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DATA SCIENCE

Data Science is revolutionizing almost every industry and gaining popularity day by day. It is difficult to fence its capabilities with a formal definition. Data Science is devoted to the extraction of clean information from raw data for the formulation of actionable insights. It is a blend of various tools, algorithms, and Machine Learning principles to discover hidden patterns from the raw data.

Why is it important?

Data is meaningless until its conversion into valuable information. Data Science involves mining large datasets containing structured and unstructured data and identifying **hidden patterns.**

The importance of Data Science lies in its innumerable uses that range of daily activities from daily activities like **Siri** or **Alexa** for recommendations to more complex applications like operating a Self - driving car.

The interdisciplinary field of Data Science encompasses Computer Science, Statistics, Inferences, Machine Learning algorithms, Predictive Analysis, and new technologies.

How it works?

The five stages of the data science life cycle: **Capture**, (data acquisition, data entry, signal reception, data extraction); **Maintain** (data warehousing, data cleansing, data staging, data processing, data architecture); **Process** (data mining, clustering/classification, data modelling, data summarization); **Analyse** (exploratory/confirmatory, predictive analysis, regression, text mining, qualitative analysis); **Communicate** (data reporting, data visualization, business intelligence, decision making).

Python for Data Science :

There are more than 250 programming languages currently in existence. One of the most popular of these is python, an open – source language that is been around since February of 1991. Data Scientists have been using python regularly for years because the language is multifaceted and flexible and has easy readability. So, python is an obvious language of choice in the field.

For instance, the grow of python in Data Science has

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III - CSE

LOW-CODE DEVELOPMENT PLATFORM

Low-Code Development Platform (LCDP) provides a development environment used to create application software through a graphical user interface instead of traditional hand-coded computer programming. A low-coded platform may produce entirely operational applications, or require additional coding for specific situations. Low-code development platforms reduce the amount of traditional *hand coding*, enabling accelerated delivery of business applications. A common benefit is that a wider range of people can contribute to the application's development—not only those with formal programming skills. LCDPs can also lower the initial cost of setup, training, deployment and maintenance.

Low-code development platforms trace their roots back to fourth-generation programming language and the rapid application development tools of the 1990s and early 2000s. Similar to these predecessor development environments, LCDPs are based on the principles of model-driven design, automatic code generation, and visual programming. The concept of end-user development also existed previously, although LCDPs brought some new ways of approaching this development. The low-code development platform market traces its origins back to 2011. The specific name "low-code" was not put forward until 9 June, 2014, when it was used by the industry analyst *Forrester Research*. Along with no-code development platforms, low-code was described as "extraordinarily disruptive" in *Forbes* magazine in 2017.

USE:

As a result of the micro computer revolution businesses have deployed computers widely across their employee bases, enabling widespread automation of business processes using software. The need for software automation and new applications for business processes places demands on software developers to create custom applications in volume, tailoring them to organizations' unique needs. Low-code development platforms have been and are developed as a means to allow for quick creation and use of working applications that can address the specific process- and data needs of the organization.
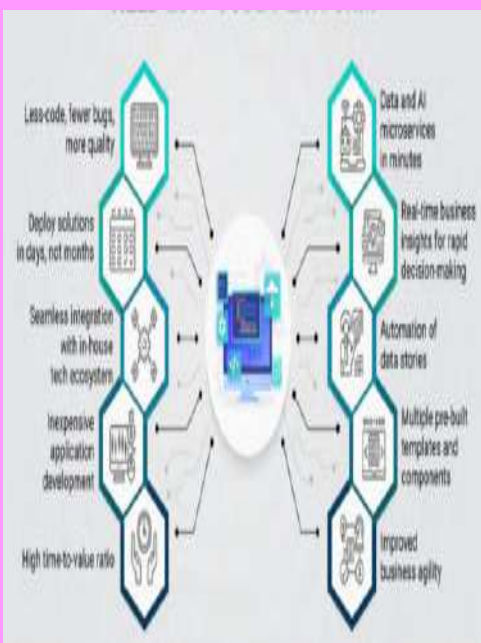
10 REASONS WHY ENTERPRISES NEED LOW – CODE PLATFORM :

LOW CODE Vs NO CODE

No-code development platforms are similar to low-code development platforms but require no coding at all.

