchase from Amazon would record your name along with Amazon.com, Inc. Instead of using your actual name, your purchase is recorded without any identifying information using a unique "digital signature," sort of like a username.

- ✓ Blocks store information that distinguishes them from other blocks. Much like you and I have names to distinguish us from one another, each block stores a unique code called a "hash" that allows us to tell it apart from every other block. Let's say you made your splurge purchase on Amazon, but while it's in transit, you decide you just can't resist and need a second one. Even though the details of your new transaction would look nearly identical to your earlier purchase, we can still tell the blocks apart because of their unique codes.

While the block in the example above is being used to store a single purchase from Amazon, the

reality is a little different. A single block on the block-chain can actually store up to 1 MB of data. Depending on the size of the transactions, that means a single block can house a few thousand transactions under one roof.

101 Blockchains | KEY FEATURES OF BLOCKCHAIN TECHNOLOGY

01 CANNOT BE CORRUPTED
Every node on the network has a copy of the digital ledger. To add a transaction every node needs to check its validity. If the majority thinks it's valid, then it's added to the ledger. This promotes transparency and makes it corruption-proof.

02 DECENTRALIZED TECHNOLOGY
The network is decentralized meaning it doesn't have any governing authority or a single person looking after the framework. Instead, a group of nodes maintain the network making it decentralized.

03 ENHANCED SECURITY
As it eliminates the need for central authority, no one can just simply change any characteristics of the network for their benefit. Also using encryption ensures another layer of security for the system.

04 DISTRIBUTED LEDGERS
The ledger on the network is maintained by all other users on the system. This distributes the computational power across the computers to ensure a better outcome.

05 CONSENSUS
Every blockchain thrives because of the consensus algorithms. The architecture is cleverly designed, and consensus algorithms are at the core of this architecture. Every blockchain has a consensus to help the network make decisions.

06 FASTER SETTLEMENT
Blockchain offers a faster settlement compared to traditional banking systems. This way a user can transfer money relatively faster, which saves a lot of time in the long run.

BLOCKCHAIN FEATURES

Created by 101blockchains

❖ How Block-chain Works

When a block stores new data it is added to the block-chain. Block-chain, as its name suggests, consists of multiple blocks strung together, however, four things must happen:

- ✓ A transaction must occur. Let's continue with the example of your impulsive Amazon purchase. After hastily clicking through multiple check-out prompt, you go against your better judgment and make a purchase.

- ✓ That transaction must be verified. After making that purchase, your transaction must be verified. With other public records of information, like the Securities Exchange Commission, Wikipedia, or your local library, there's someone in charge of vetting new data entries. With block-chain, however, that job is left up to a network of computers. When you make your purchase from Amazon, that network of computers rushes to check that your transaction happened in the way you said it did. That is, they confirm the details of the purchase, including the transaction's time, dollar amount, and participants.

- ✓ That transaction must be stored in a block. After your transaction has been verified as accurate, it gets the green light. The transaction's dollar amount, your digital signature, and Amazon's digital signature are all stored in a block. There, this transaction will likely join hundreds, or thousands, of others like it.

- ✓ That block must be given a hash. Not unlike an angel earning its wings, once all of a block's transactions have been verified, it must be given a unique, identifying code called a hash. The block is also given the hash of the most recent block added to the block-chain. Once hashed, the block can be added to the block-chain.
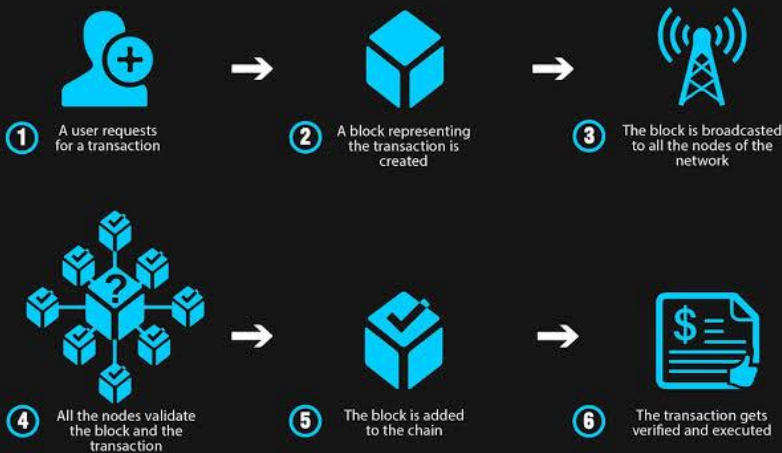
❖ Is Block-chain Private?

Anyone can view the contents of the block-chain, but users can also opt to connect their computers to the block-chain network. In doing so, their computer receives a copy of the block-chain that is updated automatically whenever a new block is added, sort of like a Facebook News Feed that gives a live update whenever a new status is posted.

❖ Is Block-chain Secure?

Block-chain technology accounts for the issues of security and trust in several ways. First, new blocks are always stored chronologically and linearly. That is, they are always added to the "end" of the block-chain. If you take a look at Bitcoin's block-chain, you'll see that each block has a position on the chain, called a "height." As of Feb. 2019, the block's height had topped 562,000.

WORLD OF DATA SCIENCE

-Harsh Shinde
(S.Y.IT)

❖ What is data science?

Considered at par with money, data is any raw material that we gather from multiple resources (surveys, internet, direct fieldwork etc.). Data science is a technique of converting the raw data into an information (processed data) using statistics and machine learning, which would be useful in some or other way (business logic, weather forecasting, statistics etc.).

The process for same encompasses many fields

❖ Process is done through series of steps

✓ Fixing the target area or the subject

✓ Gathering raw data

✓ Cleaning the data

✓ Processing the data(mainly job of data analyst) and visualization

✓ Analysing the data in -depth and arriving at a scientific solution of the problem of subject

❖ Applications with contemporary life

✓ Weather forecasting (by analysing speed of wind currents and oceanic waves).

✓ Analysing of govt. Initiates(multiple yojanas like -PMJAY,jal Shakti mission)

✓ Helps in working at weak areas by analysing it scientifically and also finding potholes to focus on it particularly.

❖ Data science languages and its demand
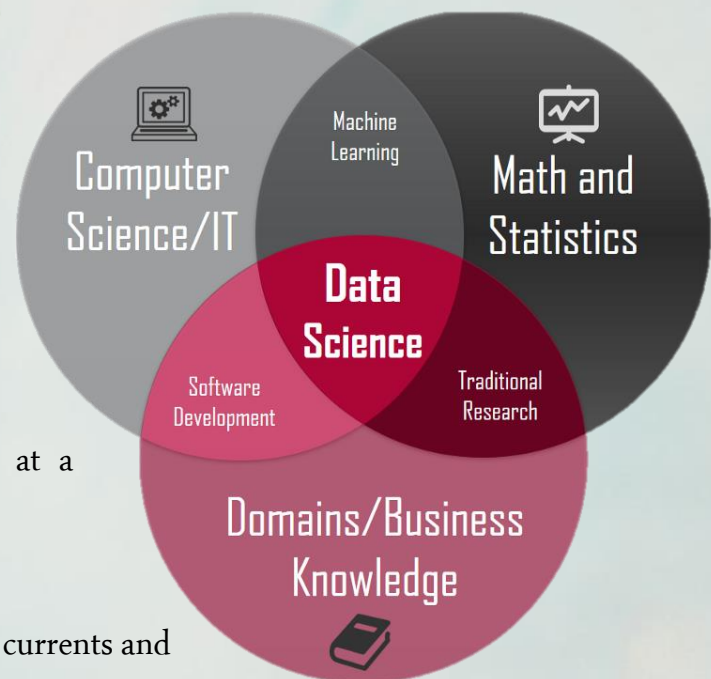
➢ **Challenges with data scientist**

- Finding the right talent with desired skills.

