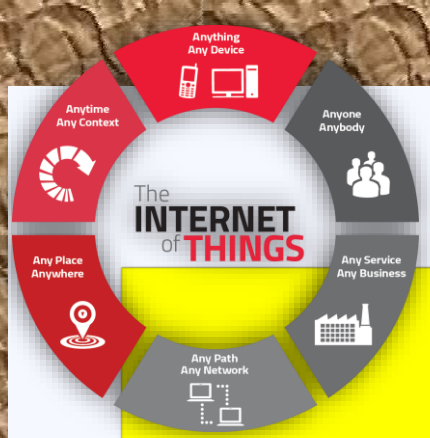
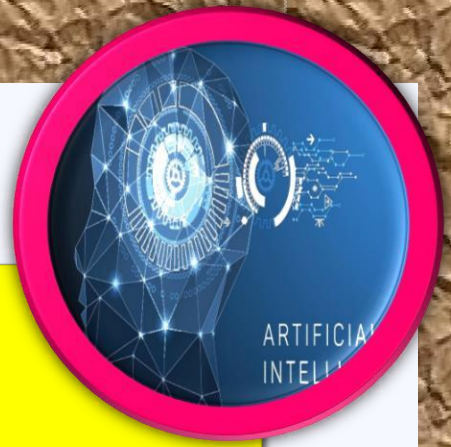
Class – IX/X

Artificial Intelligence-417

Ch-1

Introduction to Artificial Intelligence





CLASS IX / X

ARTIFICIAL INTELLIGENCE [AI-417]

WHAT IS INTELLIGENCE

The ability to acquire and apply knowledge and skills is called Intelligence.

Psychologist Howard Gardener described 9 types of Intelligence

9 Types of Intelligence

1. Linguistic Intelligence
2. Musical Intelligence
3. Logical-Mathematical Intelligence
4. Spatial Intelligence
5. Bodily-Kinesthetic Intelligence
6. Intrapersonal Intelligence
7. Interpersonal Intelligence
8. Naturalist Intelligence
9. Existential Intelligence

Types of Intelligence

S.NO	TYPES	DEFINITION
1	**Linguistic Intelligence (Language Processing Skills)**	Using Language in the form of writing and speaking. e.g. - Poets, novelists, journalists, and effective public speakers are said to have this type of Intelligence.
2	**Musical Intelligence (Music Skills)**	Recognizing Sound, Pitch, Rhythm, Timbre (लय), and Tone. e.g. - Lata Mangeshkar (Great Singer), Pandit Ravi Shankar(Sitar Player), A. R. Rahman(Music Composer), and Ustad Zakir Hussain (Tabla Player) are great Indians to possess Musical Intelligence.
3	**Logical-Mathematical Intelligence (Numerical and Logical Skills)**	Excelling in Math and logical thinking. e.g. - Mathematicians, Scientists

Types of Intelligence

S.NO	TYPES	DEFINITION
4	Spatial Intelligence (Visual world perceiving skills)	Ability to experience the world in 3 dimensions., having good graphic and artistic skills and an active imagination Skills exhibits spatial Intelligence. e.g. - Sailors, Pilots, Painters, and architects.
5	Bodily-Kinesthetic Skills (Mind Body skills)	Coordination between mind and body. e.g. – Athletes, Dancers, Surgeons, Craft People etc.
6	Intrapersonal Intelligence (Self Awareness Skills)	The ability to understand their your inner self.
7	Interpersonal Intelligence (People Skills)	Communicating with others and reading them.

S.NO	TYPES	DEFINITION
8	**Naturalist Intelligence** (Environmental Skills)	It is about connecting and understanding the Nature.
9	**Existential Intelligence** (Religious and Spiritual Skills)	Introspective questions of life, death and existence.

Introduction to Artificial Intelligence

✓ Human have been developing Machines which can make their lives easier.

Life without machines today is unimaginable. and because of this, humans have been putting efforts into making them even more sophisticated and smart.

We are surrounded by smart devices & gadgets like smartphones, smart watches, smart Tv etc.

But makes them smart ?

Today's Phone can do much more than just call-up people. They can help us in

- ✓ Navigating,
- ✓ Recommend which songs or movies should watch according to our likes & dislikes.
- ✓ Our Phone can help us connect with like-minded people
- ✓ Make our selfies fun with face filters
- ✓ Help us maintain a record of our health and fitness and a lot more.

These drastic technological advancements lead us to recognize one key concept of Artificial Intelligence.

