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ROBOTIC PROCESS AUTOMATION (RPA)

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INTRODUCTION:

Robotic process automation (or RPA) is a form of business process automation technology based on metaphorical software robots (bots) or artificial intelligence (AI) workers. These software bots can interact with an in-house application, website, user portal, etc. The RPA is a software program which runs on an end user's pc, laptop or mobile device. It is a sequence of commands which are executed by Bots under some defined set of business rules. In RPA systems develop the action list by watching the user perform that task in the application's graphical user interface (GUI), and then perform the automation by repeating those tasks directly in the GUI. RPA tools have strong technical similarities to graphical user interface testing tools. Many RPA tools come with an AI engine can process information like a human

HISTORY:

In traditional workflow automation tools, a software developer produces a list of actions to automate a task and interface to the back-end system using internal application programming interfaces (APIs) or dedicated scripting language. RPA is made up of a number of technologies, brought together under one toolkit to be deployed as and when needed for different automation purposes. The 90s also saw the emergence of technology which most closely resembles RPA. It was in this decade that workflow automation tools were released and AI emerged in its infancy; all of which paved the way for Robotic Process Automation. By the early 2000s simple RPA was developed, it remained relatively unknown for some time, it wasn't until 2015 when RPA began to enter the mainstream. The basic RPA versions released in the early noughties were useful for automating repetitive tasks, however it had its limits and so-called cognitive RPA was considered to be inevitable evolution of the tech. Cognitive RPA allows for better optical character recognition (OCR), natural language processing (NLP) and machine learning to handle semi-structured and unstructured data, expanding the efficiencies of RPA to a wider range of enterprise activities. This is the RPA we know today.

FEATURES OF RPA:

- Computer-coded software
- Programs imitating human interaction with applications
- Cross-functional application
- Virtual workforce controlled by business operations
- Agile and non-invasive, works with existing IT architecture and governance

- Actionable Intelligence
- Optical Character Recognition (OCR)
- Seamless Integration
- Hosting and Deployment Option

Common Features of RPA software:

1. **Rich-analytical Suite**-RPA software comes with a rich-analytical suite that discovers the performance of the robot workforce. Most enterprise level RPA monitors and manages automated functions from a central console. This console can be accessed from anywhere and offer basic metrics on robots, servers, workflows, and more. The detailed operation analysis not only enables the users to track the operations and determine issues but it supports with streamlining future workloads. This solution of RPA requires no integration since everything is inbuilt and all set right out of the box.
2. **Simple Bot Creation Interface**-RPA tools allow creating bots quickly and effortlessly by capturing mouse click and keystrokes with built-in screen recorder components. Many RPA products include the option to create and edit bots manually using the Task Editor.
3. **Rules-based Exception Handling**-RPA system supports deployments with rules-based exception handling. This feature handles the exception in a proactive manner. Just consider a robot reports an exception, and then the following actions are triggered:
 - I. The server re-assigns the same process to another bot for retry as well as remove the 1st bot from production.
 - II. In case the retry is successful, the server maintains the reassignment and raises a level 2 alert to report exception & resolution.
 - III. If the retry is unsuccessful, it stops the 2ndbot and raises a level 1 alert to report exception as well as failed resolution.

ADVANTAGES:

- 1) Large numbers of the process can easily have automated.
- 2) Cost are reduced significantly as the RPA takes care of repetitive task and saves precious time and resources.
- 3) The robotic software can rapidly model and deploy the automation process.
- 4) The defects are tracked for each test case story and the sprint.
- 5) Effective, seamless Build & Release Management
- 6) Real time visibility into bug/defect discovery
- 7) Software robots do not get tired. It increases which helps to increase the scalability.
- 8) Programming skills are not needed to configure a software robot. Thus, any non-technical staff can set up a bot or even record their steps to automate the process.

- 9) Robotic process automation support and allows all regular compliance process, with error-free auditing
- 10) There is no human business which means there is no need for time for the requirement of training.

DISADVANTAGES:

- 1) The bot is limited to the speed of the application
- 2) Even small changes made in the automation application will need the robots to be reconfigured.

CONCLUSION:

The main goal of Robotics process automation process to replace repetitive and boring clerical task performed by humans, with a virtual workforce. The average productivity of human is 60% with few errors as compared to Robot's productivity which is 100% without any error. There is multiple overlaps between a Test Automation Tool and RPA tool. RPA is used in wide range of industries like Healthcare, Insurance, Banking, IT etc.

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DIGITAL ETHICS AND PRIVACY

AMTUL HASEEBA (182MCA49)

INTRODUCTION:

Digital ethics and privacy is a growing concern for individuals, organizations and governments. People are increasingly concerned about how their personal information is being used by organizations in both the public and private sector, and the backlash will only increase for organizations that are not proactively addressing these concerns.

Digital ethics and privacy emerge as top tech trend to prepare for in **2019**.

Digital Ethics refers to the study of the implication of technology on the social, political, and moral space of society.

Digital privacy can be defined as the state when we can use the **internet** and connected devices without compromising our information. **Digital privacy** then, is when the information available online about a given person is within his or her comfort zone.

FUNCTIONS:

- **The main part of Digital Ethics focuses** on how the communication online should be, how corporations should responsibly behave, how companies should treat their users and how the users/clients interact back, in commerce related activity and any other subject online.
- As technology advances, people's privacy is more at stake. As a result, organizations, both in the public and private sector, must take the necessary precautions to ensure that people's personal information is protected by making digital ethics and privacy a top priority.
- **Digital ethics involves three practices – monitoring, transparency and the fine line.**

Not only should you **monitor** how prospects and customers are visiting your site, but you also need to monitor your own systems for vulnerabilities. A large part of meeting compliance involves **transparency**. You need to ensure that the data you're tracking doesn't violate the privacy of the customer. Finding that middle ground or **fine line**. There's a fine line between being helpful with personalization and

algorithms and being creepy. Always make sure your processes are on the cautious side of that line.

CONCLUSION

- In **conclusion**, the **Internet** has been a wonderful technological invention but with this invention comes issues such as **privacy** when using the **Internet**. However with the lack of legislation in controlling **privacy** on the **Internet**, people need to be aware of the risks of putting personal information out on the **Internet**.
- There is a continuous need for regular updating of data privacy legislation to meet the changing information technology environment privacy concerns.
- Governments should take the primary role in ensuring current legislation can tackle new and existing information security concerns.

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MOBILE COMPUTING

SWATHI.A.S (18MCA21)

Mobile computing is a technology that allows transmission of data, voice, and video via computer or any other wireless enabled devices without having to be connected to a fixed physical link. The importance of mobile computing is connectivity, we can stay connected to all the sources all the times with the help of network and social media to interact with the people all the times.

The main concept involves mobile communication, mobile hardware and mobile software.

- **Mobile communication**: It refers to the infrastructure where reliable communication carries on. This includes protocol, services, bandwidth for the stated devices capable of sending and receiving signals to establish communication.
- **Mobile hardware**: They include mobile devices and components range from smart laptops to digital assistants. This devices will have a receptor medium which is capable of sending and receiving signals. In most cases it is wireless network.
- **Mobile software**: It is the actual program that runs on the mobile hardware, it deals with the characteristics and requirements of mobile applications.

When using mix of networks such as Wi-Fi so on, a mobile virtual private network handles security concerns and multiple network logins that keeps the application connection alive during the data transmission in the network.

Features:

- **Portability**: The devices can move freely with independent of the environment and can be accessed anywhere.
- **Connectivity**: Ability to stay connected with the connected devices all the time with the help of network.
- **Social interactivity**: With the help of connectivity, there exists the interaction between people and stay connected all the time with the help of network.

Advantages: entertainment, easy to research, social interactivity, cloud services.

Disadvantages: security, power consumption, cost, quality of connectivity.

Application:

- Used in online services such as Ola, food booking, movie ticket booking so on.
- Used in hospitals, banks and all the areas.
- For estate agents, stock exchange and so on.
- To say that mobile communication is used widely all the places.

Conclusion:

Mobile. Computing is a platform where all human resources can be interacted with the devices and shared. The main aim is to transport the data with the help of network and interactivity between people. It's used in almost all the services in today's world. So it is very important and useful in our daily lives and corporate world where research can be done.

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MOBILE AGENTS

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Introduction:

Mobile agents are programs that can move through a network under their own control, migrating from host to host and interacting with other agents and resources on each. These mobile, autonomous agents have the potential to provide a convenient, efficient and robust programming paradigm for distributed applications, particularly when partially connected computers are involved. Partially connected computers include mobile computers such as laptops and personal digital assistants as well as in modem-connected home computers, all of which are often disconnected from the network.