- Being a critical thinker.

- To tell public what data can do for them?

- With data being worthy, it's important to secure and handle with almost efficiency.
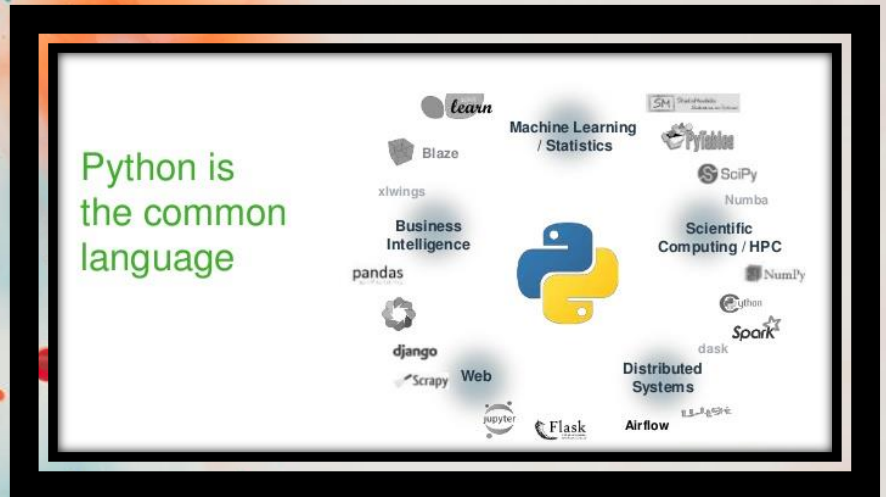
➢ **Case studies:**

- On opening YouTube we frequently get the related videos we had searched for earlier. This is off-course different for every individual. What do you think, how does YouTube provide you with this flexibility? Again the answer is through data that you enter on search panel the scientist work upon this data and accordingly related videos are popped on your screen.

- the 2021 census is also processed with the help of same technology

- Some companies like quarter are taking the help of data prediction to help improve the mental health along with physical health of their customers.

➢ **Future of data science**

- Data being developed in each field, is of immense impotence to carry out logical-deductive analysis.

- It has been considered the most paid and also the in-demand job of the contemporary world.

- It is the field which is looked upon by industries to fly their graph of profit, and thus remains an evergreen field in the field of technology.

- With the increasing demand in healthcare, data analysis and finding something useful of the prior data, of the patient can help in better diagnosis and treatment accordingly.

At last innovation in mind, compassion in heart and dedication towards goal remains the key value.

BIG DATA

BIG DATA

-Samiksha Bhosale
(T.Y.IT)

Big data is a field that treats ways to analyse, systematically extract information from, or deal with data sets that are too large or complex to be dealt with by traditional data processing application software or it is an act of accessing and storing large amounts of information for analytics has been around a long time. Big data is a term that describes the large volume of data – both structured and unstructured – that inundates a business on a day-to-day basis. Big data challenges include capturing data, data storage, data analysis, sharing, transfer, visualization, querying, information, privacy and information privacy, data source, search and updating. Big data was originally associated with three key concepts: volume, variety, and velocity. When we handle big data, we may not sample but simply observe and track what happens. The term "big data" refers to data that is so large, fast or complex that it's difficult or impossible to process using traditional methods.

Big data usually includes data sets with sizes beyond the ability of commonly used software tools to capture, create, manage, and process data within a tolerable elapsed time. A 2018 definition states "Big data is where parallel computing tools are needed to handle data", Big Data is a term used to describe a collection of data that is huge in size and yet growing exponentially with time and notes, "This represents a distinct and clearly defined change in the computer science used, via parallel programming theories, and losses of some of the guarantees and capabilities made by Cod's relational model."

The growing maturity of the concept more starkly delineates the difference between "big data" and "business Intelligence":

- Business Intelligence uses applied mathematics tools and descriptive statistics with data with high information density to measure things, detect trends, etc.
- Big data uses mathematical analysis, optimization, inductive statistics and concepts from nonlinear system identification to infer laws from large sets of data with low information density to reveal relationships and dependencies.

➢ Characteristics:

✛ Volume

The quantity of generated and stored data. This can be data of unknown value, such as Twitter data feeds, a mobile app, or sensor-enabled equipment. For some organizations, this might be tens of terabytes of data.

✛ Variety

The type and nature of the data. Variety refers to the many types of data that are available. Traditional data types were structured and fit neatly in a relational database. Big data draws from text, images, audio, and video

✛ Velocity

Velocity is the fast rate at which data is received. The speed at which the data is generated and processed to meet the demands and challenges that lie in the path of growth and development. Two kinds of velocity: the frequency of generation and the frequency of handling, recording, and publishing.

✛ Veracity

Veracity is the extended definition for big data, which refers to the data quality and the data value. The data quality of data can vary greatly, affecting the accurate analysis.

➢ Technologies:

✓ Techniques for analysing data, such as machine learning, natural language and A/B testing, processing.

✓ Big data technologies, like cloud computing, business intelligence and databases

✓ Visualization, such as graphs, charts and other displays of the data

➢ Case Studies:

India

Big data analysis was tried out for the BJP to win the Indian General Election 2014.

United Kingdom

Examples of uses of big data in public services:

- Data on prescription drugs
- Joining up data

United States of America

- In 2012, the Obama administration announced the Big Data Research and Development Initiative, to explore how big data could be used to address important problems faced by the government.
- Big data analysis played an important role in Barack Obama's successful 2012 re-election campaign.

Applications:

Government: Big data analytics has proven to be very useful in the government sector. The use and adoption of big data within governmental processes allows efficiencies in terms of cost, productivity, and innovation.

International development big data analysis used to improve decision-making in health care, employment, crime, security and resource management.

Manufacturing big data provides an infrastructure for transparency in the manufacturing industry.

BIOMETRICS

-Manimegha Yadav
(T.Y.IT)

Biometrics is that the technical term for body measurements and calculations. It refers to metrics associated with human characteristics. Biometry authentication (or realistic authentication) is employed in engineering as a variety of identification and access management. It's additionally accustomed establish people in teams that square measure below police work.

Biometric identifiers square measure the distinctive, measurable characteristics accustomed label and describe people. Biometric identifiers square measure usually categorised as physiological versus activity characteristics. Physiological characteristics square measure associated with the form of the body. Examples embody, however don't seem to be restricted to fingerprint, palm veins, face recognition, DNA, palm print, hand pure mathematics, iris recognition, membrane and odour/scent. Activity characteristics square measure associated with the pattern of behaviour of someone, together with however not restricted to typewriting rhythm, gait, and voice. Some researchers have coined the term behaviometrics to explain the latter category of biometry.

More ancient means that of access management embody token-based identification systems, like a permit or passport, and knowledge-based identification systems, like a positive identification or personal number. Since biometric identifiers square measure distinctive to people, they're a lot of reliable in confirmative identity than token and knowledge-based methods; but, the gathering of biometric identifiers raises privacy issues concerning the final word use of this info.

Facial recognition system:

A face recognition system could be a technology capable of distinguishing or supportive an individual from a digital image or a video frame from a video supply. There are multiple ways during which face recognition systems work, however normally, they work by scrutiny hand-picked countenance from given image with faces among an information. It's conjointly represented as a Biometric computer science primarily based application which will unambiguously determine an individual by analysing patterns supported the person's facial textures and form. While at the start a kind of pc application, it's

seen wider uses in recent times on mobile platforms and in different kinds of technology, like AI. It's usually used as access management in security systems and may be compared to different statistics like fingerprint or eye iris recognition systems. Though the accuracy of face recognition system as a biometric technology is less than iris recognition and fingerprint recognition, it's wide adopted because of its contactless and non-invasive method. Recently, it's conjointly become common as an advertisement identification and selling tool. Different applications embody advanced human-computer interaction, video police work, automatic compartmentalization of pictures, and video information, among others. The most standard pattern recognition techniques applied for biometric identification area unit dynamic time warp, hidden Markov models and vector quantisation. Mixtures of various techniques additionally exist.