ARTIFICIAL INTELLIGENCE

When a machine possesses the ability to mimic human traits, i.e. ability of machine to perform cognitive tasks like –

- ✓ Thinking
- ✓ Perceiving
- ✓ learn and improve on its own,
- ✓ Problem Solving
- ✓ Decision Making
- ✓ predict the future,

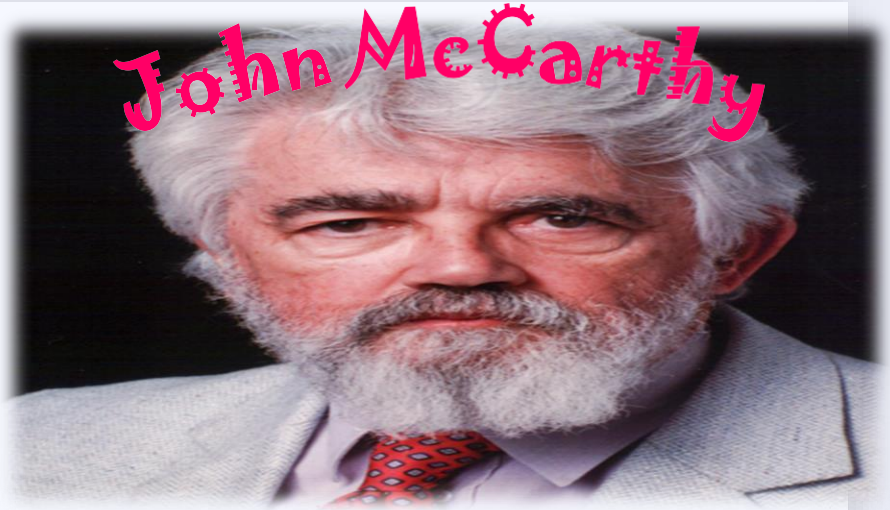
Thus AI gives the ability to machines to

- ✓ recognize a human's face;
- ✓ to move & manipulate objects;
- ✓ to understand the voice Commands by human,

Artificial Intelligence is by no means a recently discovered technology.

In fact it was started back in the 1950s inthe US and has been constantly evolving.

Standford Resercher John McCarthy coined the term “Artificial Intelligence”



AI is one of the most important things humanity is working on. It is more profound than electricity or fire.

WHY AI IS GAINING RELEVANCE - The key reason for AI recent popularity are:-

☞ increased and more than ever powerful computational resources which enable the heavy AI algorithms to work.

☞ **[average smartphones has more computational power now than was used on the entire Apollo Mission which got man on the moon!]**

AI and machine learning needs training data to be able to get better with time. More the sampling data, more would be the outcomes.

3) Internet and data plans have become cheaper with increased internet penetration, thus making more and more people and devices get connected and AI globally.

4) We have various AI applications for our convenience such as Siri, Alexa etc. which offer us relevant content and information, enabling a shift from narrow AI to broad AI.

BROAD AI VS NARROW AI

Broad AI systems are capable of executing various tasks across various fields.

Imagine a robot which can do our laundry, understand our voice commands for reading emails, managing calls and scheduling appointments – all at once.

Broad AI truly replicate human intelligence and help us leverage true power of AI.

Narrow AI systems are very good at one specific task that they are designed to do. They can't execute any task outside their scope.

Imagine an image recognition system i.e. designed to distinguish between humans and animals but can't tell the difference dog and cat unless it is so designed.

TYPES OF AI

GENERIC or GENERAL AI

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Imagine a robot which can do our laundry, understand our voice commands for reading emails, managing calls and scheduling appointments – all at once.

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NARROW AI

☞ When AI works around specific tasks only in closed domain, it is called Narrow AI. Such as asking Alexa to play song or tell a joke.

Narrow AI systems are very good at one specific task that they are designed to do. They can't execute any task outside their scope. Imagine an image recognition system i.e. designed to distinguish between humans and animals but can't tell the difference dog and cat unless it is so designed.

Narrow or Weak Artificial Intelligence

•Narrow AI is a type of AI that is used in only one narrow task. It is one of the most common types and, currently, it is the world of AI.
•Narrow AI is not too intelligent to do its own work beyond its limitations. Hence, it is also known as weak AI.
•Some examples of narrow AI are self-driving cars, chess-playing machine, image recognition, speech recognition, and purchasing suggestions on e-commerce sites.
•However, each narrow AI will contribute to the building of strong AI.

General Artificial Intelligence

•General AI is a type of Artificial Intelligence that has the ability to think and make decisions like humans.
•The purpose behind this AI is to make a system that is smarter and can act like a human on its own.
•Although they do not exist currently, researchers are focusing on developing machines based on general AI.