Developing distributed applications that make effective use of networked resources from a mobile platform, however, is difficult for several reasons. First, mobile computers do not have a permanent connection into the network and are often disconnected for long periods of time. Second, when the computer is connected, the connection often has low bandwidth and high latency and is prone to sudden failure, such as when a physical obstruction blocks the signal from a cellular modem. Third, since the computer may be forced to use different transmission channels depending on its physical location, the performance of its network connection can vary dramatically from one session to another. Finally, depending on the nature of the transmission channel, the computer might be assigned a different network address each time that it connects.

Why mobile agents?

Mobile Agents are an effective paradigm for distributed applications and are particularly attractive for partially connected computing. Partially connected devices include physically mobile computers such as laptops and personal digital assistants as well as home and business computers that are occasionally connected to the network over a SLIP or PPP modem connection. All of these devices are frequently disconnected from the network for long periods of time, often have low-bandwidth, unreliable connections into the network, and often change their network address with each reconnection. Mobile agents directly address the first two problems, and with low-level support, can handle the third problem without difficulty.

Applications of mobile agents

Mobile agents are not an enabling technology since there are few applications that are not possible without mobile Agents. However, the advantages of mobile agents lead to improved performance in many distributed applications, where performance is a matter of network utilization, completion time, programmer convenience, or just the ability to continue interacting with a user during network disconnection. Mobile agents are best viewed as a general tool for realizing arbitrary distributed applications. This view is reflected in the range of applications in which mobile agents are used.

True mobile-agent systems include Telescript, Tacoma, Mobile service Agents (MSA), and our own Agent Tcl. Telescript agents are currently used for network management, active e-mail, electronic commerce, and business process management. In network management, a Telescript agent might carry a software upgrade onto a machine along with the code to perform the installation; the agent executes the installation code and disappears. In electronic commerce, a Mobile Service Agents (MSA) have been used primarily in "follow-me" computing in which an application moves to the location of the user. One MSA demo involves an electronic conference proceedings Agent Tcl has been used primarily in information-retrieval applications. One information-retrieval application involves searching distributed collections of technical reports; another, medical records; and a third, three dimensional drawings of mechanical parts.

Conclusions:

We have constructed a system for supporting mobile computing with mobile agents. Mobile agents allow a range of adaptive, flexible applications in distributed heterogeneous systems with 11011- permanent network connections. Describe our experiences with using this system and identify a few operating-system extensions that would enable efficient, reliable, and simple mobile computing support through mobile agents.

Reference:

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DIGITAL WALLET APPS

TKPS.PRAGNA VALLIKA (182MCA29)

INTRODUCTION:

A digital wallet (or e-wallet) is a software-based system that securely stores users' payment information and passwords for numerous payment methods and websites. By using a digital wallet, users can complete purchases easily and quickly with near-field communications technology. They can also create stronger passwords without worrying about whether they will be able to remember them later. Digital wallets can be used in conjunction with mobile payment systems, which allow customers to pay for purchases with their smartphones. A digital wallet can also be used to store loyalty card information and digital coupons.

KEY TAKEAWAYS:

- Digital wallets are financial accounts that allow users to store funds, make transactions, and track payment histories by computer.
- These pieces of software may be included in a bank's mobile app, or as a payments platform like PayPal or Alipay.
- Digital wallets are also the main interface for using cryptocurrencies such as Bitcoin.

FEATURES:

- **Wallet Top up/ Add Money:** The user can add money to the wallet from the respective integrated bank. That amount of money will be reflected in the wallet after adding.
- **Send Money:** The user will be able to transfer the money in various ways. This transfer amount activity will take some specific information about a receiver.
- **Receive Payment:** A user can receive payments from the users associated with the application.

- **Pay Bills:** This app will allow the user to pay the various bills using a high functionality the app will be able to fetch the bill details associated with a number.
- **Scan to Pay:** Each registered user will assign a QR code to scan and pay to the receiver.

TYPES OF DIGITAL APPS:

- Apple Pay
- Samsung Pay
- Google Pay
- PayPal
- Mastercard Pay Pass Wallet
- V.me by Visa
- Lemon Wallet

Pros:

Smarter than your regular wallet. Digital Wallets can provide a better experience for you, as well as help you organize your finances. You can also keep coupons without bulking up your wallet.

Easily manageable. Manage both your notes, coins, forms of ID and any other cards by having it all in one place. It's also easier to evocate all your lost items if you ever lose your wallet and you can reduce the chance of theft as you need to only worry about one item.

Cons:

New technology. In the present, digital technologies are still misunderstood and haven't reached a critical mass among consumers. This means that not every merchant will have contactless payment methods, which means that you cannot use your Digital Wallet everywhere you go.

CONCLUSION:

Digital wallets are designed to be accurate when transferring data to retail checkout forms; however, if a particular e-commerce site has a peculiar checkout system, the digital wallet may fail to properly recognize the form's fields

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HUMAN AUGMENTATION

SUMALATHA.M (18MCA20)

Human augmentation is also known as Human enhancement. It can be described as the natural, artificial, or technological alteration of the human body in order to enhance physical or mental capabilities. This basically focuses on creating cognitive and physical improvements in the human body. Human augmentation aims to bring improvements to the human condition to move beyond a state of mere good health.

Human enhancements are improvements of human traits which include mental and physical attributes and abilities and behavioral dispositions.

The various types of enhancements by human traits are as follows:

1. Physical enhancement
2. Cognitive enhancement
3. Personality enhancement
4. Cosmetic enhancement

PHYSICAL ENHANCEMENT:

Enhancements of human physical capacities, which are for physical action and for the maintenance of a good physical condition. Machines work alongside humans to give them the strength, stamina and precision of a machine, protect them from accident and injury, compensate for their disabilities and old age, help them recover from infirmities, teach them to be more efficient.

COGNITIVE ENHANCEMENT:

Enhancements of human perceptual and cognitive capacities. They enhance human abilities for sensory perception, memory, decision making, thought and imagination. Cognitive stimulants enhance either by increasing the amount of neuron activity or by releasing neuro-modulator. They have enhancers like stimulants, modafinil, beta-blockers.

PERSONALITY & COSMETIC ENHANCEMENT:

Enhancements of mood, personality traits, and (social) behavioral tendencies, such as tendencies to have positive moods, to have greater confidence, or to be more sympathetic. The CASIE (computer assisted social interaction enhancers) by dues EX serves to make most conversations a bit easier, and adds a bit of replay value to the game thanks to its unique dialogue options.

Cosmetic enhancements include aesthetic enhancements of the features of the body. Existing cosmetic enhancements include surgery procedures like eyelid, breast surgery with a focus on visual appeal & beauty.

IMPACT OF HUMAN AUGMENTATION:

- Human enhancement does not only affect ontogenetic identity, it also affects bodily identity & social identity.
- Contemporary western societies are nearly all characterized by a market economy, a consumer culture and a liberal system of government.
- A liberal attitude towards enhancements would require that they are safe for the user and that they are not likely to do harm to others when used properly.
- The major companies involved in the human augmentation market such as B-Temia Inc.(U.S), BrainGate Company(U.S), Ekso Bionics Holding, Google and Raytheon, Samsung and Vuzix

FUTURE PROJECTS:

1. Bionics and prosthetics. (This is the form of human augmentation that is already being tested out for a small number of special users).
2. Brain – computer interfaces.
3. Neurotechnology.
4. Nootropics.
5. Gene editing.

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AUTONOMOUS DRIVING

MEGHANA R (182MCA32)

INTRODUCTION:

Driving us all have heard about companies like Tesla, Alphabet, and Waymo, and the one thing that is common among them is their aim, which is to craft impeccable autonomous vehicles. The idea of a driverless car in itself generates a considerable amount of excitement.

Tesla chief Elon Musk already has the future design of autonomous vehicles and aims to go big in this industry.

HISTORY OF AUTONOMOUS DRIVING:

Experiments have been conducted on automated driving systems (ADS) since at least the 1920s; [9] trials began in the 1950s.

A landmark autonomous car appeared in the 1980s.

The (STRIP) Roadmap for Connected and Automated Transport was published in 2019.

In 2020, a National Transportation Safety Board chairman clarified there is no self-driving car in the US in 2020.

