

# Artificial Intelligence(AI)

## Modul-1

### 1.What is Artificial Intelligence (AI)?

Artificial Intelligence is composed of two words **Artificial** and **Intelligence**, where Artificial defines "*man-made*," and intelligence defines "*thinking power*", hence AI means "*a man-made thinking power*."

"It is branch of computer science by which we can create intelligent machine which can behave like a human, think like humans & able to make decisions"

In AI you do not need to pre-program m/c to do some work.

You have to create a m/c with programmed algorithms which can work with own intelligence.

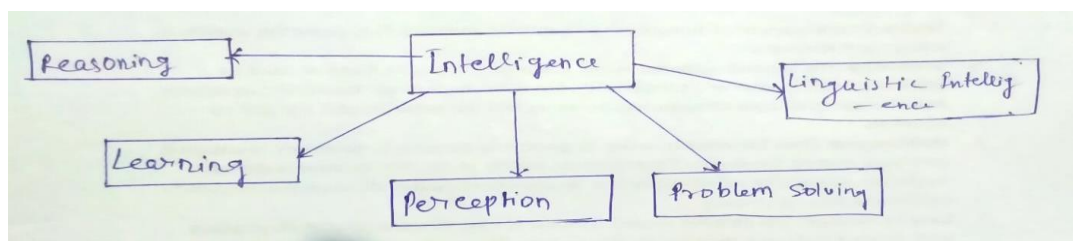
### 2.Why Artificial Intelligence???

- With the help of AI, we can create such s/w or device which can solve real-world problems very easily and accuracy such as health issues, marketing ,traffic issues.
- With the help of AI, you can create your personal virtual assistant such as google assistant, Siri etc.
- With the help of AI, you can build such Robots which can work in a environment where survival of human can be a risk place.
- AI opens a path for new technologies new devices and new opportunities.

### 3.Gools of Artificial Intelligence:-

1. Replicate human Intelligence.
2. Solve knowledge-intensive task.
3. An intelligent connection of perception and action.
4. Building a m/c which can perform tasks that requires human intelligence such as:
  - Providing a theorem
  - Playing chess
  - Plan some surgical operation
  - Driving a car in traffic.
5. Creating some system which can exhibit intelligent behavior, learn new things by itself, demonstrate explain and can advise to it user.

### 4.What is Intelligence Composed of?



## 5.Application of AI??

### AI in business intelligence

AI is playing an increasingly important role in business intelligence (BI). AI-powered BI tools can help businesses collect, analyze, and visualize data more efficiently and effectively. This can lead to improved decision-making, increased productivity, and reduced costs.

Some of the ways that AI is being used in BI include:

- **Data collection:** Collecting data from a variety of sources, including structured data (for example, databases) and unstructured data (for example, text documents, images, and videos)
- **Data analysis:** To analyze data and identify patterns, trends, and relationships
- **Data visualization:** AI can help create visualizations that make it easier to understand data
- **Decision-making:** Insights and recommendations generated by AI models can help drive data-driven decision-making for businesses

### AI in healthcare

AI is also playing an increasingly important role in healthcare. AI-powered tools can help doctors diagnose diseases, develop new treatments, and provide personalized care to patients. For example:

- **Disease diagnosis:** AI can be used to analyze patient data and identify patterns that may indicate a disease. This can help doctors diagnose diseases earlier and more accurately.
- **Treatment development:** By analyzing large datasets of patient data, AI can identify new patterns and relationships that can be used to develop new drugs and therapies.
- **Personalized care:** By analyzing a patient's data, AI can help doctors develop treatment plans that are tailored to the patient's specific needs.

### AI in education

AI could be used in education to personalize learning, improve student engagement, and automate administrative tasks for schools and other organizations.

- **Personalized learning:** AI can be used to create personalized learning experiences for students. By tracking each student's progress, AI can identify areas where the student needs additional support and provide targeted instruction.
- **Improved student engagement:** AI can be used to improve student engagement by providing interactive and engaging learning experiences. For example, AI-powered applications can provide students with real-time feedback and support.
- **Automated administrative tasks:** Administrative tasks, such as grading papers and scheduling classes can be assisted by AI models, which will help free up teachers' time to focus on teaching.