The line between the two is not sharp. However, there are a number of key differences:

App Creator - No-code platforms are accessible to any end-business user while low-code platforms require professional developers who can work within the platform's constraints.

Core Design - No-code platforms tend to function off a model-driven, declarative approach where the end user dictates an app's design through drag and drop manipulation or simple expressions. Low-code platforms depend more on hand coding to specify an application's core architecture.

User Interface - No-code platforms most often rely on a preset user interface layer which simplifies and streamlines an app's design. Low-code platforms may provide greater flexibility in UI options at the cost of additional coding and complexity requirements.

10 BEST LOW CODE DEVELOPMENT PLATFORMS IN 2021

- Visual LANSA
- GeneXus
- Zoho Creator
- Creatio
- Appian
- KiSSFLOW – BPM & Workflow Software

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THE WORLD OF CODES AND ALGORITHMS

A degree in Computer Science could be the initial step towards a rewarding and satisfying ca-

NAVIGATE YOUR WAY TO BUILD A CAREER IN COMPUTER SCIENCE

With the whole world becoming more dependent upon algorithms, codes and networks, Computer Science is a key area for future careers across the globe. From shopping to playing games or fitness, there is an app for pretty much everything that creatively resolves our everyday problems. All these systems are created by graduates in Computer Science.

Computer scientists utilize their understanding of programming and algorithms towards designing software, systems and networks to address the needs/ problems of people or clients. So if you have a knack for analytical and logical thinking, solving problems with agility by coming up with easily applicable solutions, a degree in Computer Science could be the initial step towards a rewarding and satisfying career. One can start preparing for Computer Science while still studying in a high school. Keep your mathematical concepts strong and get fieldwork experience would work before applying to a college. Learning basic programming or coding or perhaps creating simple programs would also be a good idea.

CAREER OPTIONS AND THE FUTURE

After gaining various technical and non-technical skills, from programming to leadership, which are highly valued by employers, you have ample career choices in a wide variety of highly specialized areas such as Artificial Intelligence, Machine Learning, Data Science, Cyber Security, Cloud Computing, Video Game Development, System Analysis, Data Analysis, Software Engineering, Multimedia programming and more.

As the world embarks on the Fourth Industrial Revolution, the need for more skilled experts in this field will increase. Whether you prefer to work for a big tech corporation managing networks and designing software or become a successful tech entrepreneur, a degree in Computer Science will open up a multitude of career opportunities in a variety of roles. A

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HOW TO SELF STUDY

I don't want to start with some motivational quotes or with the stuff that usual said by influencers Like: Only you can do it
Nothing is impossible
Yes these all are feel good thing's, I agree with them.
But these can apply to us only when we are with a trained brain
Trained brain …!!!!
What does it mean!
As a human being's we are having a great power which can lead us to be in a construction way as well as destruction way. It all depends on the way you use it. Yes you heard it right … It can lead to destruction way too .
*Brain : A powerful weapon*
In olden day's before the birth of android, people use to keep many thing's just as a small note in their memory But now we are in a world where we just check a machine even for a ten digit mobile number.
We just stop giving work to our brain , A message can drag our concentration . A notification can lead us to an unwanted tab. Just a ping from prime that you may like this show can lead you to drive into it rather than the work you are in, I am not a person opposite to the entertainment shows , even I love to watch and enjoy them but the thing is permitting the time. Yes allotting the time for every thing can make your day perfect
CHANGES that you need to