FEATURES:

Adaptive Cruise Control

Automatic Forward-Collision Braking Automatic Parking

Autopilot

Lane-Keep Assist

Sign Recognition

Steering Assist

Advantages

1. Decreased the number of accidents
2. Lessens traffic jams
3. Stress-free parking
4. Time-saving vehicle
5. Accessibility to transportation

Disadvantages

1. Expensive
2. Safety and security concerns
3. Prone to Hacking
4. Fewer job opportunities for others

CONCLUSION:

There is still time for the modulation of the laws for autonomous driving by legislators, regulators, and authorities. Over that, significant tweaks will be required in the existing infrastructure, laws and social attitudes before we can embrace autonomous vehicles in the current technology trends. But all these determinants can't rule out the possibility of autonomous vehicles in 2020.

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SOFTWARE TESTING

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INTRODUCTION

Software testing can be stated as the process of verifying and validating that a software or application is bug free, meets the technical requirements as guided by its design and development and meets the user requirements effectively and efficiently with handling all the exceptional and boundary cases.

The process of software testing aims not only at finding faults in the existing software but also at finding measures to improve the software in terms of efficiency, accuracy and usability. It mainly aims at measuring specification, functionality and performance of a software program or application.

Software testing can be divided into two steps:

1. **Verification:** it refers to the set of tasks that ensure that software correctly implements a specific function.
2. **Validation:** it refers to a different set of tasks that ensure that the software that has been built is traceable to customer requirements.

Different types of software testing

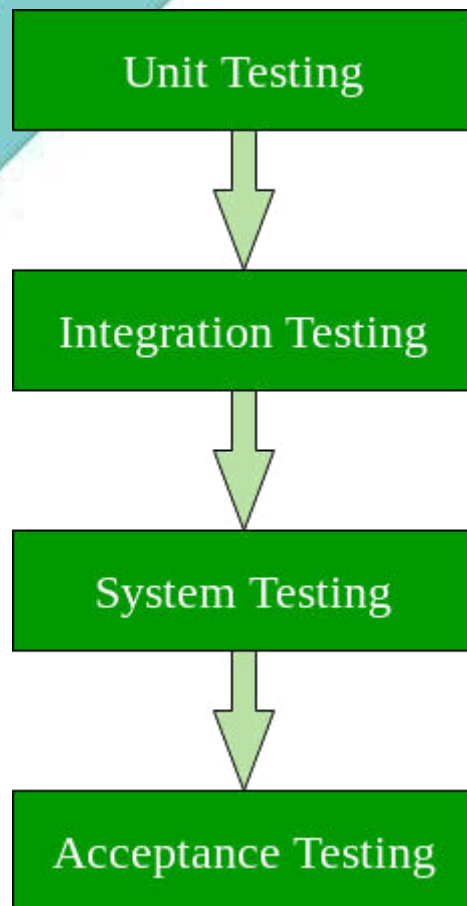
1. **Manual Testing:** Manual testing includes testing a software manually, i.e., without using any automated tool or any script. In this type, the tester takes over the role of an end-user and tests the software to identify any unexpected behaviour or bug. There are different stages for manual testing such as unit testing, integration testing, system testing, and user acceptance testing.
Testers use test plans, test cases, or test scenarios to test a software to ensure the completeness of testing. Manual testing also includes exploratory testing, as testers explore the software to identify errors in it.
2. **Automation Testing:** Automation testing, which is also known as Test Automation, is when the tester writes scripts and uses another software to test the product. This process involves automation of a manual process. Automation Testing is used to re-run the test scenarios that were performed manually, quickly, and repeatedly. Apart from regression testing, automation testing is also used to test the application from load, performance, and stress point of view. It increases the test coverage, improves accuracy, and saves time and money in comparison to manual testing.

Different techniques of Software Testing

1. **Black Box Testing:** The technique of testing in which the tester doesn't have access to the source code of the software and is conducted at the software interface without concerning with the internal logical structure of the software is known as black box testing.
2. **White-Box Testing:** The technique of testing in which the tester is aware of the internal workings of the product, have access to its source code and is conducted by making sure that all internal operations are performed according to the specifications is known as white box testing.

Different levels of software testing

- **Unit Testing:** A level of the software testing process where individual units/components of a software/system are tested. The purpose is to validate that each unit of the software performs as designed.
- **Integration Testing:** A level of the software testing process where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units.
- **System Testing:** A level of the software testing process where a complete, integrated system/software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements.
- **Acceptance Testing:** A level of the software testing process where a system is tested for acceptability. The purpose of this test is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery.



Why is Software Testing Important?

Software testing is very important because of the following reasons:

1. Software testing is really required to point out the defects and errors that were made during the development phases.
 - Example: Programmers may make a mistake during the implementation of the software. There could be many reasons for this like lack of experience of the programmer, lack of knowledge of the programming language, insufficient experience in the domain, incorrect implementation of the algorithm due to complex logic or simply human error.
2. It's essential since it makes sure that the customer finds the organization reliable and their satisfaction in the application is maintained.
 - If the customer does not find the testing organization reliable or is not satisfied with the quality of the deliverable, then they may switch to a competitor organization.

- Sometimes contracts may also include monetary penalties with respect to the timeline and quality of the product. In such cases, if proper software testing may also prevent monetary losses.
3. It is very important to ensure the Quality of the product. Quality product delivered to the customers helps in gaining their confidence. (Know more about Software Quality)
 - As explained in the previous point, delivering good quality product on time builds the customer's confidence in the team and the organization.
 4. Testing is necessary in order to provide the facilities to the customers like the delivery of high-quality product or software application which requires lower maintenance cost and hence results into more accurate, consistent and reliable results.
 - High quality product typically has fewer defects and requires lesser maintenance effort, which in turn means reduced costs.
 5. Testing is required for an effective performance of software application or product.
 6. It's important to ensure that the application should not result into any failures because it can be very expensive in the future or in the later stages of the development.
 - Proper testing ensures that bugs and issues are detected early in the life cycle of the product or application.
 - If defects related to requirements or design are detected late in the life cycle, it can be very expensive to fix them since this might require redesign, re-implementation and retesting of the application.
 7. It's required to stay in the business.
 - Users are not inclined to use software that has bugs. They may not adopt a software if they are not happy with the stability of the application.
 - In case of a product organization or start-up which has only one product, poor quality of software may result in lack of adoption of the product and this may result in losses which the business may not recover from.

CONCLUSION:

Software testing is an important part of the software development process. It is not a single activity that takes place after code implementation, but is part of each stage of the lifecycle. A successful test strategy will begin with consideration during requirements specification.

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SOFTWARE DEVELOPMENT

CHITHRA.N (18MCA07)

Software development is the process of conceiving, specifying, designing, programming, documenting, testing, and bug fixing involved in creating and maintaining applications, frameworks, or other software components.

Software development is a process of writing and maintaining the source code, but in a broader sense, it includes all that is involved between the conception of the desired software through to the final manifestation of the software, sometimes in a planned and structured process. Therefore, software development may include research, new development, prototyping, modification, reuse, re-engineering, maintenance, or any other activities that result in software products.

Most methodologies share some combination of the following stages of software development:

- Analysing the problem
- Market research
- Gathering requirements for the proposed business solution
- Devising a plan or design for the software-based solution
- Implementation (coding) of the software
- Testing the software
- Deployment
- Maintenance and bug fixing

Software Development tools in the following categories:

- Recommended Tool
- IDE (Integrated Development Environment)
- Frameworks
- Cloud Tools
- Data Science
- Source Control
- Prototyping
- DevOps
- Notifications
- UML

Different Types of Software Development:

- a. Web Development
- b. Mobile development
- c. Data science
- d. Application Development
- e. Back-end Development

Conclusion:

A software development process (also known as a software development methodology, model, or life cycle) is a framework that is used to structure, plan, and control the process of developing information systems. A wide variety of such frameworks has evolved over the years, each with its own recognized strengths and weaknesses.

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VIRTUAL REALITY (VR)

VIJAYALAKSHMI.S (182MCA53)

INTRODUCTION:

Virtual reality is a simulated experience that can be similar to or completely different from the real world. Applications of virtual reality can include entertainment (video games) and educational purposes (medical or military training).

Currently standard virtual reality systems use either virtual reality headsets or multi-projected environments to generate realistic images, sounds and other sensations that simulate a user's physical presence in a virtual environment. A person using virtual reality equipment is able to look around the artificial world, move around in it, and interact with virtual features or items. The effect is commonly created by VR headsets consisting of a head-mounted display with a small screen in front of the eyes, but can also be created through specially designed rooms with multiple large screens. Virtual reality typically incorporates auditory and video feedback, but may also allow other types of sensory and force feedback through haptic technology.

