

## 1.1 INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is the intelligence exhibited by machines or software. It is also the name of the academic field of study which studies how to create computers and computer software that are capable of intelligent behavior. The central problems (or goals) of AI research include reasoning, knowledge, planning, learning, natural language processing (communication), perception and the ability to move and manipulate objects.

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. It is a field of computer science that seeks to understand and implement computer-based technology that can simulate characteristics of human intelligence and human sensory capabilities to make

- Systems that act like humans
  - Machines with mind in the full and literal sciences
- Systems that think like humans
  - Act of creating machines, that performs functions that require
- Systems that think rationally
  - Study of mental facilities through the use of computational models
- Systems that act rationally
  - Rationalist approach involves a combination of mathematics and engineering

### Other some definitions of AI are

AI is: “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 of 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 adapt 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.

### AI Techniques:

**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.

### **Major Goals**

- Knowledge reasoning
- Planning
- Machine Learning
- Natural Language Processing
- Computer Vision
- Robotics