Iris recognition:

Iris recognition is an automatic technique of identity verification that uses mathematical pattern-recognition techniques on video pictures of 1 or each of the irises of somebody's eyes, whose advanced patterns are distinctive, stable, and might be seen from a ways.

Retinal scanning may be a completely different, ocular-based biometric technology that uses the distinctive patterns on a human membrane blood vessels and is usually confused with iris recognition. Iris recognition uses video camera technology with refined close to infrared illumination to accumulate pictures of the detail-rich, Byzantine structures of the iris that are visible outwardly. Digital templates encoded from these patterns by mathematical and applied mathematics algorithms permit the identification of a personal or somebody dissembling to be that individual. Databases of listed templates are searched by intermediary engines at speeds measured within the several templates per second per (single-core) hardware, and with remarkably low false match rates.

Several hundred million persons in many countries round the world are listed in iris recognition systems for convenience functions like passport-free automatic border-crossings and a few national ID programs. A key advantage of iris recognition, besides its speed of matching and its extreme resistance to false matches, is that the stability of the iris as an enclosed and guarded, however outwardly visible organ of the attention.

VIRTUAL REALITY

- Surender Murugdas
(T.Y.IT)

Virtual Reality use computer modelling and simulation that enables a person to interact with an artificial three dimensional (3D) visual or other sensory environment. Here applications immerse the user in a computer generated environment that simulates reality through the use of interactive devices, which send and receive information and are worn as goggles, headsets, gloves, or body suits. In a typical virtual reality format, a user wearing a helmet with a stereoscopic screen views animated images of a simulated environment. The illusion is effected by motion sensors that pick up the users movements and adjust the view on the screen accordingly or usually in real time. The user can tour a simulated suite of rooms, experiencing changing viewpoints and perspectives that are convincingly related to his own head turnings and steps. Wearing data gloves equipped with force-feedback devices that provide the sensation of touch, the user can even pick up and manipulate objects that he sees in the virtual environment.

Virtual Reality was coined in 1987 by Jaron Lanier, whose research and engineering contributed a number of products to the nascent VR industry. A common thread linking early virtual reality research and technology development in the United States was the role of the federal government, particularly the Department of Defences, and the National Aeronautics and Space Administration (NASA). These projects can be funded by these agencies and pursued at university-based research laboratories yielded an

extensive pool of talented personnel in fields such as computer graphics, simulation, networked environments with established links between academic, military, and commercial work.

It is the use of computer technology to create a simulated environment. It is not similar to traditional user interfaces, virtual reality places the user inside an experience. It will not viewing a screen in front of them, users are immersed and able to interact with 3D worlds. To imitate as many senses as possible, such as vision, hearing, touch, even smell, the computer is transformed into a gatekeeper to this artificial world. The only limits to near-real virtual reality experiences are the availability of content and cheap computing power.

Virtual Reality most immediately-recognizable component is the head-mounted display (HMD).

Types of Virtual Reality Devices

The majority of Virtual Entertainment systems that are currently available to purchase require a personal computer to power them. These systems also need an HMD to help deliver the imagery integral to creating an immersive virtual world.

The number of different HMDs on the market at the moment, ranging from affordable to expensive. Also, some of these devices are more accessible than others. For example, google cardboard is not only cheap, but due to the fact that it has been developed for use with a smartphone, just about anyone can experience Virtual Reality.

Oculus Rift

Oculus Rift plans on being the gold standard of Virtual Reality HMDs. It is specifically designed for video gaming, it has a high field of view, delivering the very best in immersive virtual experiences.

HTC Vive

HTC Vive system brought to us in partnership with Valve, and powered by

Steam VR – is the leading VR headset and controller combo on the market today. These different types of devices will all come together at some point to create a complete set of VR hardware.

VIRTUAL REALITY

-Mrityunjai Singh
(S.Y.IT)

One technique by which augmented reality can be acknowledged is recreation based computer generated experience. Driving test systems, for instance, give the driver on board the impression of really driving a real vehicle by anticipating vehicular movement brought about by driver info and sustaining back relating visual, movement and sound prompts to the driver. With symbol picture based augmented experience, individuals can join the virtual condition as genuine video just as a symbol. One can partake in the 3D conveyed virtual condition as type of either an ordinary symbol or a genuine video. A client can choose possess kind of interest dependent on the framework ability.

In projector-based augmented experience, demonstrating of the genuine condition assumes an essential job in different computer generated simulation applications, for example, robot route, development displaying, and plane re-enactment. Picture based augmented experience frameworks have been picking up notoriety in PC designs and PC vision networks. In producing reasonable models, it is basic to precisely enlist obtained 3D information; typically, a camera is utilized for demonstrating little items at a short separation. Work area based computer generated simulation includes showing a 3D virtual world on a normal work area show without utilization of any specific positional following gear. Numerous cutting edge first-individual computer games can be utilized for instance, utilizing different triggers, responsive characters, and other such intuitive gadgets to make the client feel as if they are in a virtual world. A typical analysis of this type of inundation is that there is no feeling of fringe vision, restricting the client's capacity to comprehend what's going on around them. A Missouri National Guardsman investigates a VR preparing head-mounted presentation at Fort Leonard Wood in 2015

A head-mounted showcase (HMD) all the more completely inundates the client in a virtual world. An augmented experience headset ordinarily incorporates two little high goals OLED or LCD screens which give separate pictures to each eye for stereoscopic designs rendering a 3D virtual world, a binaural sound framework, positional and rotational constant head following for six degrees of development. Choices incorporate movement controls with hepatic input for physically cooperating

inside the virtual world in a natural manner with next to zero deliberation and a unidirectional treadmill for more opportunity of physical development enabling the client to perform train movement toward any path.

Enlarged reality (AR) is a kind of augmented reality innovation that mixes what the client finds in their genuine surroundings with computerized content created by PC programming. The extra programming produced pictures with the virtual scene ordinarily improve how the genuine environment look somehow or another. AR frameworks layer virtual data over a camera live feed into a headset or smart glasses or through a cell phone enabling the client to see three-dimensional pictures.

Blended reality (MR) is the converging of this present reality and virtual universes to deliver new conditions and representations where physical and advanced articles exist together and collaborate continuously. An internet is an arranged virtual reality. Reproduced the truth is a theoretical computer generated simulation as genuinely vivid as the real reality, empowering a progressed exact encounter or even virtual endlessness. It is well on the way to be created utilizing a cerebrum PC interface and quantum registering.