Strong Artificial Intelligence

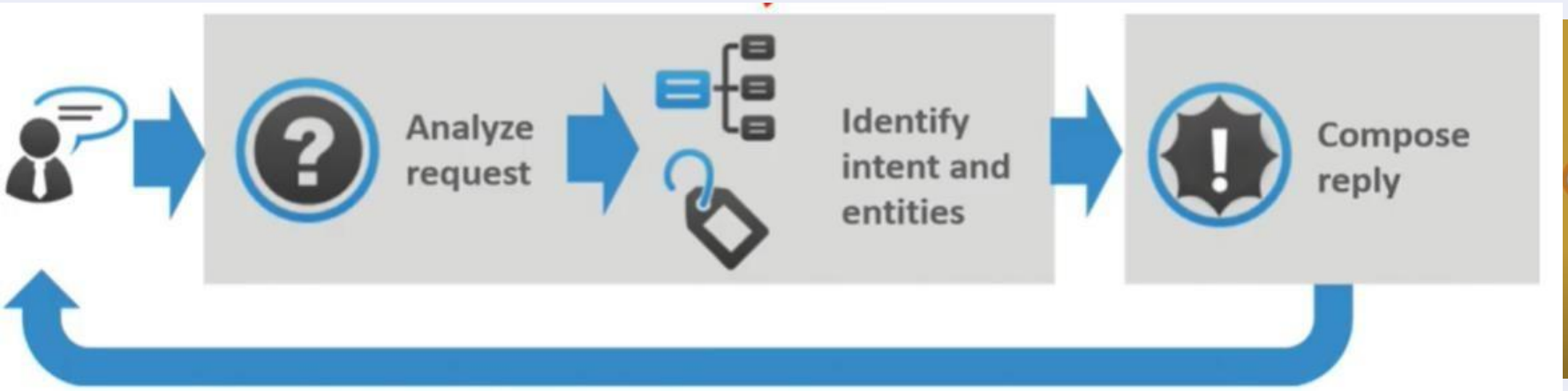
•Strong AI is a type of Artificial Intelligence where machines would surpass human intelligence and would be able to perform any task better than humans.
•Strong AI has its own ability to think, solve puzzles, reason, plan, learn, communicate, and make judgments.
•Currently, there is no proper example to provide for strong AI. However, with some of the industry leaders being focused on building strong AI, it would be materialized soon.

WHAT IS CHATBOTS

Chatbots are essentially assistants that communicate with humans through text or voice.

A chatbot is a computer program that simulates and processes human conversation (either written or spoken), allowing humans to interact with digital devices as if they were communicating with a real person.

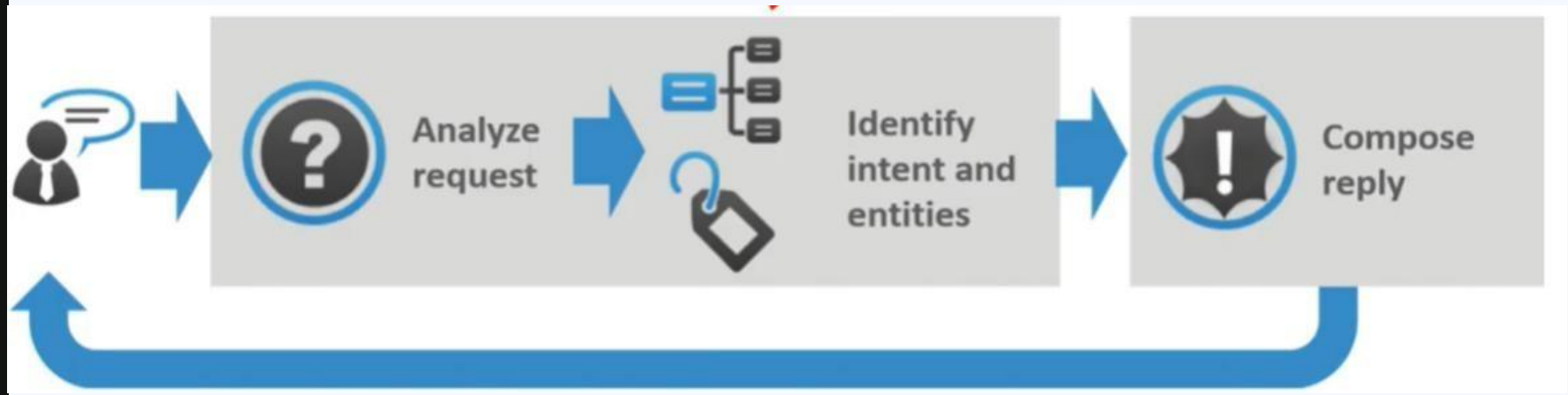
Chatbots can be as simple as rudimentary programs that answer a simple query with a single-line response, or as sophisticated as digital assistants
that learn and evolve to deliver increasing levels of personalization as they gather and process information.



