AI/ML

Definition –

Artificial Intelligence is a concept where a system or a machine performs basic human tasks like – problem solving, decision making, and analysing information.

Common examples include – Meta AI by Meta, ChatGPT by OpenAI, Gemini AI by Google, etc…..  
  
Common Applications and Examples –

* Image/Video/Audio processing and generating
* AI in Education (Graphical representation of Data)
* Health Care
* Facial Recognition

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Intelligent behaviour –

The intelligent behaviour showcases how a program/system/machine executes a task by using critical thinking, analysis and making trial-by-error situations. If a machine is provided by a certain situations, the effective response of machine determines whether it is smart or intelligent.

For example, T-Maze problem. In this scenario, a worm is placed in a “T” like structure. A small amount of food is placed on the right side (always in the right side). A worm is left to search for food.

In the above problem, worm has 2 options – either to go right or left. If it goes to left, then in second trial, it will go to right. And if it goes to right in first trial, it will go to right in the second trial also. Thus, it showcases the intelligent behaviour of the worm in the T-Maze problem.

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TURING TEST –

Human/Operator/Interrogator

Answer

Answer

Machine

Human/Other Person

The Turing test was proposed by Alan Turing in 1950 to determine whether a machine can exhibit intelligent behaviour like humans.

In the above test, if the response of the machine is indistinguishable, then the machine has passed the test, else if the response is too different, then the machine has failed the test.  
  
Agent and Environment –

An Agent is considered to be a program/machine/device that is exhibiting intelligent behaviour.

The Environment is considered to be the things around the said agent(s). These components of environments are perceived by agents, and it determines their intelligent behaviour.

For example, Tesla’s Cyber Truck is an agent and the trees, other vehicles, traffic, humans, etc… that are around it are considered as its environment.

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Rational v/s Irrational Reasoning –

AI uses different formats of reasoning depending upon the data. The two brought types of reasoning are – rational and non-rational/irrational reasoning.

Rational Reasoning –

It refers to logical thinking, and making their tasks achievable through goal-oriented thinking. These systems work on making decisions based on data, rules & regulations and expected outcomes.

Key features include –

1. It is based on logic, algorithm, etc….
2. It follows a task using step-by-step approach.
3. It uses probability and effective optimisation to complete a task.

For example: an AI based car stopping at red light

Non-Rational Reasoning –

This reasoning refers to decisions and processing not only based on logic and code, but by using emotions, judgements, intuitions, while interacting with users.

Key features include –

1. Imitating/Mimicking human-like behaviour.
2. It does not follow any scripted logic.
3. It learns by pattern recognition, past experiences, and heuristics\

For example: chatbots used in mental health platforms. ( name – Woebot: mental health chatbot )

* This AI is more useful in creative and emotionally complex tasks.
* Rational behaviour is more useful in an environment where decisions must be precised, on-point, and data-driven. Whereas Non-Rational behaviour is often used to stimulate human-like mannerisms and empathy for completing their tasks.

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Challenges faced in AI –

In the current era, AI is present in almost all the fields. Therefore, the broader challenges faced by AI are classified into two categories 🡪

* Technical challenges –
  + Handling complex tasks – If an AI driven vehicle encounters children playing in the middle of road, the next task taken by the system will be difficult as AI struggles to react appropriately without understanding the complexity of the situation.
  + Scalability and efficiency – For small ventures and businesses, AI can be difficult to make understand massive dataset and large language model for text and code. It is treated as a barrier for efficiency of AI.
  + Interperobility – It means the ability of computer systems or any software to exchange information and use that information. When two AI systems are unable to communicate or are unable to understand each other, it is a challenge that is faced by those systems
* Ethical considerations in AI –
  + BIAS (Judgemental/Prejudiced) –