DESIGNS USING LOGICAL GATES

Pinky Sasmal
FYIT
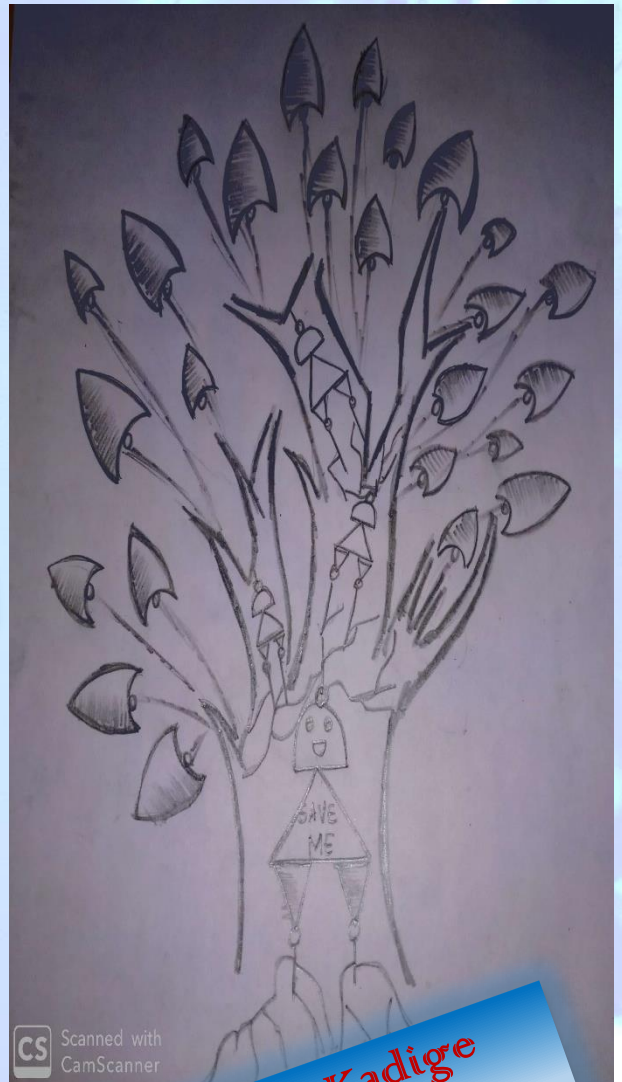
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FYIT