- ♦ *Stick on to the work that you are in*
- ♦ *Keep your phone aside(off the notification's) .*
- ♦ *Spend time with your family*
- ♦ *Enjoy the nature*
- ♦ *Read some book's*
- ♦ *Listen some audio book's, music*
- ♦ *Spend time with your family*
- ♦ *Enjoy the nature*
- ♦ *Read some book's*
- ♦ *Listen some audio book's, music*

These are the thing's helped me a lot in getting control over my brain
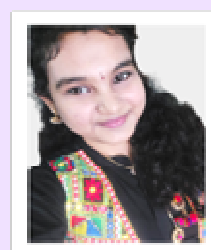
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III CSE

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Computers can Predict People's Art Tastes and Aesthetic Judgments

Researchers at the **"California Institute of Technology"** **(Caltech)** used a program to predict people's art preferences. The researchers team recruited people, to study how computers can predict people's art tastes and aesthetic (the appreciation of beauty) judgments.

The new study, published in the journal **"Nature Human Behaviour"**, enlisted over 1,500 volunteers to rate paintings in the genres of

(a)**"Impressionism"** (It is a style of painting which began in France in the late 19th century. Impressionist painting shows life-like subjects painted in a broad, rapid style, with brushstrokes that

are easily seen and colours that are often bright)

(b)**"Cubism"**(a style of painting and sculpture developed in the early 20th century, characterized chiefly by an emphasis on formal structure, the reduction of natural forms to their geometrical equivalents, and the organization of the

planes of a represented object independently of representational requirements)

(c)**"Abstract"**(the art is not representational but explores color and form) and

(d)**"Color field"**(Color field painting is a style of abstract painting that emerged in New York City during the 1940s and 1950s. Color field is characterized primarily by large fields of flat, solid color spread across or stained into the canvas creating areas of unbroken surface and a flat picture plane) via Amazon's crowdsourcing platform Mechanical Turk. The answers of the volunteers were fed into a computer program, and after this training period, the computer could predict the volunteers' art preferences much better than chance would.

In the study, the researchers programmed the computer to separate a painting's visual attributes into low-level features (such as contrast, saturation, and hue) and high-level features (which require human judgment and include characteristics such as whether the painting is dynamic or still).

The researchers taught the computer to deconstruct a painting's visual properties into low-level features (contrast, saturation, and hue) and high-level features that require human evaluation. "The computer program then estimates how much a specific feature is taken into account when making a decision about how much to like

a particular piece of art," explains Ligaya. "Both the low- and high-level features are combined together when making these decisions. Once the computer has estimated that, then it can successfully predict a person's liking for another previously unseen piece of art."

The researchers also discovered that the volunteers tended to cluster into three general categories: those who like paintings with **real-life objects**, such as an impressionist painting; those who like **colorful abstract paintings**, such as a Rothko; and those who like **complex paintings**, such as Picasso's cubist portraits. The majority of people fell into the first "real-life object" category. "Many people liked the impressionism paintings," according to Ligaya

"I used to believe that evaluating art was personal and subjective, so I was surprised by this result," says lead author **"Kiyohito Iigaya",** a **postdoctoral scholar** in the laboratory of **"Caltech psychology professor John O'Doherty"**.

The findings not only demonstrated that computers can make these predictions, but also provided new insight into how people judge art. "*The main point is that we're getting a better understanding of the mechanism that people use to make aesthetic judgments," O'Doherty says.* "That is, people appear to use basic image features and combine them. That's the first step in fig-

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III CSE

Virtual Reality is here!

The recent appearance of computer-generated simulation called virtual reality gives us feeling of leaving the real world to enter a digital one…. It is attracting the attention of users and researchers suggesting it may be the next largest stepping stone in technological innovation.

What is this Virtual reality? Is it really up to the word as all users say? Virtual reality is a computer generalized simulation in which a person can interact with the 3D environment with just headset. Isn't it sounds cool? Besides gaining an immediate acceptance in the world of computer games, it is now being used in many fields of life including architecture, medicine, military and aviation. Scientists and researchers are expecting to explore a lot in this modern technology than what we know about it today. It is a great leap in the field of 3D and a lot of work is still under progress.