HISTORY:

- 1950: "Experience Theatre" that could encompass all the senses in an effective manner (onscreen activity) by Morton Heilig.
- 1962: Morton Heilig built a prototype of his vision dubbed the Sensorama was a mechanical device along with five short films to be displayed in it while engaging multiple senses (sight, sound, smell, and touch). Predating digital computing.
- 1970-1990: The virtual reality industry mainly provided VR devices for medical, flight simulation, automobile industry design, and military training purposes.
- 1990-2000: The 1990s saw the first widespread commercial releases of consumer headsets. In 1992, for instance computer gaming world predicted "affordable VR by 1994".
1991: Virtuality launched and went on to become the first mass-produced, networked, multiplayer VR entertainment system.
- 2000: were a period of relative public and investment indifference to commercially available VR technologies.
- 2012: The Rift is presented for the first time at the E3 video game trade show by Carmack.
- 2014: Facebook purchased Oculus VR for what at the time was stated as \$3 billion dollar.
- 2014: Sony announced Project Morpheus a virtual reality headset for the PlayStation 4 video game console.
- 2016: there were at least 230 companies developing VR-related products. Amazon, Apple, Facebook, Google, Microsoft, Sony and Samsung all had dedicated AR and VR groups. Dynamic binaural audio was common to most headsets released that year.
- 2016: HTC shipped its first units of the HTC Vive SteamVR headset. This marked the first major commercial release of sensor-based tracking.

FEATURES OF VIRTUAL REALITY:

1. To Promote Travel and Tourism: to travel the whole world, it is not possible as we don't have that much time and money. Although with the help of virtual reality we will be able to walk in the streets of Vegas and even visit any tropical island with virtual reality gears. Now you can check the interiors of any hotels and visit every room as several hotels are now running virtual reality campaigns to attract travelers from all over the world.

2. **In Healthcare Facilities:** The best use of virtual reality is in healthcare facilities as they can now create 3D virtual models with the help of virtual reality software and combine diagnostic images of CAT scans and ultrasounds to help surgeons in their surgical incisions. After referring the 3D virtual model's surgeons can decide the best location and prepare themselves for surgery of patients.

3. **In Military Training:** virtual reality technology is also popular in the US military as they provide training to newly recruited soldiers before their postings. In the virtual world, soldiers try to learn the basics of teamwork in emergency situations and even after creating realistic environment US military officers prepare soldiers for dangerous wars and even train them to survive in crucial situations.

4. **In Space Projects:** Right now US government is using virtual reality in their several projects which includes NASA as well; NASA is using virtual technology to associate their engineers with all the equipment and devices they are sending in space. With the help of Oculus and Xbox one gaming console 'motion-sensing devices, NASA is controlling their robotic devices in space.

TYPES OF VIRTUAL REALITY

1. Non-immersive reality
2. Fully-immersive reality
3. Augmented reality
4. Collaborative reality
5. Web based reality

CONCLUSION:

Basically, in the virtual world, you can simply experience those things which actually don't exist in front of your eyes, with the help of VR devices and computer applications, it is an imaginary world just like when we close our eyes and imagine things and our imagination creates an environment which doesn't prevail in reality. There are hundreds of examples and you need to believe that you're right there on the place which you're experiencing VR gadget in front of your eyes which creates the illusion of virtual reality for us.

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DRONES

BRUNDA V (18MCA35)

INTRODUCTION:

An unmanned aerial vehicle (UAV) (or uncrewed aerial vehicle commonly known as a Drone)

Drone an aircraft without a human pilot on board and a type of unmanned vehicle. UAVs are a component



of an unmanned aircraft system (UAS); which include a UAV, a ground-based controller, and a system of communications between the two. The flight of UAVs may operate with various degrees of autonomy: either under remote control by a human operator or autonomously by onboard computers.

Compared to crewed aircraft, UAVs were originally used for missions too "dull, dirty or dangerous"^[4] for humans. While they originated mostly in military applications, their use is rapidly expanding to commercial, scientific, recreational, agricultural, and other applications,^[5] such as policing and surveillance, product deliveries, aerial photography, infrastructure inspections, smuggling,^[6] and drone racing. Civilian UAVs now vastly outnumber military UAVs, with estimates of over a million sold by 2015.

Drones are helping to transform certain verticals, giving an edge over competitors and offering a technologically powered physical connection between businesses and end users. The remote capabilities of drones coupled with AI applications are transforming business in the industrial, public safety, construction, and insurance sectors, just to name a few.

Terminology:

Multiple terms are used for unmanned aerial vehicles, which generally refer to the same concept.

The term **drone**, more widely used by the public, was coined in reference to the early remotely-flown target aircraft used for practice firing of a battleship's guns, and the term was first used with the 1920s Fairey Queen and 1930's de Havilland Queen Bee target aircraft. These two were followed in service by the similarly-named Airspeed Queen Wasp and Miles Queen Martinet, before ultimate replacement by the GAF Jindivik.

The term *unmanned aircraft system (UAS)* was adopted by the United States Department of Defense (DoD) and the United States Federal Aviation Administration in 2005 according to their Unmanned Aircraft System Roadmap 2005–2030. The International Civil Aviation Organization (ICAO) and the British Civil Aviation Authority adopted this term, also used in the European Union's Single-European-Sky (SES) Air-Traffic-Management (ATM) Research (SESAR Joint Undertaking) roadmap for 2020.^[9] This term emphasizes the importance of elements other than the aircraft. It includes elements such as ground control stations, data links and other support equipment. A similar term is an *unmanned-aircraft vehicle system (UAVS)*, *remotely piloted aerial vehicle (RPAV)*, *remotely piloted aircraft system (RPAS)*.^[10] Many similar terms are in use.

Classification

UAVs typically fall into one of six functional categories (although multi-role airframe platforms are becoming more prevalent):

- Target and decoy – providing ground and aerial gunnery a target that simulates an enemy aircraft or missile
- Reconnaissance – providing battlefield intelligence
- Combat – providing attack capability for high-risk missions (see: *Unmanned combat aerial vehicle (UCAV)*)
- Logistics – delivering cargo
- Research and development – improve UAV technologies
- Civil and commercial UAVs – agriculture, aerial photography, data collection

The U.S. Military UAV tier system is used by military planners to designate the various individual aircraft elements in an overall usage plan.

Vehicles can be categorized in terms of range/altitude. The following has been advanced^[by whom?] as relevant at industry events such as ParcAberporth Unmanned Systems forum:

- Hand-held 2,000 ft (600 m) altitude, about 2 km range
- Close 5,000 ft (1,500 m) altitude, up to 10 km range
- NATO type 10,000 ft (3,000 m) altitude, up to 50 km range
- Tactical 18,000 ft (5,500 m) altitude, about 160 km range
- MALE (medium altitude, long endurance) up to 30,000 ft (9,000 m) and range over 200 km
- HALE (high altitude, long endurance) over 30,000 ft (9,100 m) and indefinite range
- Hypersonic high-speed, supersonic (Mach 1–5) or hypersonic (Mach 5+) 50,000 ft (15,200 m) or suborbital altitude, range over 200 km
- Orbital low earth orbit (Mach 25+)
- CIS Lunar Earth-Moon transfer
- Computer Assisted Carrier Guidance System (CACGS) for UAVs

Other categories include

- Hobbyist UAVs – which can be further divided into
 - Ready-to-fly (RTF)/Commercial-off-the-shelf (COTS)
 - Bind-and-fly (BNF) – require minimum knowledge to fly the platform
 - Almost-ready-to-fly (ARF)/Do-it-yourself (DIY) – require significant knowledge to get in the air
 - Bare frame – requires significant knowledge and your own parts to get it in the air
- Midsize military and commercial UAVs
- Large military-specific UAVs

UAV Components:

Crewed and uncrewed aircraft of the same type generally have recognizably similar physical components. The main exceptions are the cockpit and environmental control system or life support systems. Some UAVs carry payloads (such as a camera) that weigh considerably less than an adult human, and as a result can be considerably smaller. Though they carry heavy payloads, weaponized military UAVs are lighter than their crewed counterparts with comparable armaments.

Small civilian UAVs have no life-critical systems, and can thus be built out of lighter but less sturdy materials and shapes, and can use less robustly tested electronic control systems. For small UAVs, the quadcopter design has become popular, though this layout is rarely used for crewed aircraft. Miniaturization means that less-powerful propulsion technologies can be used that are not feasible for crewed aircraft, such as small electric motors and batteries.

Control systems for UAVs are often different than crewed craft. For remote human control, a camera and video link almost always replace the cockpit windows; radio-transmitted digital commands replace physical cockpit controls. Autopilot software is used on both crewed and uncrewed aircraft, with varying feature sets.

