# What Is Artificial Intelligence (AI)?

*Artificial intelligence imitates human thinking by employing intelligent algorithms built into a dynamic computing environment.*

**Artificial intelligence (AI) is the intelligence of a machine or computer that enables it to imitate or mimic human capabilities.**

AI uses multiple technologies that equip machines to sense, comprehend, plan, act, and learn with human-like levels of intelligence. Fundamentally, AI systems perceive environments, recognize objects, contribute to decision making, solve complex problems, learn from past experiences, and imitate patterns. These abilities are combined to accomplish tasks like driving a car or recognizing faces to unlock device screens.

The AI landscape spreads across a constellation of technologies such as machine learning, natural language processing, computer vision, and others. Such cutting- edge technologies allow computer systems to understand human language, learn from examples, and make predictions.

Although each technology is evolving independently, when applied in combination with other technologies, data, analytics, and automation, it can revolutionize businesses and help them achieve their goals, be it optimizing supply chains or enhancing customer service.

## How does AI work?

To begin with, an AI system accepts data input in the form of speech, text, image, etc. The system then processes data by applying various rules and algorithms, interpreting, predicting, and acting on the input data. Upon processing, the system provides an outcome, i.e., success or failure, on data input.

The result is then assessed through analysis, discovery, and feedback. Lastly, the system uses its assessments to adjust input data, rules and algorithms, and target outcomes. This loop continues until the desired result is achieved.

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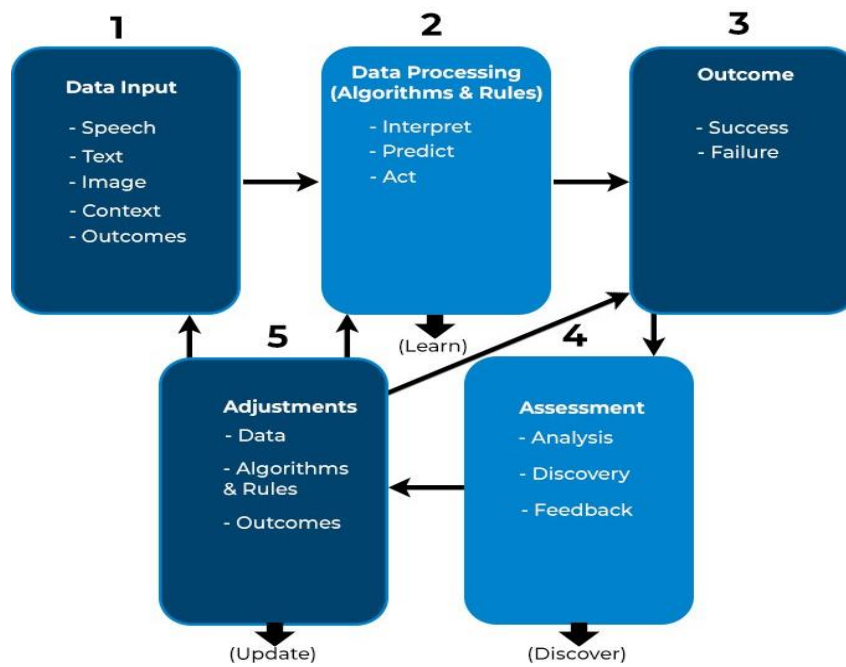
How AI Works

# Key components of AI

However, for it to qualify as AI, all its components need to work in conjunction with each other. Let's understand the key components of AI.
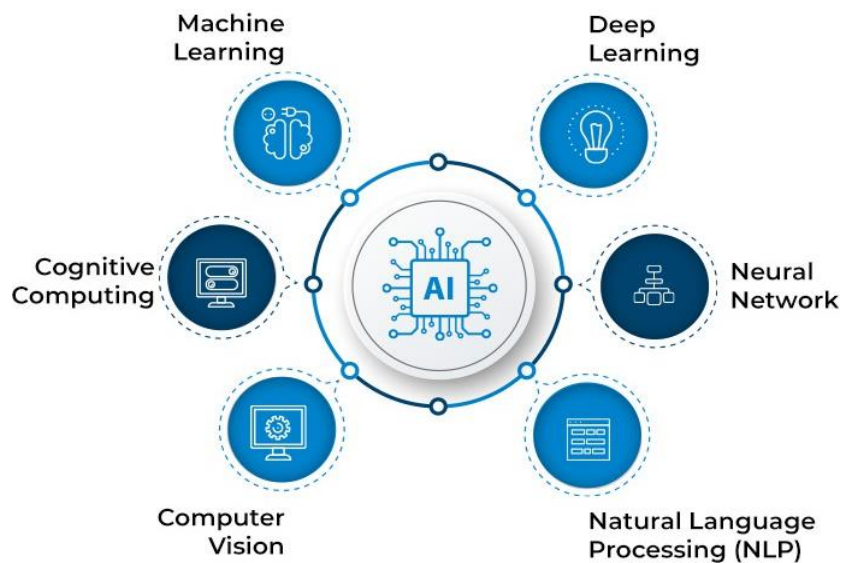
# Key Components of AI

1. **Machine learning:** Machine learning is an AI application that automatically learns and improves from previous sets of experiences without the requirement for explicit programming.

