PARSHWANATH CHARITABLE TRUST'S
A.P. SHAH INSTITUTE OF TECHNOLOGY
Department of Computer Science and Engineering
Data Science

Semester : V Subject : AI Academic Year: 20 - 20

Module 1 : Introduction to Artificial Intelligence

1.1 Artificial Intelligence (AI), AI Perspectives : Acting & Thinking Humanly, Acting & Thinking Rationally

→ AI refers to the simulation of human intelligence in machines that are programmed to think and act like humans.

→ It involves the development of algorithms and computer programs that can perform tasks that typically require human intelligence such as speech recognition.

→ The term was coined by John McCarthy in 1956.

→ Before leading to the meaning of AI, understand the meaning of Intelligence

Intelligence : The ability to learn and solve problems.

→ If the computers can, somehow, solve real-world problems, by improving on their own from past experiences, they would be called "Intelligent"

→ Hence, Artificial Intelligence is the system which is capable of acquiring and applying the information it has gained through past experiences.

→ Intelligence is composed of

[Reasoning, Learning, Problem-Solving, Perception, Linguistic Intelligence.]

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Intelligent Systems:

- intelligent systems are divided into four categories:
  1. Systems that thinks like humans
  2. Systems that act like humans
  3. Systems that think rationally
  4. Systems that act rationally

	Human-Like	Rationally
Think	Cognitive Science Approach "Machines that think like Humans"	Laws of thought Approach "Machines that think Rationally".
Act	Turing Test Approach "Machines that behave like humans"	Rational Agent Approach "Machines that behave Rationally"

* Turing Test: Act Human-Like

→ The art of creating machines that perform functions requiring intelligence when performed by people.
→ It is the study of how to make computers do things which, at the moment people do better.

e.g. Turing Test

→ proposed by Alan Turing (1950)
→ 3 rooms contain : a person, a computer & an interrogator.
→ The interrogator can communicate with the other two by teletype.
→ The interrogator tries to determine which the person is and which the machine is.
→ The machine tries to fool the interrogator to believe that it is the human and the person also tries to convince the interrogator that it is the human.
→ If the machine succeeds in fooling the interrogator, then conclude that the machine is intelligent.
→ The computer would need to possess the following capabilities :

1. NLP : to enable it to communicate successfully in English (or some other human language)
2. Knowledge Representation : To store information provided before or during the interrogation.
3. Automated Reasoning : To use the stored information to answer questions and to draw new conclusions.
4. Machine Learning : To adapt to new circumstances & to detect and extrapolate patterns.

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* Thinking Humanly : The Cognitive Modelling Approach

→ Cognitive modelling is ~~used~~ an area of computer science that deals with simulating human problem solving & mental processing in a computerized model.
→ Such a model can be used to simulate or predict human behaviour & improve human-computer interaction.
→ Applications : Expert System, NLP, VR, NN.

* Thinking Rationally : The laws of thought Approach
→ It uses the logic
e.g. Socrates is a man, all men are mortal
∴ Socrates is a mortal.

* Acting Rationally : The rational agent approach
→ Acting rationally means acting to achieve goals.
Rational Agent : It considers how people think with preferences for advantageous outcomes. and ability to learn.
→ used in game theory and decision theory to help us apply AI to various real-world scenarios.
→ It uses a set of rules to determine the best course of action for a given situation.
e.g. Self driving cars, Siri, Alexa, Robots.