Body:

The primary difference for planes is the absence of the cockpit area and its windows. Tailless quadcopters are a common form factor for rotary wing UAVs while tailed mono- and bi-copters are common for crewed platforms.^[49]

Power supply and platform:

Small UAVs mostly use lithium-polymer batteries (Li-Po), while larger vehicles rely on conventional airplane engines. Scale or size of aircraft is not the defining or limiting characteristic of energy supply for a UAV. At present,^[when?] the energy density of Li-Po is far less than gasoline. The record of travel for a UAV (built from balsa wood and mylar skin) across the North Atlantic Ocean is held by a gasoline model airplane or UAV. Manard Hill in "in 2003 when one of his creations flew 1,882 miles across the Atlantic Ocean on less than a gallon of fuel" holds this record. See:^[50] Electric power is used as less work is required for a flight and electric motors are quieter. Also, properly designed, the thrust to weight ratio for an electric or gasoline motor driving a propeller can hover or climb vertically. Botmte airplane is an example of an electric UAV which can climb vertically.^[51]

Battery elimination circuitry (BEC) is used to centralize power distribution and often harbors a microcontroller unit (MCU). Costlier switching BECs diminish heating on the platform.

Computing:

UAV computing capability followed the advances of computing technology, beginning with analog controls and evolving into microcontrollers, then system-on-a-chip (SOC) and single-board computers (SBC).

System hardware for small UAVs is often called the flight controller (FC), flight controller board (FCB) or autopilot.

Sensors:

Position and movement sensors give information about the aircraft state. Exteroceptive sensors deal with external information like distance measurements, while exproprioceptive ones correlate internal and external states.

Non-cooperative sensors are able to detect targets autonomously so they are used for separation assurance and collision avoidance.

Degrees of freedom (DOF) refers to both the amount and quality of sensors on board: 6 DOF implies 3-axis gyroscopes and accelerometers (a typical inertial measurement unit – IMU), 9 DOF refers to an IMU plus a compass, 10 DOF adds a barometer and 11 DOF usually adds a GPS receiver.

Actuators:

UAV actuators include digital electronic speed controllers (which control the RPM of the motors) linked to motors/engines and propellers, servomotors (for planes and helicopters mostly), weapons, payload actuators, LEDs and speakers.

Software:

UAV software called the flight stack or autopilot. UAVs are real-time systems that require rapid response to changing sensor data. Examples include Raspberry Pis, Beagleboards, etc. shielded with NavIO, PXFMini, etc. or designed from scratch such as Nuttx, preemptive-RT Linux, Xenomai, OrocOS-Robot Operating System or DDS-ROS 2.0.

Basic principles:

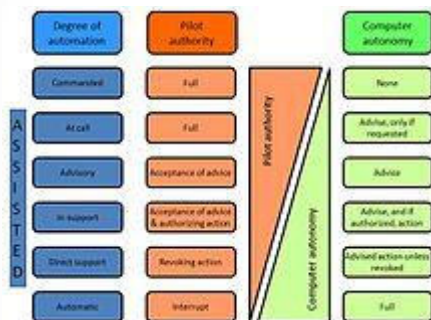
One way to achieve autonomous control employs multiple control-loop layers, as in hierarchical control systems. As of 2016 the low-layer loops (i.e. for flight control) tick as fast as 32,000 times per second, while higher-level loops may cycle once per second. The principle is to decompose the aircraft's behavior into manageable "chunks", or states, with known transitions. Hierarchical control system types range from simple scripts to finite state machines, behavior trees and hierarchical task planners. The most common control mechanism used in these layers is the PID controller which can be used to achieve hover for a quadcopter by using data from the IMU to calculate precise inputs for the electronic speed controllers and motors.

Examples of mid-layer algorithms:

- Path planning: determining an optimal path for vehicle to follow while meeting mission objectives and constraints, such as obstacles or fuel requirements
- Trajectory generation (motion planning): determining control maneuvers to take in order to follow a given path or to go from one location to another^{[68][69]}
- Trajectory regulation: constraining a vehicle within some tolerance to a trajectory

Evolved UAV hierarchical task planners use methods like state tree searches or genetic algorithms.

Autonomy features:



UAV's degrees of autonomy

UAV manufacturers often build in specific autonomous operations, such as:

- Self-level: attitude stabilization on the pitch and roll axes.
- Altitude hold: The aircraft maintains its altitude using barometric or ground sensors.
- Hover/position hold: Keep level pitch and roll, stable yaw heading and altitude while maintaining position using GNSS or inertial sensors.
- Headless mode: Pitch control relative to the position of the pilot rather than relative to the vehicle's axes.
- Care-free: automatic roll and yaw control while moving horizontally
- Take-off and landing (using a variety of aircraft or ground-based sensors and systems; see also:Autoland)
- Failsafe: automatic landing or return-to-home upon loss of control signal
- Return-to-home: Fly back to the point of takeoff (often gaining altitude first to avoid possible intervening obstructions such as trees or buildings).

- Follow-me: Maintain relative position to a moving pilot or other object using GNSS, image recognition or homing beacon.
- GPS waypoint navigation: Using GNSS to navigate to an intermediate location on a travel path.
- Orbit around an object: Similar to Follow-me but continuously circle a target.
- Pre-programmed aerobatics (such as rolls and loops)

Conclusion:

It is obvious that drone technology is an important part of the future of warfare and is set to become a big commercial industry. The fact that drones capabilities pose a threat to the liberties of people around the globe is also apparent. Legislating on drones now is of paramount importance because it sets the necessary limitations to protect rights as drones are used in the future.

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DATA SCIENCE AND ANALYTICS

GAYATHRI K S (182MCA40)

INTRODUCTION:

Data Science has been established as an important emergent scientific field and paradigm driving research evolution in such disciplines as statistics, computing science and intelligence science, and practical transformation in such domains as science, engineering, the public sector, business, social science, and lifestyle. The field encompasses the larger areas of artificial intelligence, data analytics, machine learning, pattern recognition, natural language understanding, and big data manipulation. It also tackles related new scientific challenges,

ranging from data capture, creation, storage, retrieval, sharing, analysis, optimization, and visualization, to integrative analysis across heterogeneous and interdependent complex resources for better decision-making, collaboration, and, ultimately, value creation. The International Journal of Data Science and Analytics (JDSA) brings together thought leaders, researchers, industry practitioners, and potential users of data science and analytics, to develop the field, discuss new trends and opportunities, exchange ideas and practices, and promote transdisciplinary and cross-domain collaborations.

FEATURES OF DATA SCIENCE AND ANALYTICS

- First scientific journal in data science and analytics science
- Publishes original, fundamental and applied research outcomes in data and analytics theories, technologies and applications
- Promotes new scientific and technological approaches to strategic value creation in data-rich applications

TYPES OF DATA SCIENCE AND ANALYTICS

- Descriptive
- Diagnostic
- Predictive
- prescriptive

ADVANTAGES OF DATA SCIENCE AND ANALYTICS

- It's in Demand
- Abundance of Positions
- A Highly Paid Career
- Data Science is Versatile
- Data Science Makes Data Better
- Data Scientists are Highly Prestigious
- No More Boring Tasks

DISADVANTAGES OF DATA SCIENCE AND ANALYTICS

- Data Science is Blurry Term
- Mastering Data Science is near to impossible
- Arbitrary Data May Yield Unexpected Results
- Problem of Data Privacy

CONCLUSION:

After weighing the pros and cons of Data Science we are able to envision the full picture of this field. While Data Science is a field with many lucrative advantages, it also suffers from its disadvantages. Being a less-saturated, high paying field that has revolutionized several walks of life, it also has its own backdrops when considering the immensity of the field and

its cross-disciplinary nature. Data Science is an ever-evolving field that will take years to gain proficiency.

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MACHINE LEARNING

DINAMANI R (182MCA33)

Introduction

Machine learning is an application of artificial intelligence it allows software applications to become accurate in predicting outcomes. Moreover machine learning focuses on the development of computer programs.

The primary aim is to allow the computer learn automatically without human intervention.

History

Machine learning has progressed dramatically over the past two decades from laboratory curiosity to a practical technology in widespread commercial use. Within artificial intelligence, machine learning has emerged as the method of choice for developing practical software for computer vision, speech recognition, natural language processing, robot control and other applications.

Features

Machine learning is one of today's most rapidly growing technical fields, lying at the core of artificial intelligence and data science. Recent progress in machine learning has been driven both by the development of new learning algorithms and theory and by the ongoing explosion in the availability of online data and low-cost computation methods can be found throughout science, technology and commerce, leading to more evidence based decision making across many walks of life, including health care, manufacturing, education, financial modeling, policing and marketing.