Piyush Ingavale
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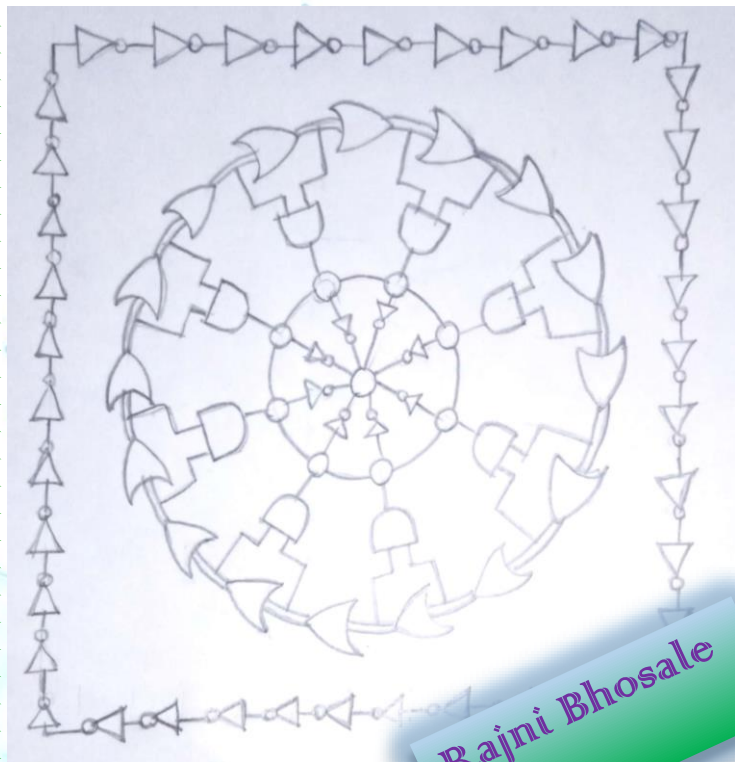
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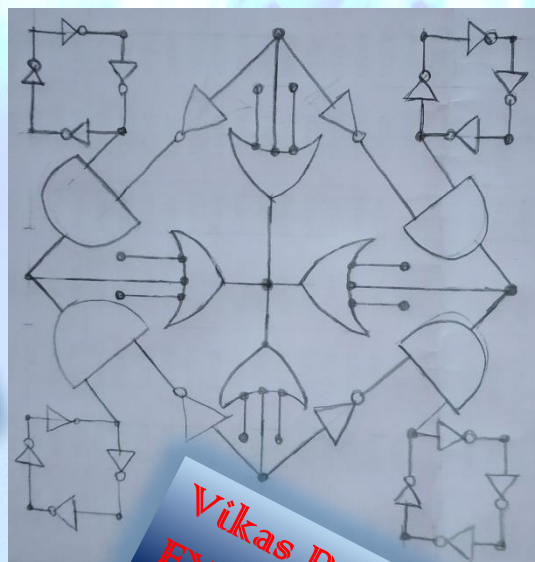
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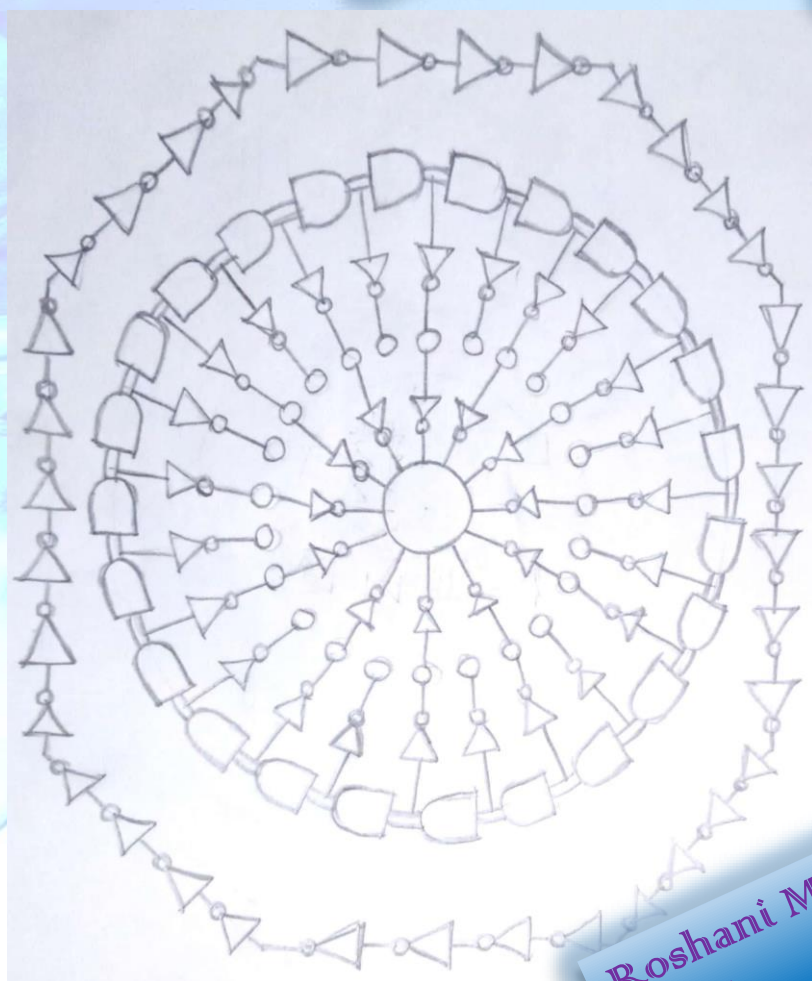
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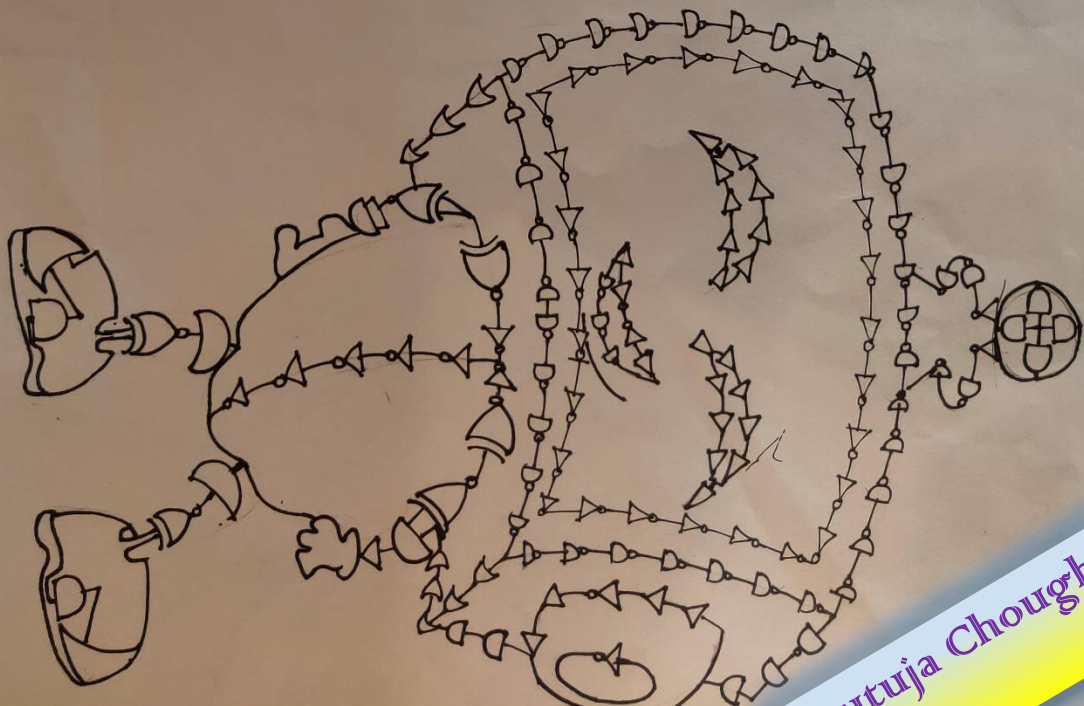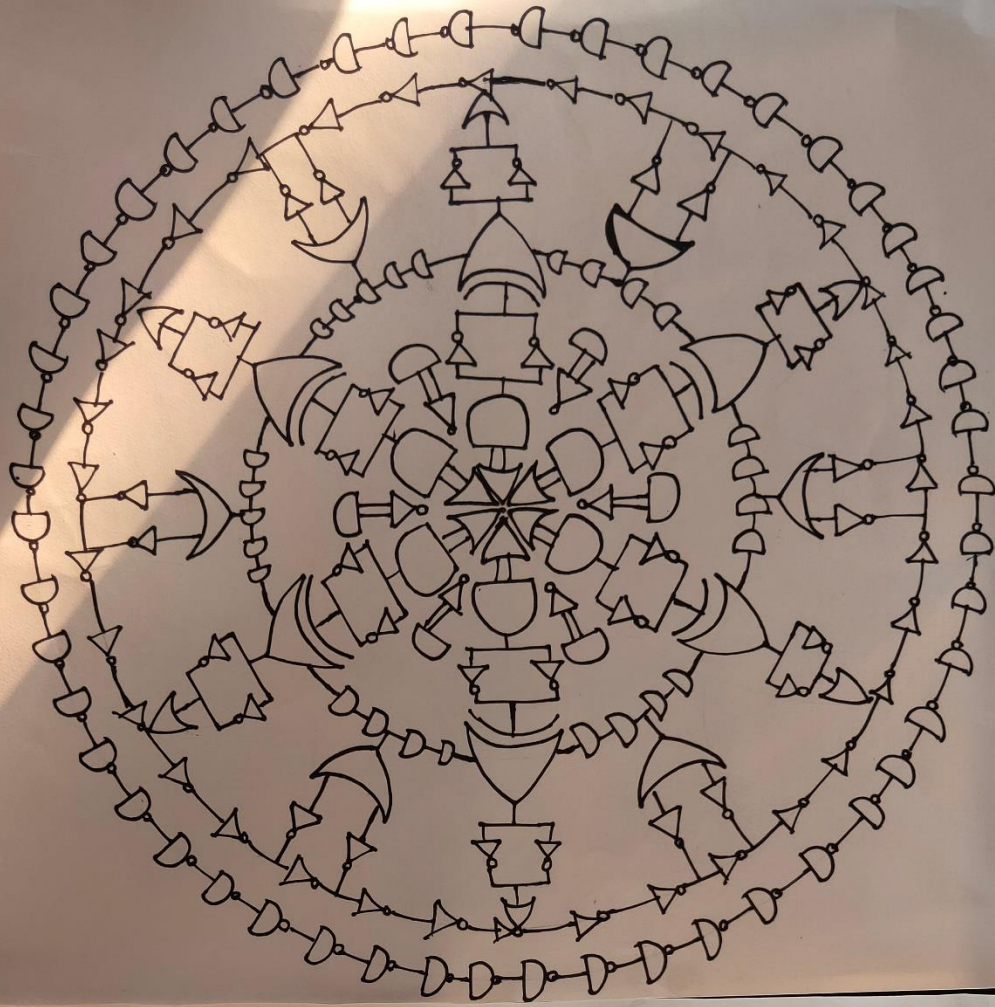
Rutuja L. Cho
FYIT
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Rutuja Choughule
FYIT
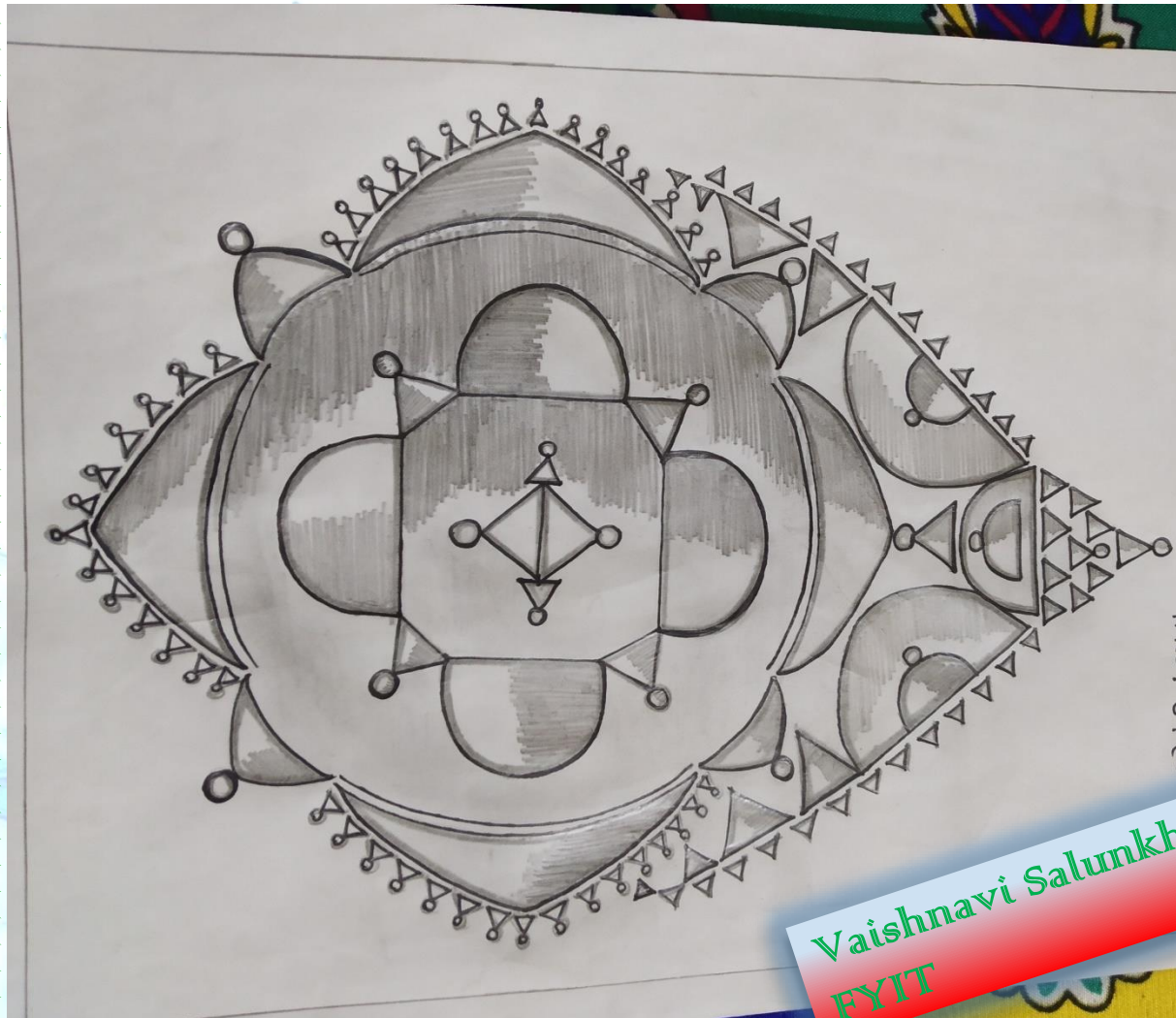
Vaishnavi Salunkhe
FYIT
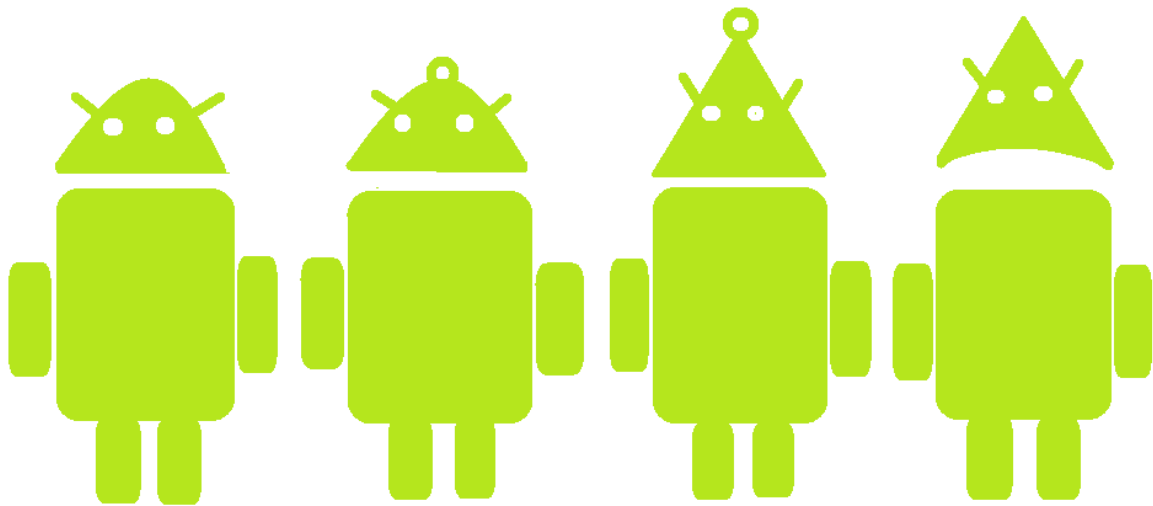
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Harshada Dhamapurkar
SYIT