The idea of virtual reality was first presented in 1930s, when the first flight simulator was invented by

the scientists for the purpose of training the pilots.

The invention got improvement in 1965, when Ivan Sutherland, an American, presented his theory of developing a portable virtual world using two tiny television sets, one meant for each eye. His invention worked, but to a very basic level. The images were rough and not clear. Another problem was the weight of the helmet used. It was quite heavy and needed to be supported from the ceiling.

But the idea has actually got its base and now needed to be improved. Scientist continued working on this idea until in 1985, Michael McGreevy, from NASA introduced a much-improved version of virtual reality. It was light weighted, using motorcycle helmet with mini display screens. It was also provided with the special sensors which were used to detect movements with the help of sensitive computer technology. Finally, during 1986, the invention got its final touch when a computer games programmer named Jaron Lanier introduced a new glove for virtual reality. In this way took the modern form in which we look it today. (Virtual Reality, 2004).

But how does this work? The primary subject of virtual reality is simulating the vision. Every headset aims to perfect their approach to creating an immersive 3D environment. Each VR headset puts up a screen (or two – one for each eye) in front of eyes thus, eliminating any interaction with the real world. Two autofocus lenses are generally placed between the screen and the eyes that adjust based on individual eye movement and positioning. The visuals on the screen are rendered either by using a mobile phone or HDMI cable connected to a PC. But there is more technical stuff related to make this VR dream working in reality. Whatever the working process that is undergoing in preparing VR, the vision and mission of this technological revolution remains same.

We can experience Virtual Reality in many ways. The 3 most common ways are:
- The first one uses a helmet, ear phones and a pair of special gloves or joy sticks controlled by a computer and assisted by special sound effects and graphic images.
- The second one makes use of the video cameras. These cameras track the image of the participant in an artificially created virtual world. The participant can even move the objects in this world using virtual technology.
- The third type makes use of the

three-dimensional images. The screen used is shaped in a curve. This makes the images closer to the real world.

Virtual Reality can be used in many fields like Architecture, weather forecast, Military training, Cancer chemotherapy, Driving lessons, medical studies, Disabled children and so on…

Virtual world is although quite close to the real world yet it is still unable to 'replace' the feelings of a real world. As an example, the virtual reality technology is now being used for military training as well. But a soldier actually knows that he is not going to get any harm from any bullet coming from an unknown origin or a surprising attack. These feelings can only be experienced while being in an actual war field where all of a soldier's instincts are fully active in order to prevent him from any unknown danger, as he knows that it is real and he can even loose his life if he gets distracted from this actual environment. Thus, virtual reality can be easily described as one of those inventions of science, which carry a great elasticity in them and with the research work going on in this field, we can hope to get even better results expected to bring great changes in almost every field using computer technology.

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II CSE

How Photography Can Help Cultivate

If you were to think about teaching both mindfulness and gratitude to students, photography might not be the first method that comes to mind. But mindfulness is, at its core, a state of open awareness and attention—and to feel gratitude, we first have to truly notice the good things in life.

Looked at that way, it's easier to see how photography could be used as a tool in classrooms to promote mindfulness and gratitude—and the benefits they both have been shown to bring to young people. As French photojournalist Marc Riboud said, "Taking pictures is savoring life intensely, every hundredth of a second."

The Center for Healthy Minds (CHM) at the University of Wisconsin-Madison has long been studying the teaching of mindfulness in elementary school classrooms. Over the past few years—with a grant from The John Templeton Foundation in partnership with the Greater Good Science Center—they developed and tested a five-week mindful photography curriculum. Their project manual explains:

One can say photography is a physical manifestation of mindfulness. It is about stopping/pausing, observing, framing, focusing, and capturing/receiving… Basically, photography is about a relationship to the present moment. Relating to the present moment with joy and gratitude is a choice we can make. Slowing down, we can access joy by shifting the focus of our awareness to what uplifts.