TYPES OF CHATBOTS

They work on pre-written keywords that they understand. Each of the commands that they are going to follow must be coded into them by the developer.so, if a user asks them something outside of their knowledge base, they respond with :"sorry, I did not understand:, or something along these lines.

Smart chatbots are in trend today! Based on AI, these bots don't have pre- prommed answers. They learn with time, catching keywords and putting them in context, and help users arrive at the most relevant answers to their queries.



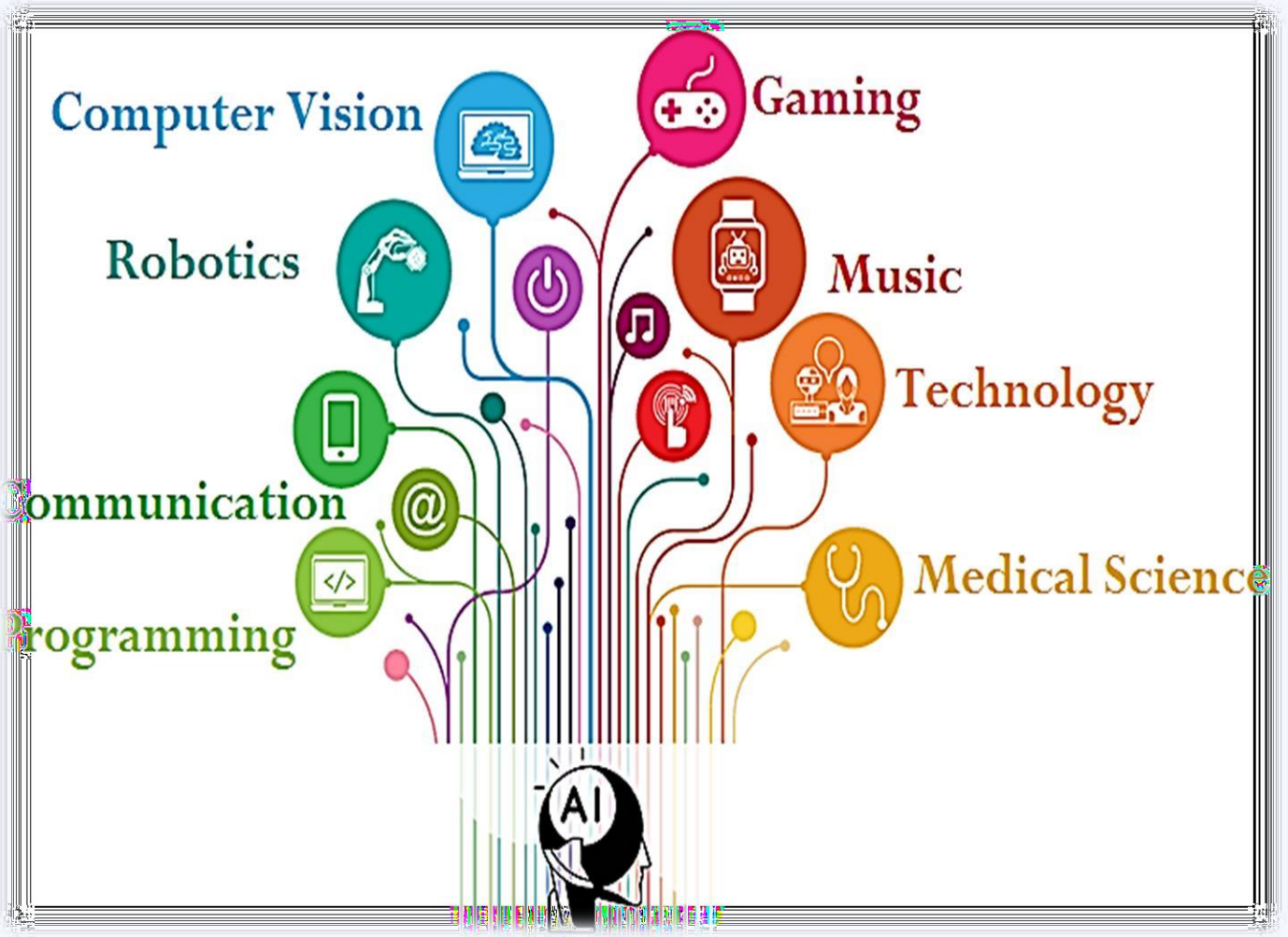
SOPHIA WAS THE FIRST ROBOT THAT WAS RECENTLY OFFERED CITIZENSHIP BY THE KINGDOM OF SAUDI ARABIA.