Ritesh Yadav
FYIT
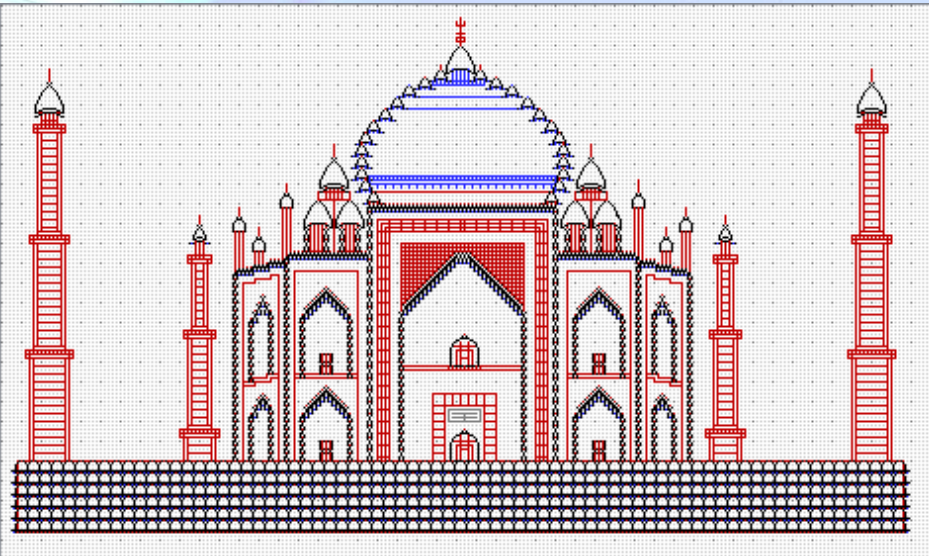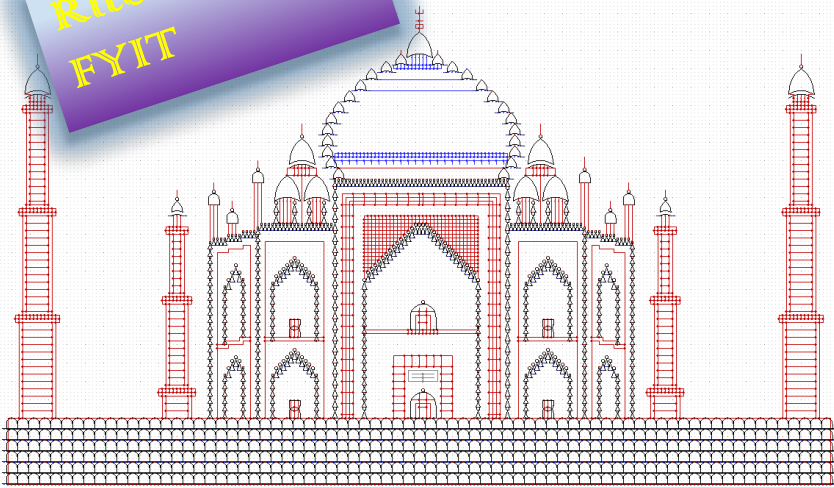
Rahul Mahtolia
SYIT