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China Launches New Meteorological Satellite to Improve Weather Forecast

China on July 5,Monday launched a new meteorological satellite equipped with 11 remote sensing payloads into planned orbit.

The satellite, Fengyun-3E (FY-3E), was launched by a Long March-4C rocket at 7.28 a.m. (Beijing Time) from the Jiuquan Satellite Launch Center , Xinhua news agency reported.

This is the 377th flight mission of the Long March rocket series, according to the China National Space Administration. FY-3E, which will be the world's first meteorological satellite in early morning orbit for civil service, is designed with a lifespan of eight years and will mainly obtain the atmospheric temperature, humidity, and other meteorological parameters for numerical prediction applications, improving China's weather forecast capacity.

It will also monitor the global snow and ice coverage, sea surface temperature, natural disasters, and ecology to better respond to climate change and prevent and mitigate meteorological disasters.

In addition, the satellite will monitor solar and space environments and their effects, as well as ionospheric data to meet the needs of space weather forecasts and supporting services.

The satellite and rocket were developed by the Shanghai Academy of Spaceflight Technology.

It operates under the China Aerospace Science and Technology Corporation. The Weather Company's primary journalistic mission is to report on breaking weather news, the environment and the importance of science to our lives.

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Virtualization Ahead…..

Each one of us had some aspirations and expectations from the year 2020. People made several resolutions about utilizing the upcoming year differently, with a set of new goals and dreams to achieve. Few people had planned their wedding, some were eager to get a job, and the outgoing batch was excited about getting their first salaries. The new year got us all pumped up. Things were going smoothly; few people were participating in competitions, and most of us were busy looking for internships. However, no one knew what stood ahead of us.

Amidst the routine, the college administration asked us to move back home due to COVID – 19. Many of us were still figuring out whether this move was for the long term or just until March 31st. We left for our homes with very little preparation, no planning, and packing, thinking this was just a short break, and we would be returning shortly after this mini-vacation. Later, in a week, the news came in that the government had imposed a nationwide lockdown to control the pandemic spread.

A directive from UGC came in, which stated that all the universities must complete the final year students' assessment by May 31st and results by mid-June. It was a turning point. The college administration started to plan out the activities like how to complete the syllabus, making sure that the final year students

graduate on time. They began to communicate with each student to get a clear picture of the available resources such as data connectivity, communication devices. They collaborated with Cisco Webex, a virtual meeting portal where a whole batch could communicate with the professors. Each department scheduled the lectures and doubt clearing sessions. After two weeks, each department individually conducted the online examinations. Students had choices of submitting their answers in the form of scanned copy, a word file or through email within a stipulated time. The final assessment was the tricky part as the administration had to restructure their marking patterns; they made few changes in their current marking system. The evaluation of the other students will also happen similarly. As of now, classes are going on to complete the syllabus.

The virtual system still has many flaws, such as signal drop, the digital synergy between the systems, lag, stutter. Internet connectivity is a critical factor that affects the system. The internet strength and availability is the typical issue that has to be addressed at the national level as it varies from region to region. Many students who live in remote areas do not have access to high-speed internet. Therefore, a strong telecom network throughout the nation is required to make this transition fruitful and successful.

Apart from technical factors, students & professors play a vital role. The professors need to make the digital classroom livelier to attract the students' attention and get them involved in the topic. They need to try a fresh,

different approach from their conventional teaching methods as these virtual platforms do not work the same as physical classrooms. Similar efforts are required from the students too. They need to participate actively and not consider these classes merely as general video lectures. They need to focus more on grasping the knowledge from these virtual lectures; otherwise, these lectures will be of no use. It is impossible to build a reliable virtual system overnight; it requires patience and time. Each day will bring some new challenges that will help in creating a sturdy virtual system.