2. **Deep learning:** Deep learning is a subset of ML that learns by processing data with the help of artificial neural networks.

3. Neural network: Neural networks are computer systems that are loosely modeled on neural connections in the human brain and enable deep learning.

4. Cognitive computing: Cognitive computing aims to recreate the human thought process in a computer model. It seeks to imitate and improve the interaction between humans and machines by understanding human language and the meaning of images.

5. Natural language processing (NLP): NLP is a tool that allows computers to comprehend, recognize, interpret, and produce human language and speech.

6. Computer vision: Computer vision employs deep learning and pattern identification to interpret image content (graphs, tables, PDF pictures, and videos).
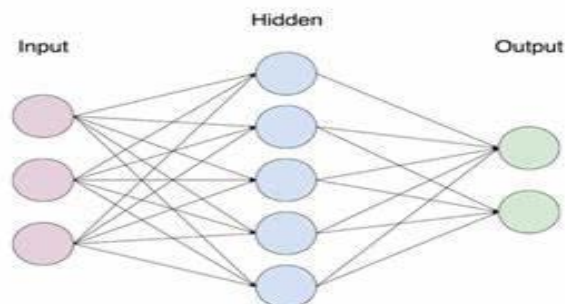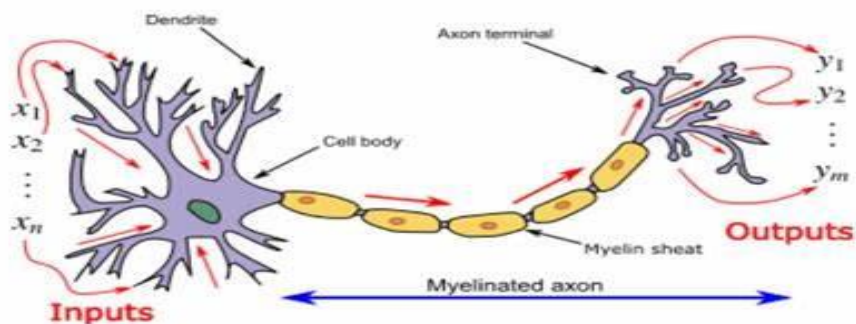
# Types of AI

Artificial Intelligence can be broadly divided into two categories: AI based on capability and AI based on functionality.
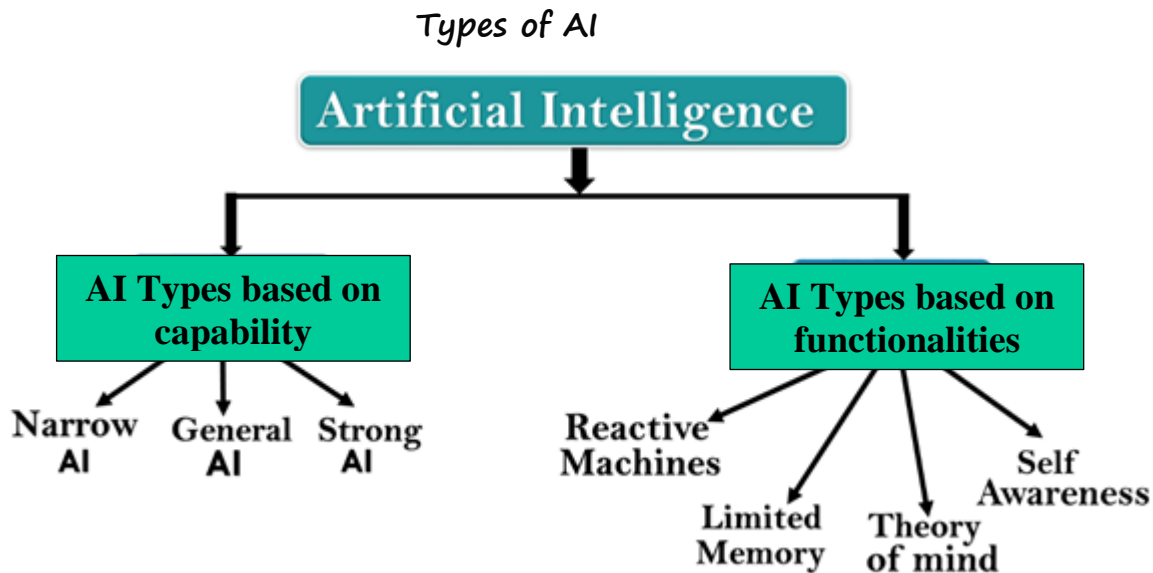
Types of AI



## ➢ types of AI based on capability.

# 1. Narrow AI

Narrow AI is a goal-oriented AI trained to perform a specific task. The machine intelligence that we witness all around us today is a form of narrow AI. Examples of narrow AI include :