SPACE INVADERS

Janhavi Devare
SYIT
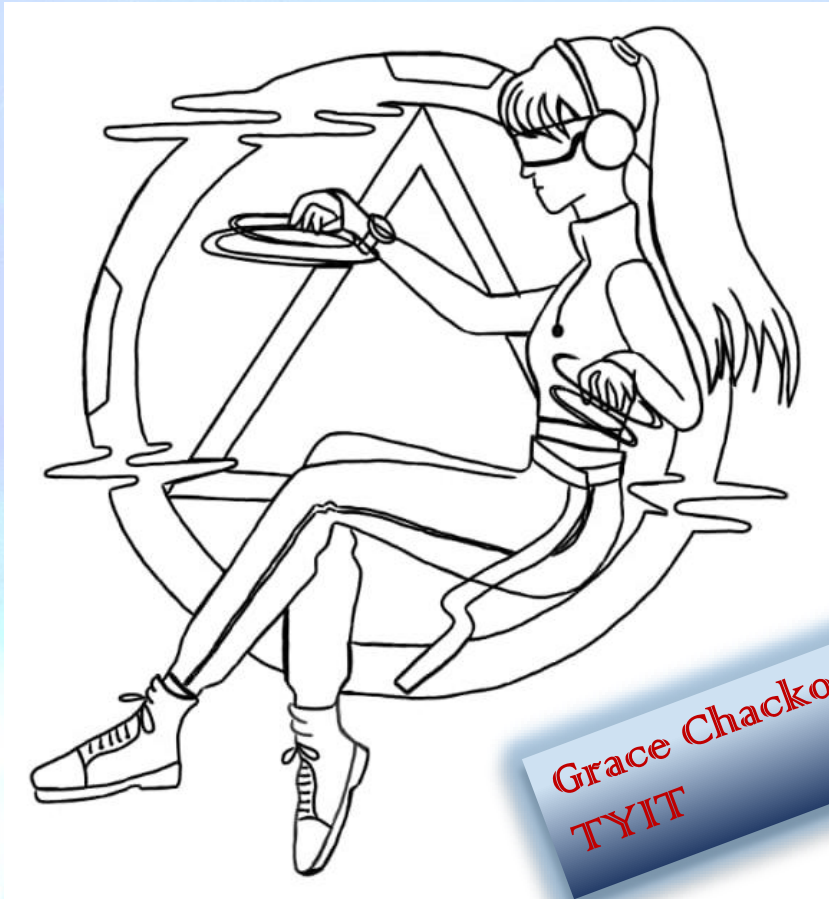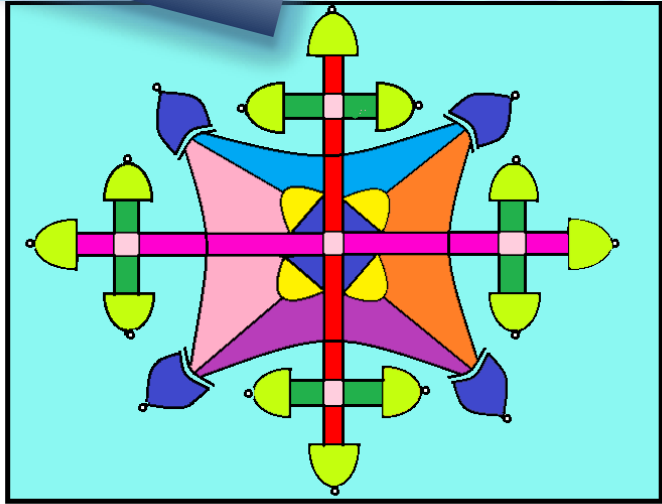
Grace Chacko
TYIT

POETRY

Programmed Human

Our Life, our choices, our rhythm,
Following a stringent algorithm.
Our choices defined in switch-case,
Dictating joy and sorrow we face.

Many thoughts synchronised and parallel,
Multithreaded living in marvel.
Life is all about winning a race,
Giving the output in less time and space.

To err is to human is popularly said,
A try-catch block custom-made.
Exceptions are dealt with precision,
After a well executed if-else condition.

Every thought follows a pattern,
Every choice follows a logic,
Looping endlessly we return,
Deleting all the life's magic.

Have we lost ourselves in this digital era,
Have become machines and mechanical plethora.
Life is beautiful in its unpredictability,
Yet we are forced to follow the functionality.

Life is a gift to be cheered and relished,
Every moment to be lived, loved and cherished.
Open your eyes to this miracle, Newbie!
Don't be late as life has no CTRL+Z!

—Mrs. Samruddhi S. Kotibhaskar (Asst. Prof. [BSc.IT])

Welcome to Programming

My first program was Hello World!

After watching the output I was on top of my world

C was the programming language that was used

But now during programming my brain gets fused!

That first program didn't have any error

But now whenever I start typing I fear

Whether it's Python, Java, C++ or C

They are the only things that I get to see

Python is love, Java is fun

C and C++ are the base

In your IT life

You all will have to face

Programming has taught me many things

Like you can't fly in sky without wings

Similarly to do a complex task you need to import header files

Otherwise you have to write a code of thousand lines

Years changed, friends remained the same

Missing a semicolon now feels lame

Keyboard shortcuts are now my mates

Loosing the hope while programming is now not on my fate

Programming seems to look hard

But to be successful there is a card

Do practice single program everyday

I am sure that will make your day!

Me:
I am good in C language.

Interviewer:
Then write "Hello World" using C.

Me:

--Rahul Mahtolia (SYIT)

Isn't It Amazing!!

Isn't it amazing!
A day without WhatsApp,
Could feel like forever.

Isn't it amazing!
How a video on YouTube,
Could fill us with joy.

Isn't it amazing!
How a comment on our post,
Could make us anxious,

Isn't it amazing!
How internet has made,
The world so small.

Isn't it amazing!
How our smartphones,
Could make us happy,
When real people are out there.

Isn't it amazing!
That now I wonder,
Is it really that amazing!

-Gulzar Nizar (SYIT)

Smartphone

I am smart and I am small
Yet you fear when I fall
I have camera you got eyes
Difference is that I don't lie

Everyone depends on me
Whether it's he or she
Games and videos I can play
Whether it's night or a day
Remembering the lyrics is the quality you lack
Don't worry I got a headphone jack

Remember that I am just a tool
Developed by humans to do things cool
Using me up to a limit sounds cool
But after that you are just becoming a fool!

Recollect those days when you went to play
When I was not there to drag you away
Everything you captured was in your eyes
There were no batteries to die
Your life was full of disease-proof
And your grandparents are the proof

There is a life without me
Enjoy that life it's my plea!
Don't be dependent completely on me
It's the advice that I can give
Your minds are shrinking, habits are changing
Whether I am boon or bane? It is the only question that
I am asking!

--Rahul Mahtolia (SYIT)

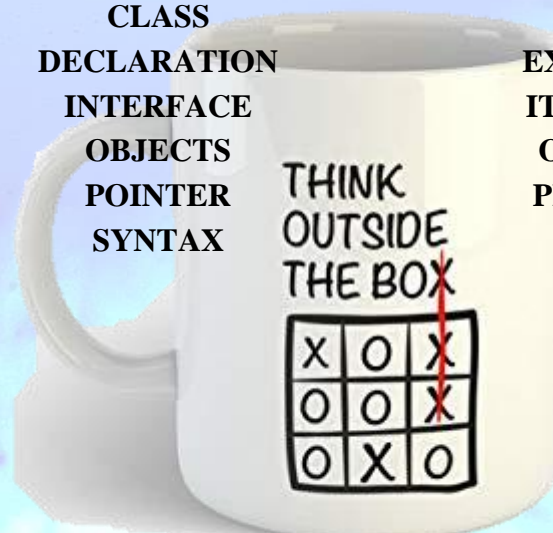# CROSSWORD

```
S  K  B  A  O  P  E  R  A  N  D  S  P  W  N
S  T  R  U  L  Y  A  R  R  A  N  R  W  P  O
N  Y  C  O  G  G  C  G  T  M  W  P  X  S  I
K  E  N  E  W  N  O  I  T  P  E  C  X  E  T
S  R  K  T  J  E  H  R  I  E  W  I  V  A
N  C  U  O  A  B  M  L  I  X  B  C  N  A  R
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C  I  H  P  T  L  A  U  S  K  Y  E  E  J  C
I  O  V  S  I  M  N  S  N  A  E  L  O  O  B
I  P  E  G  A  K  C  A  P  H  P  A  O  R  M
```

ALGORITHM	API	ARGUMENT
ARRAY	ASCII	BOOLEAN
BUG	CLASS	CODE
CONSTANTS	DECLARATION	EXCEPTION
FRAMEWORK	INTERFACE	ITERATION
NULL	OBJECTS	OPERAND
PACKAGE	POINTER	PROGRAM
RUNTIME	SYNTAX	TOKEN