In the meantime, many digital platforms like Coursera, edX have offered a vast selection of certification courses to the students free of cost. These courses have helped students to utilize their time effectively at home, and it will also help these students in getting ready for industries. Now, students are getting used to the idea of a virtual classroom. Many premier universities and institutes have already planned their upcoming academic sessions to be digital until the situation is under control. They are working on the system to make it more effective, highly interactive, and lively.

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AUGMENTED REALITY

Augmented reality (**AR**) is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information, sometimes across multiple sensory modalities, includng visual, auditory, hatic, somatosensory and olfactory. A R can be defined as a system that incorporates three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects. The overlaid sensory information can be constructive (i.e., additive to the natural environment), or destructive (i.e., masking of the natural environment). This experience is seamlessly interwoven with the physical world such that it is perceived as an immersive aspect of the real environment. In this way, augmented reality alters one's ongoing perception of a real-world environment, whereas virtual reality completely replaces the user's real-world environment with a simulated one. Augmented reality is related to two largely synonymous terms: mixed reality and computer-mediated reality.

The primary value of augmented reality is the manner in which components of the digital world blend into a person's perception of the real world, not as a simple display of data, but through the integration of immersive sensations, which are perceived as natural parts of an environment. The earliest functional AR systems that provided immersive mixed reality experiences for users were invented in the early 1990s, starting with the Virtual Fixture system developed at the U.S. Air Force's Armstrong Laboratory in 1992. Commercial augmented reality experiences were first introduced in entertainment and gaming businesses. Subsequently, aug

Virtual Fixtures - first AR system, U.S. Air Force, Wright-Patterson Air Force Base (1992)

mented reality applications have spanned commercial industries such as education, communications, medicine, and entertainment. In education, content may be accessed by scanning or viewing an image with a mobile device or by using markerless AR techniques. Augmented reality is used to enhance natural environments or situations and offer perceptually enriched experiences. With the help of advanced AR technologies (e.g., adding, incorporating computer vision, AR cameras into smartphone applications and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulated. Information about the environment and its objects is overlaid on the real world. This information can be virtual. Augmented Reality is any experience which is artificial and which adds to the already existing reality or real, e.g., seeing other real sensed or measured information such as electromagnetic radio waves overlaid in exact alignment with where they actually are in space. Augmented reality also has a lot of potential in the gathering and sharing of tacit knowledge.

Comparison with virtual reality

In virtual reality (VR), the users' perception of reality is completely based on virtual information. In aug-

mented reality (AR) the user is provided with additional computer generated information within the data collected from real life that enhances their perception of reality. For example, in architecture, VR can be used to create a walk-through simulation of the inside of a new building; and AR can be used to show a building's structures and systems superimposed on a real-life view. Another example is through the use of utility applications. Some AR applications, such as Augment, enable users to apply digital objects into real environments, allowing businesses to use augmented reality devices as a way to preview their products in the real world. Augmented reality (AR) differs from virtual reality (VR) in the sense that in AR part of the surrounding environment is actually 'real' and just adding layers of virtual objects to the real environment. On the other hand, in VR the surrounding environment is completely virtual. A demonstration of how AR layers objects onto the real world can be seen with augmented reality games. WallaMe is an augmented reality game application that allows users to hide messages in real environments, utilizing geolocation technology in order to enable users to hide messages wherever they may wish in the world. Such applications have many uses in the world, including in activism and artistic expression.
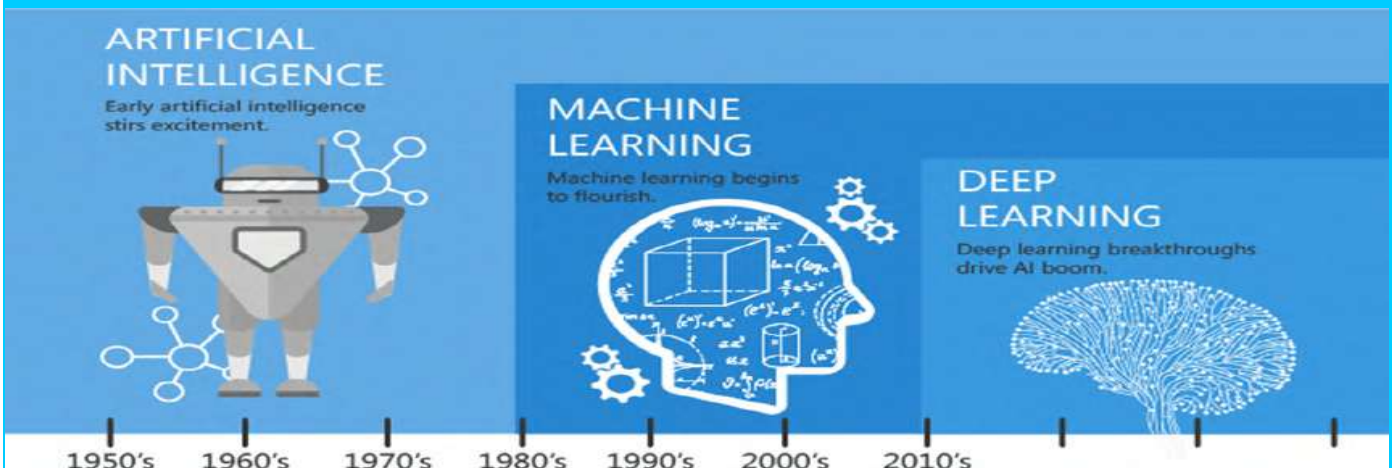
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III CSE