IBM WATSON – A BIG LEAP INAI

In 2011, the Watson computer system competed on jeopardy! Against legendary champions Brad Rutter and Ken Jennings, winning the first place prize of $1 million (IN RS. 7 CRORE 44 LAKHS 76 THOUSAND 250)

A Machine is **artificially intelligent** when it can accomplish tasks by itself such as

- ✓ **Collect data**
- ✓ **Understand it**
- ✓ **Analyse it**
- ✓ **Learn from it &**
- ✓ **Improve it**



But what makes a machine intelligent ?

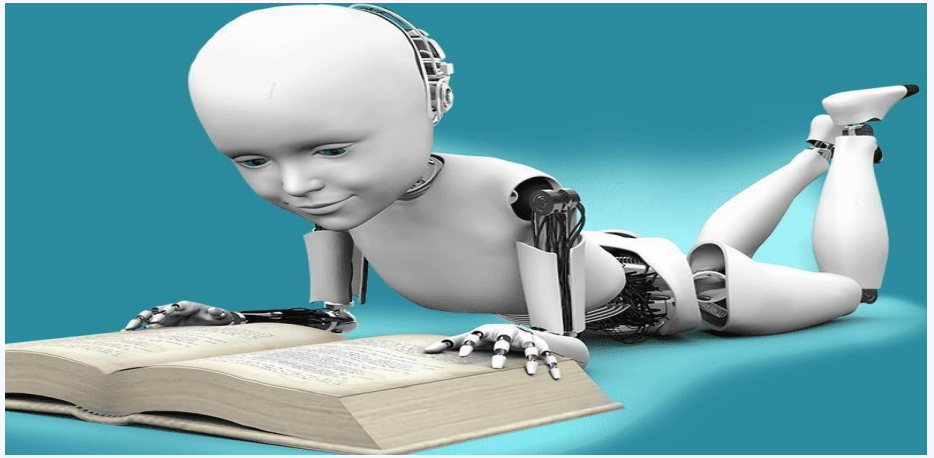
How do machines become artificially intelligent?

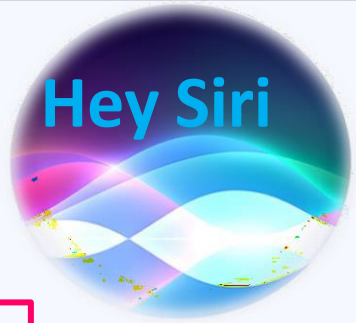
Human become more & more intelligent with time as they gain experiences during their lives.

e.g.

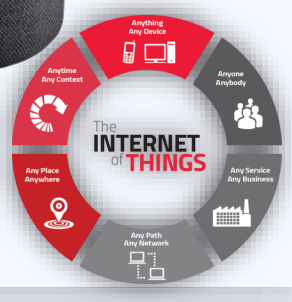
1. in elementary school we learn about alphabets & eventually we move ahead to making words with them. As we grow, we become more & more fluent in the language as we keep learning new words and use them in our conversations.
2. Another example is how we learn walking. Initially a baby struggle to walk . He takes help from others while learning how to walk & once he knows it, he keeps on upgrading by learning how to run, jump etc.

Similarly, machines also become intelligent once they are trained with some information which helps them achieve their tasks. AI machines also keep updating their knowledge to optimize their output.





- ➔ We are surrounded by machines that work on AI.
- ➔ They are becoming a crucial part of our everyday life & provide us with an ease of having even some of the most complicated & time-consuming tasks being done at the touch of a button or by the simple use of a sensor.