#### AI in finance

AI can help [financial services](#) institutions in five general areas: personalize services and products, create opportunities, manage risk and fraud, enable transparency and compliance, and automate operations and reduce costs. For example:

- **Risk and fraud detection:** Detect suspicious, potential money laundering activity faster and more precisely with AI.
- **Personalized recommendations:** Deliver highly personalized recommendations for financial products and services, such as investment advice or banking offers, based on customer journeys, peer interactions, risk preferences, and financial goals.
- **Document processing:** Extract structured and unstructured data from documents and analyze, search and store this data for document-extensive processes, such as loan servicing, and investment opportunity discovery.

## Types of Artificial Intelligence

There are 7 types of [Artificial Intelligence](#) divided on the basis of Capabilities and functionalities of AI. Artificial Intelligence can be divided based on capabilities and various other functionalities.

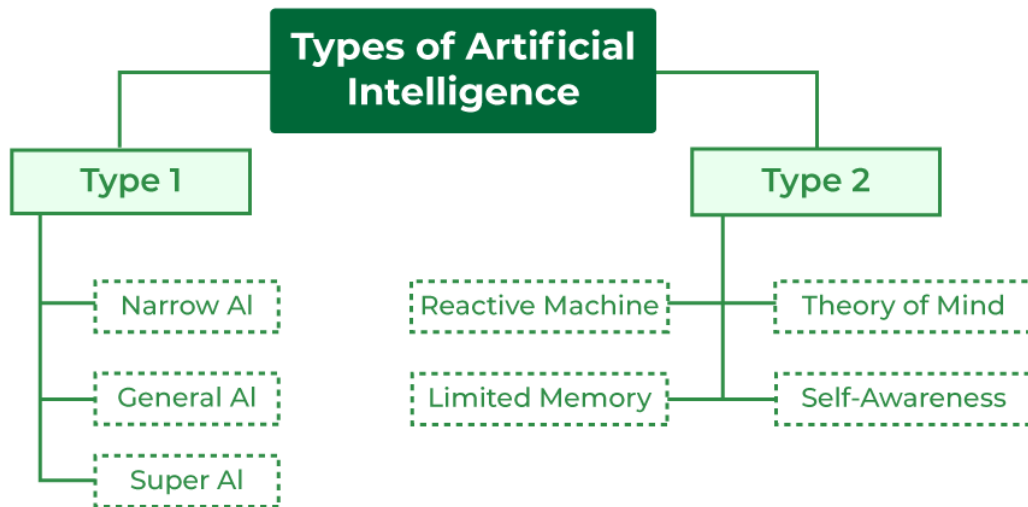
### Based on Capabilities of AI -Type 1

- Narrow AI
- General AI
- Super AI

### Based on the Functionality of AI- Type 2

- Reactive Machines
- Limited Theory

- Theory of Mind
- Self-awareness



*Types of Artificial Intelligence*

### Based on Capabilities of AI -Type 1

1. **Narrow AI:** Narrow AI also known as **Weak AI or Narrow AI**.  
Narrow AI is designed and trained on a specific task or a narrow range tasks. These Narrow AI systems are designed and trained for a purpose. These Narrow systems performs their designated tasks but mainly lack in the ability to generalize tasks. Personal Virtual assistance like Alexa or Siri, recommendation systems, image recognition software and other language translation tools.
2. **General AI:** It is known as **Strong AI**. It refers to AI systems that have human intelligence and abilities to perform various tasks. Systems have capability to understand, learn and apply across a wide range of tasks that are similar to how a human can adapt to various tasks. In general AI remains a theoretical concept, and now no AI can achieve this level of intelligence.
3. **Super AI:** It is known as **Superintelligent AI** that surpasses intelligence of human in solving-problem, creativity, and overall abilities. Super AI develops emotions, desires, need and beliefs of their own. They are able to make decisions of their own and solve problem of its own.