Three types of machine learning algorithms:

1. Supervised machine learning algorithms
2. Unsupervised machine learning algorithms
3. Reinforcement machine learning algorithms

Advantages:

- Handling multi-dimensional and multi-variety data
- Supplementing data mining

Limitations:

- Time constraint in learning
- Problems with verification

Conclusion

As a result, we have studied the future of machine learning also study algorithms of machine learning. Along with we have studied its application which will help you to deal with real life.

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USER INTERFACE

AFRAH HASHMI A G (182MCA44)

INTRODUCTION

The user interface (UI) is the point of human-computer interaction and communication in a device. This can include display screens, keyboards, a mouse and the appearance of a desktop. It is also the way through which a user interacts with an application or a website. The growing dependence of many businesses on web

applications and mobile applications has led many companies to place increased priority on UI in an effort to improve the user's overall experience.

HISTORY ABOUT USER INTERFACE

In early computers, there was very little user interface except for a few buttons at an operator's console. Many of these early computers used punched cards, prepared using keypunch machines, as the primary method of input for computer programs and data. While punched cards have been essentially obsolete in computing since 2012, some voting machines still use a punched card system. The user interface evolved with the introduction of the command line interface, which first appeared as a nearly blank display screen with a line for user input. Users relied on a keyboard and a set of commands to navigate exchanges of information with the computer. This command line interface led to one in which menus (lists of choices written in text) predominated.

Finally, the GUI arrived, originating mainly in Xerox's Palo Alto Research Center (PARC), adopted and enhanced by Apple and effectively standardized by Microsoft in its Windows operating systems. Elements of a GUI include such things as windows, pull-down menus, buttons, scroll bars and icons. With the increasing use of multimedia as part of the GUI, sound, voice, motion video and virtual reality are increasingly becoming the GUI for many applications.

The emerging popularity of mobile applications has also affected UI, leading to something called mobile UI. Mobile UI is specifically concerned with creating usable, interactive interfaces on the smaller screens of smartphones and tablets and improving special features, like touch controls.

FEATURES OF GOOD USER INTERFACE

1. **Clear and Simple :** A good user interface provides a clear understanding of what is happening behind the scenes or provides visibility to the functioning of the system. The whole purpose of user interface design is to enable the user to interact with your system by communicating meaning and function.
2. **Creative but familiar:** When the users are familiar with something and know how it behaves, navigation becomes easier. In effect, the user expects to see what is familiar to him or her. It is good to identify things that your users are accustomed to and integrate them into your user interface.
3. **Intuitive and consistent:** The controls and information must be laid out in an intuitive and consistent way for an interface to be easy to use and navigate. It's not good to drastically change the lay out to achieve the changing functionality the business may require from time to time.

4. **Responsive:** If the interface fails to keep up with the demands of the user, this will significantly diminish their experience and can result in frustration, particularly when trying to perform basic tasks. Wherever possible, the interface should move swiftly in pace with the user.
5. **Maintainable:** A UI should have the capacity for and changes to be integrated without causing a conflict of interest.

THE VARIOUS TYPES OF USER INTERFACE

- Graphical User Interface (GUI)
- Command Line Interface (CLI)
- Menu-Driven User Interface
- Touch User Interface
- Voice User Interface (VUI)
- Form-Based User Interface
- Natural Language User Interface

EXAMPLES OF USER INTERFACE

- Computer mouse
- Remote control
- Virtual reality
- ATMs
- Speedometer
- The old iPod click wheel

CONCLUSION

The user interface is a very important aspect in applications, it allows interacting with the computer and getting their desired response. The user interface makes the communication between computer and user easier through different hardware devices.

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BIGDATA

PRANATHI S (182MCA37)

INTRODUCTION:

Now we are living in Big Data Era. Few years ago, Systems or Organizations or Applications were using all Structured Data only. It was very easy to use Relational Data Bases (RDBMS) and old Tools to store, manage, process and report this Data. However recently, Nature of Data is changed. And Systems or Organizations or Applications are generating huge amount

of Data in variety of formats at very fast rate. Big Data Solutions solve all these problems very easily.

HISTORY:

- **2007**-Wired brings the concept of Big Data to the masses with their article The End of Theory: The Data Deluge Makes the Scientific Model Obsolete.
- **2008**-The world's servers process 9.57 zettabytes of information – equivalent to 12 gigabytes of information per person, per day, according to the How Much Information? 2010 report.
- **2009**-The average US company with over 1,000 employees is storing more than 200 terabytes of data according to the report Big Data: The Next Frontier for Innovation, Competition and Productivity by McKinsey Global Institute.
- **2010**-Eric Schmidt, executive chairman of Google, tells a conference that as much data is now being created every two days, as was created from the beginning of human civilization to the year 2003.
- **2011**-The McKinsey report states that by 2018 the US will face a shortfall of between 140,000 and 190,000 professional data scientists, and states that issues including privacy, security and intellectual property will have to be resolved before the full value of Big Data will be realised.
- **2014**-The rise of the mobile machines – as for the first time, more people are using mobile devices to access digital data, than office or home computers. 88% of business executives surveyed by GE working with Accenture report that big data analytics is a top priority for their business.

CHARACTERISTICS:

1. Volume: The quantity of generated and stored data. The size of the data determines the value and potential insight, and whether it can be considered big data or not.

2. Variety: The type and nature of the data. This helps people who analyse it to effectively use the resulting insight. Big data draws from text, images, audio, video; plus it completes missing pieces through data fusion.

3. Velocity: 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. Big data is often available in real-time. Compared to small data, big data are produced more continually. Two kinds of velocity related to big data are the frequency of generation and the frequency of handling, recording, and publishing.

Advantages:

- Big data analysis derives innovative solutions. Big data analysis helps in understanding and targeting customers.
- Anyone can access vast information via surveys and deliver answer of any query.

Disadvantages:

- Lots of big data is unstructured.

- Big data analysis is not useful in short run. It needs to be analyzed for longer duration to leverage its benefits.

APPLICATIONS:

- Government
- International development
- Manufacturing
- Media

Types of Big Data:

1. Structured
2. Unstructured
3. Semi-structured

CONCLUSION:

The availability of Big Data, low-cost commodity hardware, and new information management and analytic software have produced a unique moment in the history of data analysis. They represent a genuine leap forward and a clear opportunity to realize enormous gains in terms of efficiency, productivity, revenue, and profitability.

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AUGMENTED REALITY

PREETHI.C (182MCA41)

INTRODUCTION

Augmented reality is the technology that expands our physical world, adding layers of digital information onto it. AR does not create the whole artificial environments to replace real world with a virtual one. Augmented Reality appears in direct view of an existing environment and adds sounds, videos and graphics to it. In other words, A view of the physical real-world environment with superimposed computer-generated images, thus changing the perception of reality is the AR.

INVENTION OF AUGMENTED REALITY

- ✚ In 1968, a Harvard professor and computer scientist by the name of Ivan Sutherland invented what he called Sword of Damocles. The Sword of Damocles featured a head-mounted display that hung from the ceiling. The user would experience computer graphics, which made him or her feel as though they were in an alternate reality.
- ✚ Another big development in augmented reality was in 1974 by Myron Krueger. The project was called video place, which combined a projection system and video cameras that produced shadows on the screen.
- ✚ In 1990, a Boeing researcher named Tom Caudell coined the term “Augmented Reality”.
- ✚ In 1992, Louis Rosenberg from the USAF Armstrong’s Research Lab created the first real operational augmented reality.

WORKING OF AUGMENTED REALITY

Augmented Reality works in conjunction with headsets or digital devices such as tablets, smartphones and even PCs. The device themselves contain software, sensors and digital projectors that trigger digital displays onto physical objects. AR can be created and consumed in many different forms. For example, Google Glass displays 3D images onto see-through glasses, whilst Microsoft’s HoloLens embeds 3D images into the world around you. Apps include such as Snap chat and Pokémon go. The AR process uses a camera with “scanning mode”. Most recently 3D world lenses uses basic AR to create face masks and animations triggered by motion, gestures, facial expressions and user surroundings.

There are four types of Augmented Reality apps:

- Marker less AR
- Marker-based AR
- Projection-based AR
- Superimposition-based AR

ADVANTAGES

- Useful for domestic as well as international organizations
- Increase in sales, with use of augmented reality in e-commerce or online shopping, it is possible to visualize the object in its effective form before making an actual purchase.
- Effective content
- Enhances perceptions and interactions with the real world.
- Less time consuming process is augmented reality.

REAL-WORLD APPLICATIONS OF AR TODAY

- Gatwick airport passenger app, an award winning app for its creative use of AR technology.
- Ikea place, Furniture based app build using Apple’s ARKit technology.