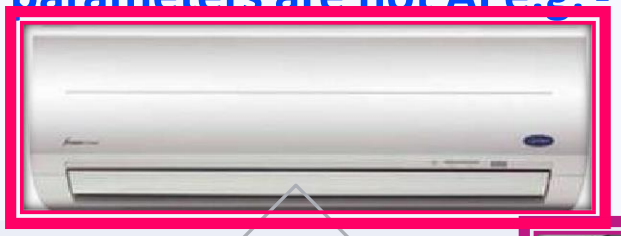


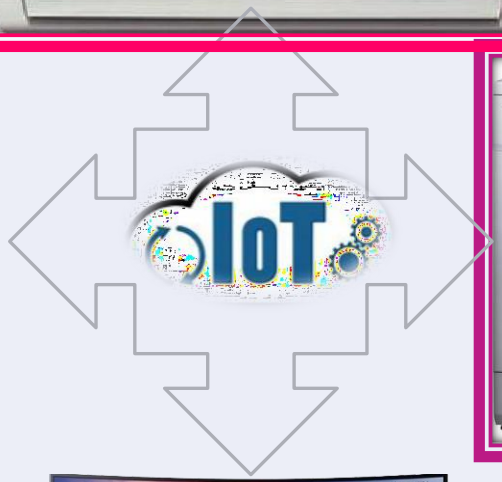
Applications of Artificial Intelligence around us

Personalized Online Shopping	Smart Cars
Marketing	Enhanced Images
Social Media	Surveillance
Agriculture	Customer Service
Video Games	Healthcare
Banks	Smart Homes
Virtual Assistance	Space Exploration
Chatbots	

WHAT IS NOT AI ?

Machine which can work on its own, but requires human intervention to select the parameters are not AI e.g. -

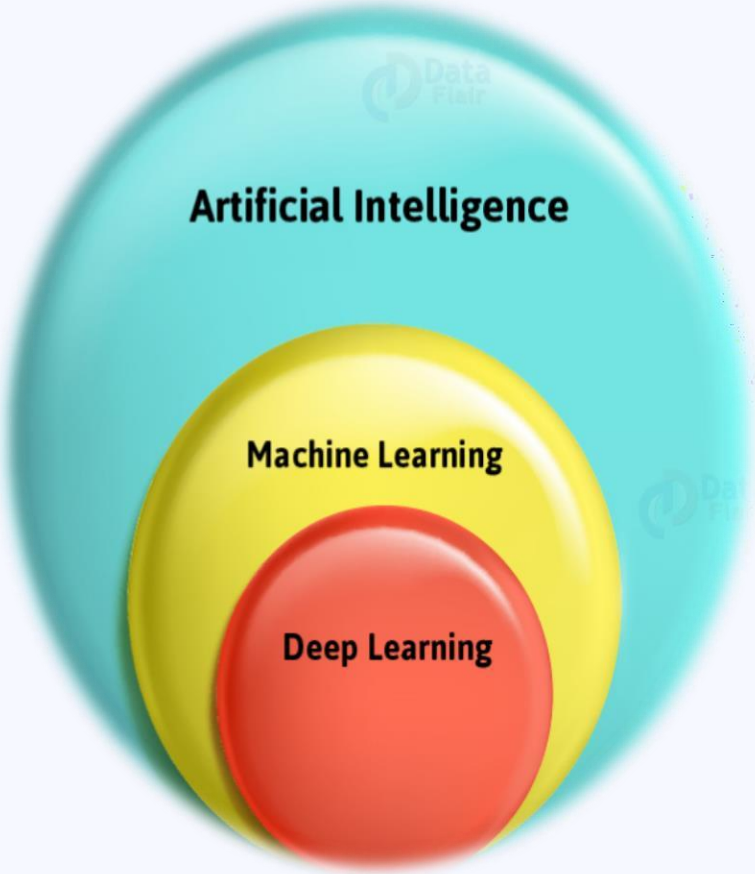




AI

Any machine that has been trained with data and can make decisions/ predictions on its own can be termed as AI.