THINK OUTSIDE THE BOX

NETWORK CROSSWORD

Complete the crossword puzzle below
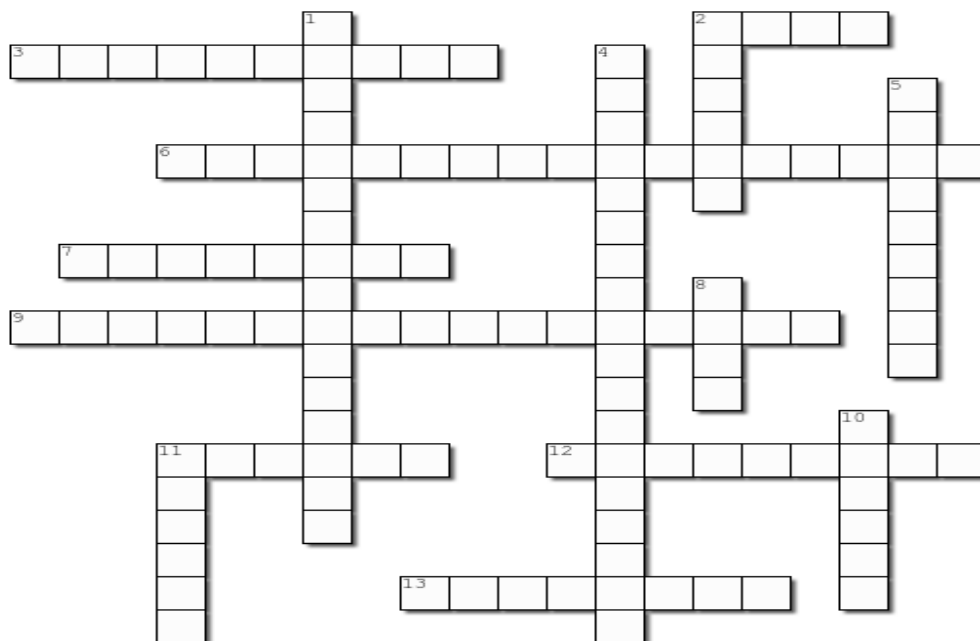
Across

2. A hole or connection found on the front or back of a computer.
3. A command which can show you the path a packet of information takes from your computer to one you specify.
6. 'DMZ' stands for?
7. A network security system that monitors and controls incoming and outgoing network traffic based on security rules
9. 'ILL' stands for ?
11. A multiport network bridge that uses media access control addresses to forward data at the data link layer (layer 2)
12. The IPv4 address 127.0.0.1 or the IPv6 address ::1 is also known as ?
13. A set of rules

Down

1. 'DNS' stands for?
2. The combination of the headers used to carry the payload or message from the original source to the final destination
4. 'MAC' stands for?
5. The amount of data that can be transmitted in a fixed amount of time.
8. A command usually used as a simple way to verify that a computer can communicate over the network with another computer
10. A networking device that forwards data packets between computer networks
11. A logical subdivision of an IP network

CROSSWORD PUZZLE BY: VIPUL HEMANT PATIL

1	2	3	4	5	6	7	8	9	10	11 A	12	13
14	15 L	16	17	18 R	19	20	21	22	23	24	25	26

Coaster: YOU DON'T KNOW WHAT YOU HAVE... UNTIL IT'S GONE

Mug: PEOPLE think it's MAGIC we call it ENGINEERING

NETWORK CROSSWORD
Complete the crossword puzzle below

Across
2. The combination of the headers used to carry the payload or message from the original source to the final destination (packet)
5. A multiport network bridge that uses media access control addresses to forward data at the data link layer (layer 2) (switch)
6. A command usually used as a simple way to verify that a computer can communicate over the network with another computer (ping)
7. A network security system that monitors and controls incoming and outgoing network traffic based on security rules (firewall)
9. A set of rules (protocol)
10. 'DNS' stands for? (domainnamesystem)
11. The IPv4 address 127.0.0.1 or the IPv6 address ::1 is also known as ? (localhost)
14. 'TTL' stands for ? (timetolive)

Down
1. 'MAC' stands for? (mediaaccesscontrol)
3. 'DMZ' stands for? (demilitarizedzone)
4. The amount of data that can be transmitted in a fixed amount of time. (bandwidth)
6. A hole or connection found on the front or back of a computer. (port)
8. A command which can show you the path a packet of information takes from your computer to one you specify. (traceroute)
12. A networking device that forwards data packets between computer networks (router)
13. A logical subdivision of an IP network (subnet)

CROSSWORD PUZZLE BY : VIPUL HEMANT PATIL

Peek In Activities

Swapnil Patil
SYIT

Grace Chacko
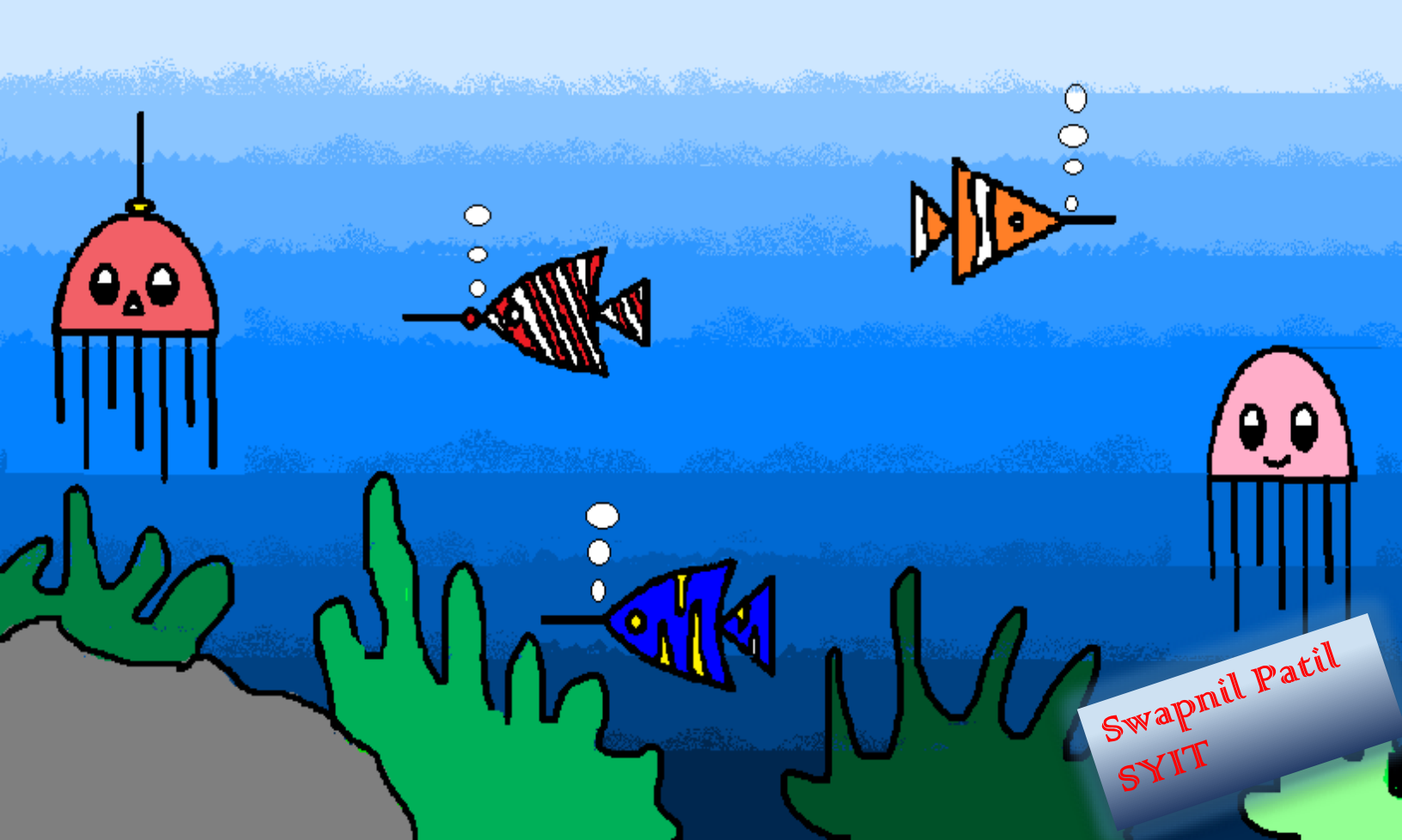TYIT

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