- Dulux Visualizer helps you to try out a shade of paint for your room before you buy.
- Sephora Virtual Artist and Rolex, cosmetic company uses AR technology to allow customers to try out different looks and eye products.
- Augmented Reality in Health Care – AccuVein.
- DrawyBook app is created for fun to engage with customers.
- U.S Army- The United States is giving their soldiers improved situational awareness with the use of AR technology with the tech called “Tactical Augmented Reality (TAR)”.

CONCLUSION

Augmented Reality is more than just smartphone fun. It’s a technology that finds uses in more serious matters, from business to warfare to medicine. The possibilities of AR tech are limitless. The only uncertainty is how smoothly and quickly developers will integrate these capabilities into devices that we’ll use on a daily basis.

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NETWORK SECURITY

GOWRI A (182MCA25)

Introduction

Network security consists of the policies and practices adopted to prevent and monitor unauthorized access, misuse, modification, or denial of a computer network and network-accessible resources. Network security involves the authorization of access to data in a network, which is controlled by the network administrator.

Types of attacks

Networks are subject to attacks from malicious sources. Attacks can be from two categories: "Passive" when a network intruder intercepts data traveling through the network, and "Active" in which an intruder initiates commands to disrupt the network's normal operation or to conduct reconnaissance and lateral movements to find and gain access to assets available via the network.

Advantages of Network Security

- Protect data
- Prevents cyber attack
- Levels of access
- Centrally controlled
- Centralized updates

Disadvantages of Network Security

Network security is a real boon to the users to ensure the security of their data. While it has many advantages, it has lesser disadvantages. Let us discuss some of them.

- Costly set up
- Time consuming
- Requires skilled staff
- Careless admin

Example: Honey Pots

In computer terminology, is a computer security mechanism set to detect, deflect, or, in some manner, counteract attempts at unauthorized use of information systems. Generally, a honeypot consists of data (for example, in a network site) that appears to be a legitimate part of the site that seems to contain information or a resource of value to attackers, but actually, is isolated

and monitored and, enables blocking or analysing the attackers. This is similar to police sting operations, colloquially known as "baiting" a suspect.

History of Honeypots

The metaphor of a bear being attracted to and stealing honey is common in many traditions, including Germanic, Celtic, and Slavic. A common Slavic word for the bear is *medved* "honey eater". The tradition of bears stealing honey has been passed down through stories and folklore, especially the well-known Winnie the Pooh. The Brazilian folk tale "Boneca de pixe" tells of a stealing monkey being trapped by a puppet made of pitch.

The earliest honeypot techniques are described in Clifford Stoll's 1989 book *The Cuckoo's Egg*. In 2017, Dutch police used honeypot techniques to track down users of the darknet market Hansa.

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Introduction

Momentary marketing is changing the way businesses retail their products and services by using temporary content social networks like Snapchat to offer special deals, coupons and price matching in real-time, on the spot. In a “limited time only” fashion, momentary marketing increases brand awareness to heighten excitement for a specific event, promotion or service.

Everything has always been about the consumer, and now that they too have reached digital maturity they are becoming increasingly more selective and demanding of their favorite travel brands. This may sound like quantum physics to some, yet the truth is that technology is creating a world of intensely customized and on-demand experiences. Which is why travel marketers should view each opportunity as if it’s an individual market - a momentary market.

Features

- Responsible marketing
- Unique opportunities for unique customers
- The value of micro-moments
- Hyper-connection
- Turning illusion into reality

Advantages

- Faster response to both marketers and the end user
- Boundless universal accessibility
- Opens the possibility to a market of one through personalization
- Reduction in costs through automation and use of electronic media

Disadvantages

- Dependability on technology
- Security, privacy issues
- Maintenance costs due to a constantly evolving environment
- Higher transparency of pricing and increased price competition

Conclusion

Realistically speaking, the world is not yet at the point of everything being instantaneous. But organizations that may not have quite reached digital maturity are still looking for a competitive edge, be it innovation or increased personalization, post-digital travel brands on the other hand, are looking for much more. They are poised to overtake the competition by changing the way the market itself works.

Moving beyond digital requires its own set of transformational strategies and these focus on the momentary market. It is time for travel marketers to belt up and go for a new experiential journey!

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ANIMATION INDUSTRY

JYOTSANA R JAIN (182MCA52)

Animation, a unique branch of technology which can bring matchless value to a trove of business, entertainment activities and extensively everywhere. Short and featured films, special effects, gifs, motion graphics or images, video games, smartphone apps, IT interfaces, or other modes. The possibility of animation is limitless. Animation is an imitation of real life motion through moving pictures evolved digitally.

Animations are developed with Computer – generated imagery (CGI). Pictures made to move at certain number of frames per second lead to an illusion of continuous motion. Effects accomplished, by making images move over sequentially in quick succession. Consecutive images are so minimal that human eye fails to understand the same during transition.

Types of Animation

Traditional Animation -

In Tom and Jerry and in Studios of Disney, movements with the flick of a finger, a number of frames needed with accuracy for producing stunning movies

2 – D Animation –

Vector – based, computer program – Flash or Adobe Animate. The interim key frames get aligned consequently and seamless motion is achieved.

3 – D Animation –

3D objects are moved on – screen for simulating the real – time motion. The awesome graphics in sci – fi or modern movies is the effect of technical proficiency of leveraging 3D modelling software.

Animation thought motion graphics –

Text fragments are used for creation of animation – visible in infotainment videos, film titles, animated logos, promotional campaigns, and advertisements.

Stop Motion Animation –

Photographing of an object in a succession of images. Each image is a representation of a subtle motion of the object. Stop motion animation tests the patience of the artist.

Cutout and Collage Animation –

Different textures are brought within the same frame through collage. Parts which have to be animated are cutouts of clipart, magazines, books and images. Well cut out characters are animated using collage method.

Rotoscoping –

This animation is capturing human movements realistically. Live motion of human actors is used for rendering animation.

Cel Animation –

It takes a lot of time to create a compelling cel animation. Each detail has to be considered and a high level of organization is required. A transparent cellulose acetate sheet called cel where the animated frame is painted. Cel has to see – through feature and can be placed on other similar cels.

Digital Imagery

All the world's loving animation and effects and technology has pushed the content out of the screens into the real world. The true power of technologies like AR and VR will lie in the interaction between the scene and the audience.

The Global Workflow

The dotcom boom has also helped in forming a stable connection between the different worlds. The uplift from the space conundrums and the introduction of cloud computing have eased the way in which corporations are interacting.

Animation for Adults

As the current economics of the online streaming media is maturing, the industry will perceive the more content creation for the adults.

Real – Time Rendering and Creation

Real – time monitoring will aid in pre-production, production, post-production, compositing, and rendering. All these trends and techno – friendly advancements provide easy ways not only for the freelancers and startups but also for the big corporations to generate their best content all around the world for the animation industry.

Conclusion

Animation industry has come a long way from traditional 2-Dimensional images to the 3 Dimensional. 3D animation latest trends with special effects.

The 3D version brings life to the animated characters and connects them directly with the audience. Today game industry is thrice the size of Hollywood Industry. People with a thorough knowledge of 3D animation technology can make a promising career in this domain

Industry giants like Pixar, DreamWorks have already shown their tremendous work and have inspired others to contribute to the industry. The VFX and CGI used in the movies delivering high-end performance and effects.

Software like Blender and GIMP has provided cost free alternatives and opportunities to the individuals and start-ups to deliver their best to the industry.

Animation industry is the fastest, prospering and advancing technology in the world. With the increase of satellite channels, animation industry and animation institutes booming rapidly.

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QUANTUM COMPUTING

SHRESTA R (182MCA34)

Introduction

Quantum computing is the use of quantum-mechanical phenomena such as superposition and entanglement to perform computation. A quantum computer is used to perform such computation, which can be implemented theoretically or physically.[1]:I-5 There are currently two main approaches to physically implementing a quantum computer: analog and digital. Analog approaches are further divided into quantum simulation, quantum annealing, and adiabatic quantum computation. Digital quantum computers use quantum logic gates to do computation. Both approaches use quantum bits or qubits.

Qubits are fundamental to quantum computing and are somewhat analogous to bits in a classical computer. Qubits can be in a 1 or 0 quantum state, or they can also be in a superposition of the 1 and 0 states. However, when qubits are measured the result is always either a 0 or a 1; the probabilities of the two outcomes depends on the quantum state that they were in.