MACHINE LEARNING

Machine learning is a method of data analysis that automates analytical model building. It is a branch of [artificial intelligence](#) based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention.

- **Multi-Class Classification**

Binary Classification is when the target you are trying to find can only be one of the two (bi - two) outcomes. On/Off, Yes/No, Can/Cannot, Will/Will Not. And usually, the favorable outcome is given code 1 and the other one, 0.

such a way that data points in the same group are more similar than the data points in different groups. We can do unsupervised learning based on different methods which calculate the distance between the points in different ways. K-Means clustering, Agglomerative (Hierarchical) Clustering, and Density-based clustering are some of the many methods used for clustering.

There are two types of Machine Learning. These are:

Supervised Learning

Unsupervised Learning

Supervised Learning:

Supervised Learning is where there is a target we are trying to achieve or predict. The learning happens based on various features that lead to the target. For example, if you are shown a picture and asked to identify the animal in the picture, that is a target you are expected to identify. The features in the case of an animal will be size, color, etc.,

There are two types of Supervised learning.

- **Classification**
- **Regression**

Classification can be of two types:

- **Binary Classification**

Multi-Class Classification is where the outcome can be one of three or more options. Identify the cuisine of a dish or identify the animal where the options are finite but is three or more are good examples for multi-class classification.

Unlike classification, in regression, we predict a continuous value which is a number. Like weight, house price, temperature, etc., While it is not possible to predict continuous numbers precisely, the machine learning model is able to predict the number which is closest to actual value while testing is considered to be performing the best.

Unsupervised Learning:

Unsupervised learning is where there is no target. We are not trying to predict a class or a continuous value. Instead, we are trying to find some similarities in the data and group them in

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5G TECHNOLOGY

5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G network. 5th generation of mobile network is set to offer much faster connection speeds than previous networks. Also being more reliable with lower response time and greater capacity. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects and devices.

In South Korea, all the 5G carries used Samsung, Ericsson and Nokia basestations and equipment, apart from one who used Huawei equipment. There currently 9 companies that sell 5G radio hardware and system for carries.

HOW DOES 5G WORK?

Wireless communication system use radio frequencies (also called as spectrum) to carry information through the air. 5G operates in the same way, but uses higher radio frequencies that are less cluttered. This allows for it to carry more information at a much faster rate. These higher bands are called millimeter waves (mmwaves). While higher bands are faster at carrying information, there can be problems with sending over large distances. In order to circumvent this challenge, 5G will utilize multi input and output antennae to boost signals and capacity across the wireless. 5G technology will also be able to 'slice' a physical network into multiple virtual network. This means that operator will be able to deliver the right slice of network depending on how it is being used, and thereby better manage their network.