## Based on the Functionality of AI- Type 2

1. **Reactive Machines:** Reactive machines were created by IBM in the mid-1980s. These machines are the foremost basic sort of AI system. This suggests that they can't form memories or use past experiences to influence present -made a choice, they will only react to currently existing situations hence "Reactive". An existing sort of reactive machine is Deep Blue, chess played by the supercomputer. These are the most basic type of AI and can only react to the environment, they cannot form memories or make decisions based on past experiences. Examples include simple rule-based systems like chess-playing programs.
2. **Limited Memory:** It is comprised of machine learning models that the device derives knowledge from previously-learned information, stored data, or events. Unlike Reactive machines, limited memory learns from the past by observing actions or data fed to them to create experiential knowledge.
3. **Theory of Mind:** In this sort of AI decision-making ability is adequate to the extent of the human mind, but by machines. While some machines currently exhibit humanlike capabilities like voice assistants, for example, none are fully capable of holding conversations relative to human standards. One component of human conversation has the emotional capacity or sounding and behaving sort of a person would in standard conversations of conversation AI systems with a theory of mind can understand and simulate the mental states of other agents. This type of AI is still in development and is not yet practical.
4. **Self-Awareness:** This AI involves machines that have human-level consciousness. This type of AI isn't currently alive but would be considered the foremost advanced sort of AI known to man. These AI systems possess consciousness and self-awareness, but this is currently the stuff of science fiction, and not yet a reality.

1. What is an Agent in AI?
2. • Definition: An agent in AI is any entity (software or hardware) that can perceive its environment through sensors and act upon that environment through actuators to achieve a set of goals.
3. • Characteristics of an AI Agent:

4.   o Perception: The agent receives input from its environment via sensors.   o Action: The agent responds to the environment using actuators.
5.   o Autonomy: The agent operates without human intervention, making its own decisions based on its perception and goals.
6.   o Goal-Driven: The agent is designed to achieve certain objectives.

## 2. Structure of an Agent

AI agents are structured into four key components:

- Sensors: Used by the agent to gather information about the environment. In a software system, sensors could be data inputs like user commands or environmental data.
- Actuators: The components through which an agent performs actions. For a robot, these could be motors controlling movement, while in software, actuators might represent system commands or responses.
- Perception: The agent's ability to interpret sensor data and create an internal representation of the environment.
- Decision-Making Process: The core intelligence of the agent, where it decides what actions to take to achieve its goals. This decision process may involve:
  - o Rule-based logic.
  - o Search algorithms.
  - o Machine learning models.

## 4. Types of Agents

- Simple Reflex Agents:

- o These agents act based solely on the current perception, without considering history or past experiences.

- o They follow a condition-action rule (if condition, then action).

- o Example: A thermostat that turns the heater on if the temperature drops below a set point.

- Model-Based Reflex Agents:

- o These agents maintain an internal state that represents aspects of the world that are not immediately visible.

- o They use a model of the environment to make decisions, considering both the current perception and their internal state.

- o Example: A vacuum robot that keeps track of which areas have already been cleaned.

- Goal-Based Agents:

- o These agents take actions to achieve specific goals. They have a clear objective and make decisions based on what actions will bring them closer to achieving that goal.

- o Example: A navigation system that plans the shortest route to a destination.

- Utility-Based Agents:

- o Utility-based agents aim not just to achieve goals but to optimize the achievement of these goals based on a utility function (a measure of success or happiness).

- o Example: A self-driving car that not only reaches the destination but does so while minimizing fuel consumption or travel time.

- Learning Agents:

- o These agents can improve their performance over time based on past experiences. They learn from data and adjust their behavior accordingly.

- o Example: A recommendation system that improves its suggestions by learning from user interactions.

### (1)Sensors:-

It is a device which detects the change in environment & sends the information to other electronic device.

An agent observes the environment through sensors.

### (2)Actuators:-

It is a component of machine that converts energy into motion.

### (3)Effectrs:-

Which effect the environment ,It can be legs, wheds, arms, finges & display screen.