History

Quantum computing began in the early 1980s, when physicist Paul Benioff proposed a quantum mechanical model of the Turing machine.[Richard Feynman and Yuri Manin later suggested that a quantum computer had the potential to simulate things that a classical computer could not. In 1994, Peter Shor developed a quantum algorithm for factoring integers that had the potential to decrypt RSA-encrypted communications. Despite ongoing experimental progress since the late 1990s, most researchers believe that "fault-tolerant quantum computing [is] still a rather distant dream" On 23 October 2019, Google AI, in partnership with the U.S. National Aeronautics and Space Administration (NASA), published a paper in which they claimed to have achieved quantum supremacy. While some have disputed this claim, it is still a significant milestone in the history of quantum computing.

Obstacles

There are a number of technical challenges in building a large-scale quantum computer. Physicist David DiVincenzo has listed the following requirements for a practical quantum computer:

- Scalable physically to increase the number of qubits
- Qubits that can be initialized to arbitrary values
- Quantum gates that are faster than decoherence time
- Universal gate set
- Qubits that can be read easily

Sourcing parts for quantum computers is also very difficult. Many quantum computers, like those constructed by Google and IBM, need Helium-3, a nuclear research byproduct, and special superconducting cables that are only made by a single company in Japan.

Quantum Computing Models

There are a number of quantum computing models, distinguished by the basic elements in which the computation is decomposed. The four main models of practical importance are:

- Quantum gate array (computation decomposed into a sequence of few-qubit quantum gates)
- One-way quantum computer (computation decomposed into a sequence of one-qubit measurements applied to a highly entangled initial state or cluster state)
- Adiabatic quantum computer, based on quantum annealing (computation decomposed into a slow continuous transformation of an initial Hamiltonian into a final Hamiltonian, whose ground states contain the solution)
- Topological quantum computer (computation decomposed into the braiding of anyons in a 2D lattice)

The quantum Turing machine is theoretically important but the direct implementation of this model is not pursued. All four models of computation have been shown to be equivalent; each can simulate the other with no more than polynomial overhead.

Conclusion

Quantum computers are actually ready to do anything useful. Researchers have made great progress in developing the algorithms that quantum computers will use. But the devices themselves still need a lot more work. Quantum computing could change the world – but right now, its future remains uncertain.

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ANGULAR AND REACT JS

ZAINAB FATHIMA KZ (182MCA28)

INTRODUCTION TO ANGULAR JS

AngularJS is a very powerful JavaScript Framework. It is used in Single Page Application (SPA) projects. It extends HTML DOM with additional attributes and makes it more responsive to user actions. AngularJS is open source, completely free, and used by thousands of developers around the world.

FEATURES OF ANGULAR JS

- AngularJS provides developers an options to write client side applications using JavaScript in a clean Model View Controller (MVC) way
- Unit testing assures Quality Code: In Angular JS, the code is divided into the smallest testable parts i.e. units. This also helps you easily detect any flaws or mistakes in each line of the code.
- Data binding in AngularJS is a two way street. This means that the view layer of the architecture is always an exact representation of the model. Unlike in other applications, the model and view layers are continuously updated to remain in sync with one another.
- Requires Writing Less Code: One does not have to write code to connect the MVC layers, you don't have to write separate codes for the view manually, directives are separate from the app code and can be written parallelly etc.
- It is developed by Google: Google is the pioneer of the internet age and you know when there's something that Google develops, it will be great.

INTRODUCTION TO REACT JS

ReactJS is a JavaScript library for building user interfaces. It is maintained by Facebook and a community of individual developers and companies. In React everything is segments the total landing page is isolated into little parts which consolidated to finish the view. Likewise reflected in the information and the other way around however in reactjs Instead of refreshing the DOM legitimately react makes two duplicates of a Virtual DOM, the first and a refreshed rendition that reflects changes showed in from the view. The two duplicates that are put away are then looked at and when any progressions happen respond update see straightforwardly that is the reason it favored for the constant application.

FEATURES OF REACTJS

- Explanatory perspectives make your code progressively lucid and simpler to investigate.
- In React, for each DOM object, there is a comparing "virtual DOM object". It's a single direction information restricting consequently controlling the virtual DOM is snappy instead of refreshing unique DOM since nothing gets drawn on screen.
- React occasion framework is actualized through occasion assignment and furthermore has a pool of occasion items to decrease memory overhead.

- Execution: ReactJS encourages us update the View for the client and, with Flux, can control the application work process. Presenting virtual DOM includes points of interest where it contrasts the new information and unique DOM and consequently refreshes the view.
- Respond Native additionally offers access to the features these stages offer, aside from changing React code to take a shot at iOS and Android.

Angular is most widely used for large applications like video streaming app or music instrument app because of its full-blown framework nature. On the other hand, ReactJS is just a library so it's good for SPA (Single page application) or where it doesn't require much formatting.

ANGULAR JS	REACT JS
<ul style="list-style-type: none"> • It allows two-way data binding • It uses the browser's DOM • Angular is a JS framework by nature, but is built to use Typescript (Typescript is a superset of JavaScript) • Harder to learn • With Angular you can build hybrid mobile apps, but let's be fair, a native mobile app will always outdo a hybrid mobile app. • Angular is best suited for: Cross-platform Mobile Apps, Enterprise Software, Progressive Web Apps and Hybrid Mobile Apps 	<ul style="list-style-type: none"> • It allows one-way data binding. • It uses a virtual DOM. • React, on the other hand, is a JavaScript library as well, but recommends using JSX (JSX is JavaScript but with extended XML syntax.) • Easier to learn • React has a sibling by the name of React Native, which allows you to build a complete mobile app for either Android or iOS. Not a web app that runs on a mobile phone, but a full-fledged mobile app built with JavaScript. • React is best suited for: Dynamic Applications, Single Page Apps, Native Mobile Apps

CONCLUSION: Choosing among the above two will be based on application requirement and future deployment environments. Though, React is most widely used than Angular JS.

BIG DATA-HADOOP

RAKSHITHA.V (182MCA36)

INTRODUCTION:

Apache Hadoop is an open source software framework used to develop data processing applications which are executed in a distributed computing environment.

Applications built using HADOOP are run on large data sets distributed across clusters of commodity computers. Commodity computers are cheap and widely available. These are mainly useful for achieving greater computational power at low cost.

Similar to data residing in a local file system of a personal computer system, in Hadoop, data resides in a distributed file system which is called as a **Hadoop Distributed File system**. The processing model is based on '**Data Locality**' concept wherein computational logic is sent to cluster nodes (server) containing data. This computational logic is nothing, but a compiled version of a program written in a high-level language such as Java. Such a program, processes data stored in Hadoop HDFS.

HISTORY:

Apache Software Foundation is the developers of Hadoop, and its co-founders are **Doug Cutting** and **Mike**.

Its co-founder Doug Cutting named it on his son's toy elephant. In October 2003 the first paper release was Google File System. In January 2006, MapReduce development started on the Apache Nutch which consisted of around 6000 lines coding for it and around 5000 lines coding for HDFS. In April 2006 Hadoop 0.1.0 was released.

FEATURES:

- **Economically Feasible:** It is cheaper to store data and process it than it was in the traditional approach. Since the actual machines used to store data are only commodity hardware.
- **Easy to Use:** The projects or set of tools provided by Apache Hadoop are easy to work upon in order to analyze complex data sets.
- **Open Source:** Since Hadoop is distributed as an open source software under Apache License, so one does not need to pay for it, just download it and use it.
- **Scalability:** Hadoop is highly scalable in nature. If one needs to scale up or scale down the cluster, one only needs to change the number of commodity hardware in the cluster.
- **Distributed Processing:** HDFS and Map Reduce ensures distributed storage and processing of the data.

ADVANTAGES:

- Ability to store a large amount of data.
- High flexibility.
- Cost effective.
- High computational power.

- Tasks are independent.

DISADVANTAGES:

- Not very effective for small data
- Hard cluster management.
- Has stability issues.
- Security concerns.

TYPES OF BIG DATA-HADOOP:

- **Apache HBase** - a distributed database that's often paired with Hadoop;
- **Apache Hive**-a SQL-on-Hadoop tool that provides data summarization, query and analysis;
- **Apache Pig**-a high-level platform for creating programs that run on Hadoop clusters;
- **Apache Zookeeper**-a configuration, synchronization and naming registry service for large distributed systems.

CONCLUSION:

In conclusion, we can say, Hadoop is highly fault-tolerant. It reliably stores huge amount of data despite hardware failure. It provides High scalability and high availability. Hadoop is cost efficient as it runs on a cluster of commodity hardware. Hadoop work on Data locality as moving computation is cheaper than moving data. All these features of Big data Hadoop make it powerful for the Big data processing

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