What is AI/ML/DL



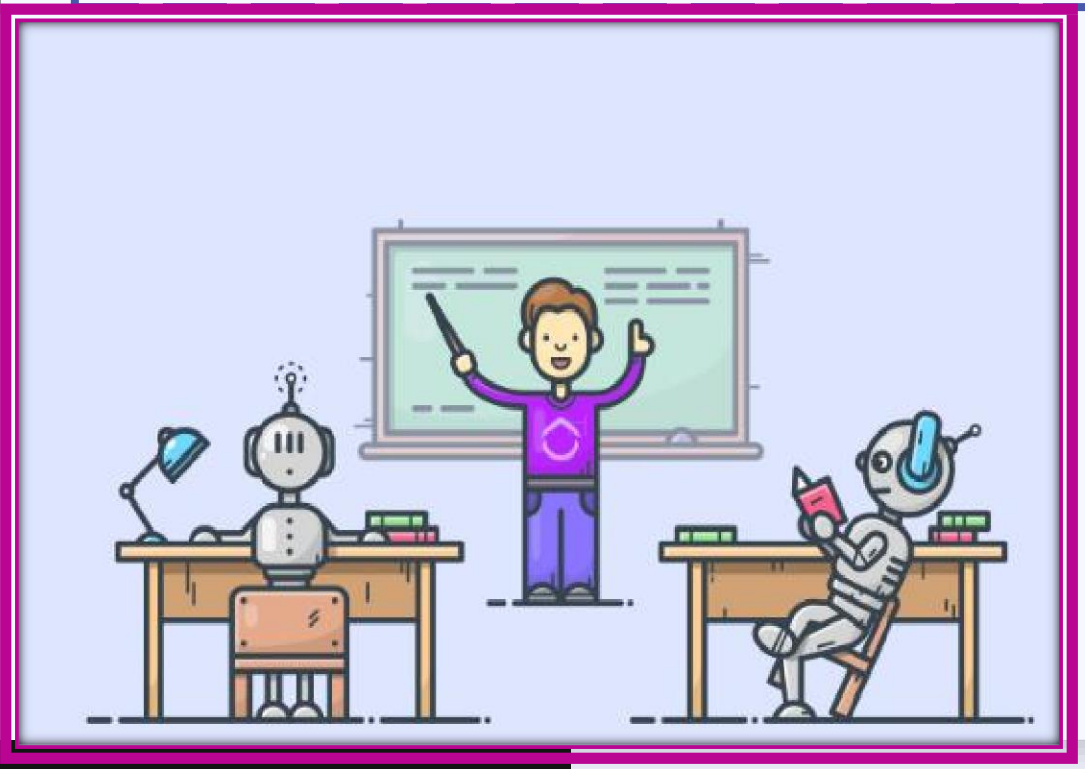
ARTIFICIAL INTELLIGENCE is the study of devices that perceive their environment and define a course of action that will maximize its chance of achieving a given goal.[8]

MACHINE LEARNING is a subset of artificial intelligence, in which machines learn how to to complete a certain task without being explicitly programmed to do so.

DEEP LEARNING is a subset of machine learning in which the tasks are broken down and distributed onto machine learning algorithms that are organised in consecutive layers. Each layer builds up on the output from the previous layer. Together the layers constitute an artificial neural network that mimics the distributed approach to problem-solving carried out by neurons in a human brain.

Machine Learning

1. It is a subset of Artificial Intelligence which enables machines to improve tasks with experience (data).
2. The intention of Machine Learning is to enable machines to learn by themselves using the provided data and make accurate Predictions/Decisions.



How machine learning works. Well, let me show you a picture

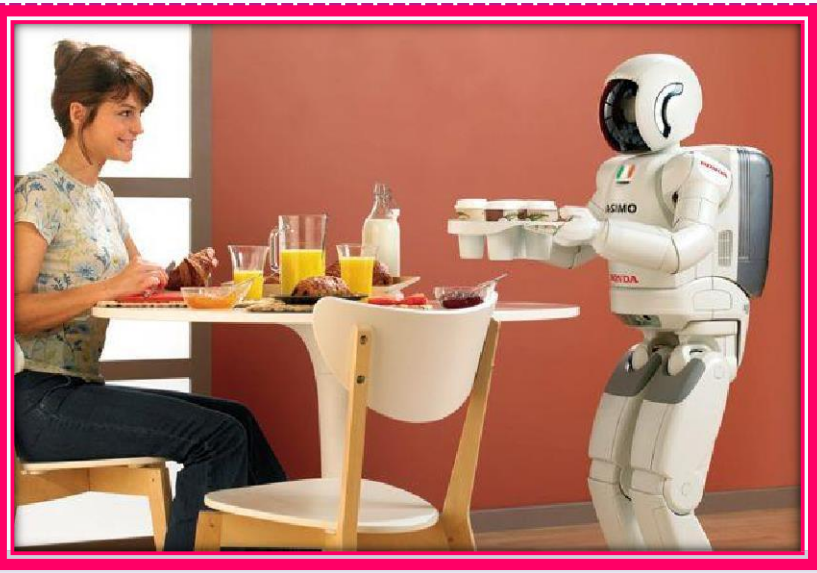
➔ You can see there are two robots there let's call them machines in this context and there is human teaching those machines. Well, that's machine learning in a nutshell.

➔ In machine learning, we do not explicitly code machines on how to solve a particular problem. Rather than that, we give the machine the abilities so that it can figure out the problem and try to solve it on its own.