Features of 5G network

5G wireless technology is meant to deliver higher multi-Gbps() peak data speeds.

Ultra low latency, more reliability, massive network capacity, increased availability and a more uniform user experience to more users. Higher performance and improved efficiency empower new user experiences and connects new industries.

Advantages of 5G network over 4G Network

Emerging 5G network feature lower latency, higher capacity and increased bandwidth compared to 4G. These network improvement far-reaching impact on how people live work and play all over the work and play all over the world.

With 5G network high amount of data can be transmitted more efficiently than 4G LTE. That means faster downloads and support for more connected devices than ever before.

Important Advantages of 5G network

There are several advantages of 5G technology are described below:

- Technology to gather all network on one platform.
- More effective and efficient.
- Easily manageable with previous generations.
- Possible to provide uniform uninterrupted and consistent connectivity across the world.

Disadvantages of 5G Network

- Developing infrastructure needs high cost.
- Technology is still under process and research on its viability is going on.
- It will take time for security and privacy issues yet to be resolved.

5G will have to define the uncertainties related to security threats including trust, privacy cybersecurity, which are growing across the globe, this type of challenges faced in 5G era.

Here we can see both advantages and disadvantages of 5G network. Punjab University study found that sparrows exposed to cell tower radiation for five to 30 minutes produced disfigured eggs. 5G technology is bad for nature.

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AUTOMOTIVE TECHNOLOGY

A **self-driving car**, is a vehicle that is capable of sensing its environment and moving safely with little or no human input. Although current **Advanced Driver-Assistance Systems (ADAS)** provide important safety functions such as pre-collision warnings, steering assistance, and automatic braking, self-driving vehicles take these technologies to the next level by completely removing the need for a driver.

There are "levels" to autonomy, which breaks down as follows:

Level 0: The automated system has no control over the vehicle, but may prompt the driver of hazards

Level 1: The driver and the automated system share control of the vehicle. Examples of this can be found in most cars equipped with ADAS

Level 2: The automated system is capable of taking full control of the vehicle; however, the driver must be ready to intervene if the system fails to recognize a potential hazard

Level 3: The Automated system takes full control of the vehicle and the passenger can safely take their attention away from driving tasks; however, they must still be able to intervene

Level 4: Driver can safely divert all attention away from driving tasks and let the automated system take full control. This functionality is currently limited to specific "geofenced" areas and other relatively controlled environments

Level 5: No human intervention is required.

Technology used in this self driving cars are **Hybrid navigation, Homogenization and decoupling, Vehicle communication systems, Reprogrammable, Digital traces, Modularity**. **Hybrid navigation** is simultaneous use of more than one navigation system for location data determination, needed for navigation. It also allows for a more reliable navigation system, as if one system fails, other can kick in and provide accurate navigation for the user. In order autonomous vehicles to perceive their surroundings, they have to use different techniques each with their own accompanying digital information (e.g. radar, GPS, motion sensors and computer vision).

Homogenization requires that the digital information from these different sources is transmitted and stored in the same form. This means their differences are decoupled, and digital information can be transmitted, stored, and computed in a way that the vehicles and their operating system can better understand and act upon it.

Vehicular communication systems are computer networks in which vehicles and roadside units are the communicating nodes, providing each other with information, such as safety

warnings and traffic information. Vehicular communications is usually developed as a part of intelligent transportation systems (ITS).

Reprogrammable technology allows software-like design methodologies to be applied to logic design. This paper describes the construction of this kind of FPGA, design tradeoffs and examples of applications that take advantage of reprogrammability, debug it, then re-work and re-prototype to improve the design.

Digital traces, generally defining them as numerically produced correlations of disparate kinds of data that are generated by our practices in a media environment characterized by digitalization.

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