

## 1.1 INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Many human mental activities such as developing computer programs, working out mathematics, engaging in common sense reasoning, understanding languages and interpreting it, even driving an automobile are said to demand "intelligence". Several computer systems have been built that can perform tasks such as these. Also there are specially developed computers systems that can diagnose disease, solve quadratic equations, understand human speech and natural language text.

The AI is the science and engineering of making intelligent machines, especially intelligent computer programs. A branch of science which deals with helping machines find solutions to complex problems in a more human-like fashion.

### Definitions of AI

AI may be defined as the branch of computer science that is concerned with the automation of intelligent behavior

AI is defined as “The art of creating machines that perform functions that require intelligence when performed by people”

AI is: “The automation of activities that we associate with human thinking, activities such as decision-making, problem solving, learning...”

AI is : The study of agents that receive percepts from the environment and perform actions

### Foundation of AI is based on

- > Computer Science
- > Engineering
- > Mathematics
- > Neuroscience
- > Control Theory
- > Linguistics

### Capabilities of AI :

AI is the programming the computer to have the following capabilities.

- Natural language processing

To enable it to communicate successfully in English

- Knowledge representation

It is the field if AI to representing information about the world in a form that a computer system

can utilize to solve complex tasks such as diagnosing a medical condition or having a dialog in a natural language.

- Automated reasoning

To use stored information to answer questions and to draw new conclusions.

- Machine learning

To adopt to new circumstances that provides computers with the ability to learn without being explicitly programmed.

Machine learning focuses on the development of computer programs that can change when exposed to new data.

Four approaches that are followed in AI. These four approaches are

**1. Acting Humanly**

- Turing introduced the concept of the Turing Test to assess a machine's ability to exhibit intelligent behavior from that of a human.

**2. Thinking Humanly**

- Machines could possess the ability to think in ways similar to humans.

**3. Thinking Rationally**

- Focuses on evaluating the internal thought processes of an artificial intelligence system, emphasizing logical reasoning and deduction.

**4. Acting Rationally.**

- Ability to make rational decisions and achieve optimal outcomes in pursuit of specified goals

**Current Trends in AI and AI Applications**

**Gaming** - AI plays important role for machine to think of large number of possible positions based on deep knowledge in strategic games. for example, chess, river crossing, N-queens problems and etc.

**Natural Language Processing** - Interact with the computer that understands natural language spoken by humans.

**Expert Systems** - Machine or software provide explanation and advice to the users.

**Vision Systems** - Systems understand, explain, and describe visual input on the computer.

**Speech Recognition** - There are some AI based speech recognition systems have ability to hear and express as sentences and understand their meanings while a person talks to it. For example, Siri and Google assistant.

**Handwriting Recognition** - The handwriting recognition software reads the text written on paper and recognize the shapes of the letters and convert it into editable text.

**Intelligent Robots** - Robots are able to perform the instructions given by a human.