Deep learning

➔ It enables software to train itself to perform tasks with vast amounts of data. In Deep Learning, the machine is trained with huge amounts of data which help it in training itself around the data.
Such machine are intelligent enough to develop algorithms for themselves.

➔ Deep Learning is the most advanced form of Artificial Intelligence.



Artificial Intelligence	Machine Learning	Deep Learning
AI stands for Artificial Intelligence, and is basically the study / process which enables machines to **mimic human behaviour through particular algorithm.**	ML stands for Machine Learning, and is the study that uses **statistical methods enabling machines to improve with experience.**	DL stands for Deep Learning, and is the study that makes use of Neural Networks(similar to neurons present in human brain) **to imitate functionality just like a human brain.**
AI is the **broader family** consisting of ML and DL as it's components.	ML is the **subset of AI.**	DL is the **subset of ML.**

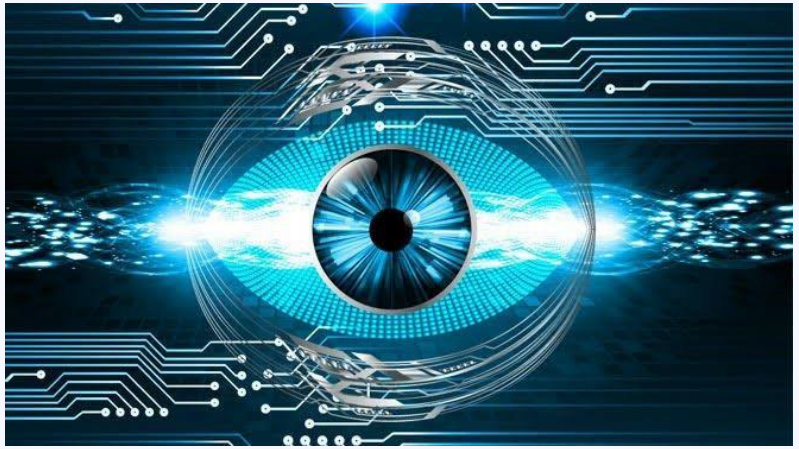
Artificial Intelligence	Machine Learning	Deep Learning
AI is a computer algorithm which exhibits intelligence **through decision making.**	ML is an AI algorithm which allows system to **learn from data.**	DL is a ML algorithm that uses deep(more than one layer) neural networks to **analyze data and provide output accordingly.**
✓ Examples of AI applications include: ✓ **Google's AI-Powered Predictions**, ✓ **Ridesharing Apps Like Uber and Lyft,** ✓ **Commercial Flights Use an AI Autopilot, etc.**	Examples of ML applications include: ✓ **Virtual Personal Assistants: Siri, Alexa, Google, etc.,** ✓ **Email Spam and Malware Filtering.**	Examples of DL applications include: ✓ **Sentiment based news aggregation,** ✓ **Image analysis and caption generation, etc.**

DOMAINS OF AI

AI Model can be broadly categories into three domains:-

DATA SCIENCES

Computer Vision(CV)



Natural Language Processing

Data Sciences

Data Sciences is a domain of AI related to data systems and processes, in which the system collects ***numerous data, maintain data sets and derives meaning/ sense out of them.***

Example of Data Science –

Price Comparing Websites –These websites are driven by lots and lots of data.
PriceGrabber, PriceRunner, Shopzilla, DealTime are some examples of price comparisons websites .
Price comparison website can be found in almost every domain such as technology, hospitality, automobiles, durables, apparels etc.

Computer Vision

Computer Vision i.e. CV, is a domain of AI that depicts the capability of a machine to get and analyse visual information and afterwards predict some decision about it.

The entire process involves image acquiring, screening, analysing, identifying and extracting information.

In Computer Vision, input to machines can be photographs, videos and pictures from thermal or infrared sensors, indicators and different sources.

The main objectives of this domain of AI is to teach machines to collect information from pixels.

Example of Computer Vision–

1. ***Self Driving Car / Automatic Cars – CV systems scan live objects and analyse them, based on whether the car decides to keep running or to stop.***
2. ***Face Lock in Smartphones***

Face Unlock

Natural Language Processing [NLP] - Natural language processing (NLP) refers to **the branch of artificial intelligence or AI—concerned with giving computers the ability to understand text and spoken words in much the same way human beings can.**

Example of NLP –

➔***Email filters –***

➔***Sppech recoginition – Google Assistant/ Siri /***

➔***ChatBots***

➔***Smart assistants***

Thanks