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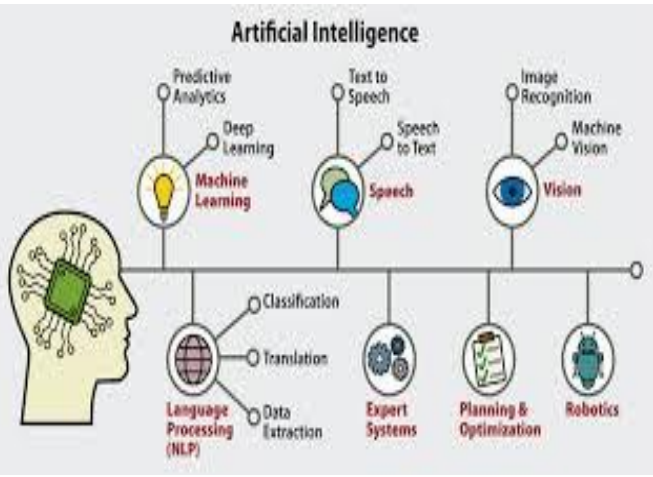
CHAPTER – 1
WHAT IS AI ?



Subject : AI **Code : 2180703**	**Prepared By:** **Asst. Prof. Twinkal Panchal** **(CSE Department, ACET)**	AMIRAJ COLLEGE OF ENGINEERING & TECHNOLOGY

Artificial Intelligence (AI)

- Artificial Intelligence is a way of **making a computer, a computer-controlled robot, or a software think intelligently**, in the similar manner the intelligent humans think.
- AI is accomplished by studying how human brain thinks, and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.
- Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.

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Goals of AI

- **To Create Expert Systems** − The systems which exhibit intelligent behavior, learn, demonstrate, explain, and advice its users.

- **To Implement Human Intelligence in Machines** − Creating systems that understand, think, learn, and behave like humans.

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AI Technique

- In the real world, the knowledge has some unwelcomed properties −

➢ Its volume is huge, next to unimaginable.

➢ It is not well-organized or well-formatted.

➢ It keeps changing constantly.

➢ AI Technique is a manner to organize and use the knowledge efficiently in such a way that −

➢ It should be perceivable by the people who provide it.

➢ It should be easily modifiable to correct errors.

➢ It should be useful in many situations though it is incomplete or inaccurate.

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Applications of AI

1. **Gaming**

- AI plays crucial role in strategic games such as chess, poker, tic-tac-toe, etc., where machine can think of large number of possible positions based on heuristic knowledge.

2. **Expert Systems**

- There are some applications which integrate machine, software, and special information to impart reasoning and advising. They provide explanation and advice to the users.

3. **Natural Language Processing**

- It is possible to interact with the computer that understands natural language spoken by humans.

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4. Vision Systems

- These systems understand, interpret, and comprehend visual input on the computer. For example, Doctors use clinical expert system to diagnose the patient.

5. Speech Recognition

- Some intelligent systems are capable of hearing and comprehending the language in terms of sentences and their meanings while a human talks to it.

6. Handwriting Recognition

- The handwriting recognition software reads the text written on paper by a pen or on screen by a stylus. It can recognize the shapes of the letters and convert it into editable text.

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7. Intelligent Robots

- Robots are able to perform the tasks given by a human. They have sensors to detect physical data from the real world such as light, heat, temperature, movement, sound, bump, and pressure.
- They have efficient processors, multiple sensors and huge memory, to exhibit intelligence.
- In addition, they are capable of learning from their mistakes and they can adapt to the new environment.

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Turing Test in AI

- In 1950, Alan Turing introduced a test to check whether a machine can think like a human or not, this test is known as the Turing Test. In this test, Turing proposed that the computer can be said to be an intelligent if it can mimic human response under specific conditions.

- The Turing test is based on a party game "Imitation game," with some modifications. This game involves three players in which one player is Computer, another player is human responder, and the third player is a human Interrogator, who is isolated from other two players and his job is to find that which player is machine among two of them.

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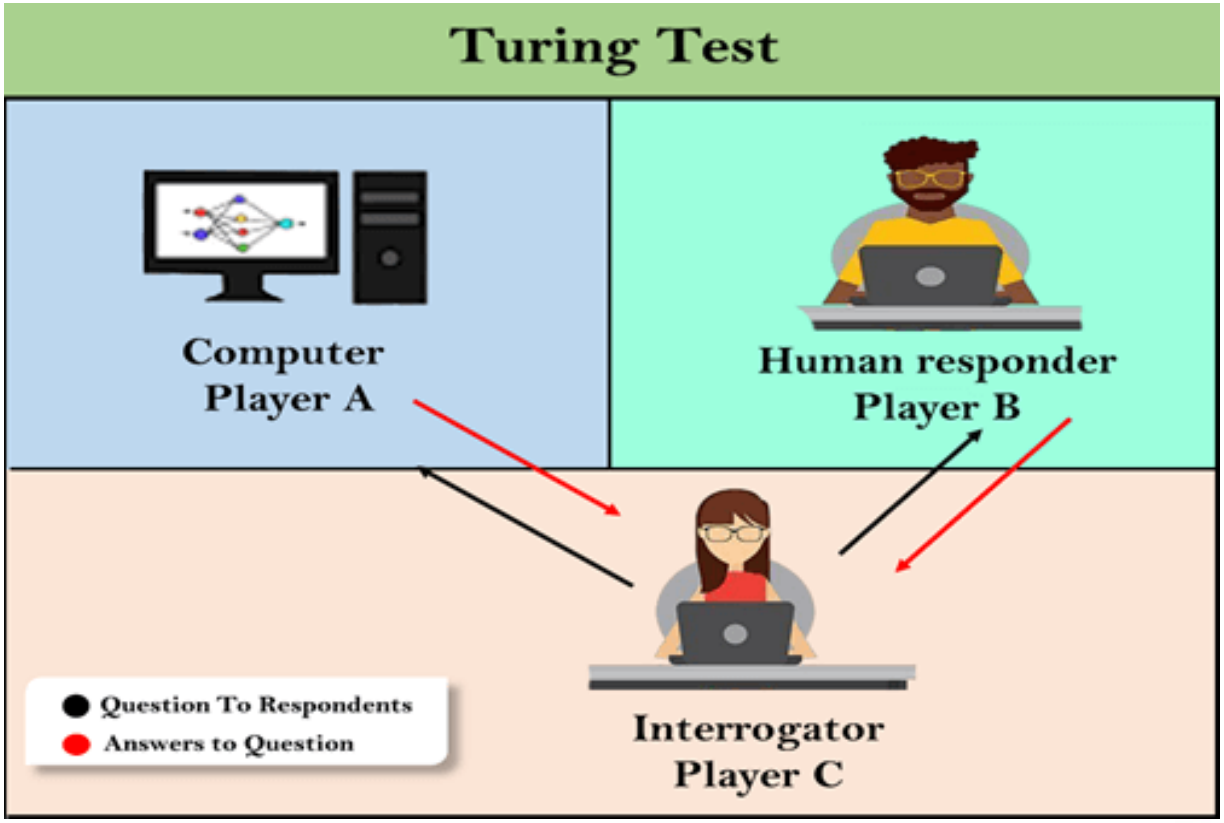
- Turing Test was introduced by Turing in his 1950 paper, "Computing Machinery and Intelligence," which considered the question, "Can Machine think?"



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- Player A is a computer, Player B is human, and Player C is an interrogator. Interrogator is aware that one of them is machine, but he needs to identify this on the basis of questions and their responses.

- The conversation between all players is via keyboard and screen so the result would not depend on the machine's ability to convert words as speech.

- The test result does not depend on each correct answer, but only how closely its responses like a human answer. The computer is permitted to do everything possible to force a wrong identification by the interrogator.

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The questions and answers can be like:

- **Interrogator:** Are you a computer?
- **Player A (Computer):** No
- **Interrogator:** Multiply two large numbers such as (256896489*456725896)
- **Player A:** Long pause and give the wrong answer.

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Features required for a machine to pass the Turing test

1. **Natural language processing:** NLP is required to communicate with Interrogator in general human language like English.

2. **Knowledge representation:** To store and retrieve information during the test.

3. **Automated reasoning:** To use the previously stored information for answering the questions.

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4. **Machine learning:** To adapt new changes and can detect generalized patterns.

5. **Vision (For total Turing test):** To recognize the interrogator actions and other objects during a test.

6. **Motor Control (For total Turing test):** To act upon objects if requested.

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