Voice assistants like Siri, Alexa, and Google Assistant

Siri و Alexa و Google Assistant

Narrow AI is also referred to as weak AI as it operates within a limited and pre- defined set of parameters, constraints, and contexts. For example, use cases such as Netflix recommendations, purchase suggestions on ecommerce sites, autonomous cars, and speech & image recognition fall under the narrow AI category.
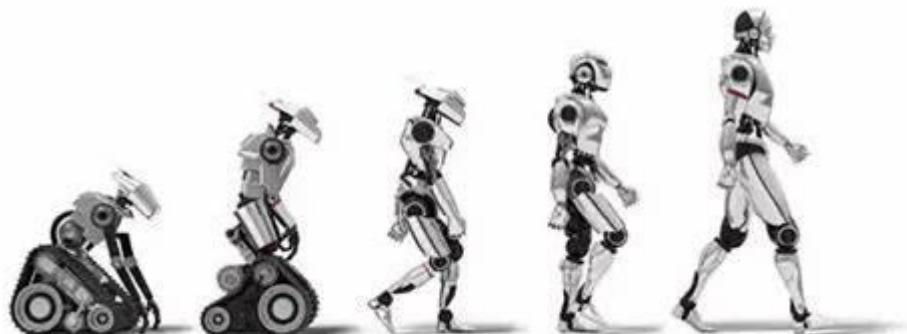
# 2. General AI

General AI is an AI version that performs any intellectual task with a human-like efficiency. The objective of general AI is to design a system capable of thinking for itself just like humans do. Currently, general AI is still under research, and efforts are being made to develop machines that have enhanced cognitive capabilities.

AGI is essentially AI that has cognitive computing capability and the ability to gain complete knowledge of multiple subjects the way human brains can. It does not currently exist; it is simply in the process that's being researched and experimented with. If it were able to surpass human capabilities, AGI could process data sets at speeds beyond what AI is currently capable of. Some of these could include:

- The ability to think abstractly
- Gathering and drawing from background knowledge of multiple subjects
- Common sense and consciousness
- Causation–a thorough understanding of cause and effect
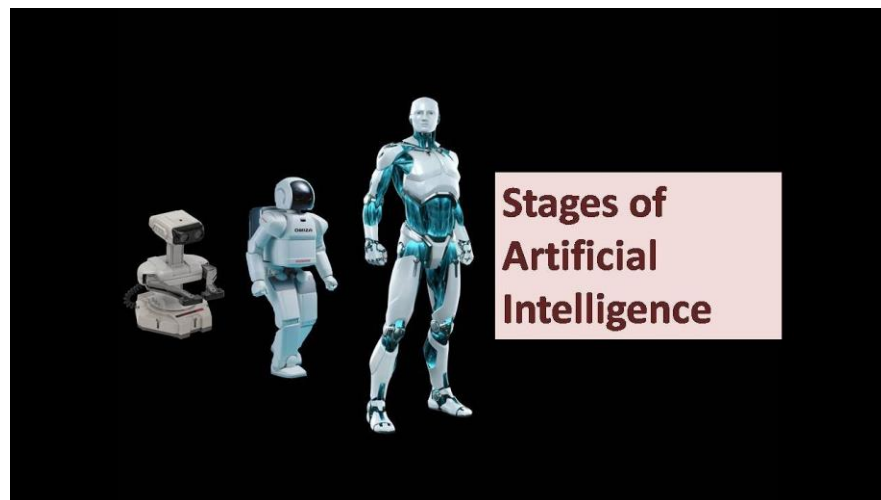
# 3 Stages of AI



**Narrow AI**

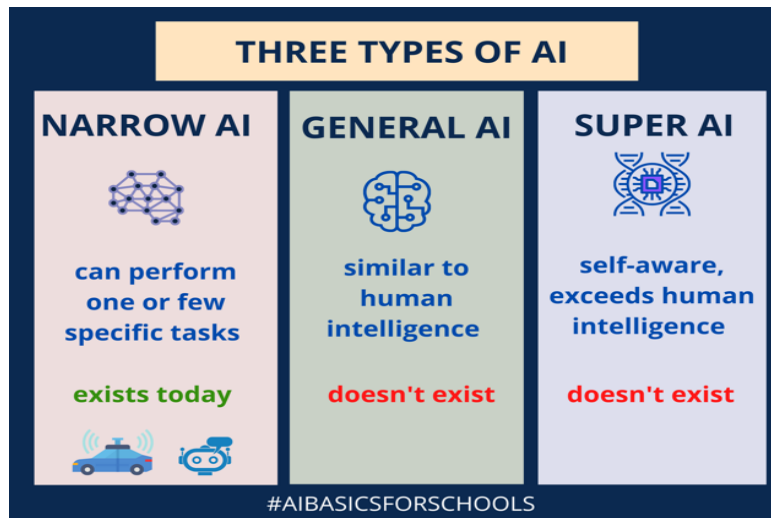Weak AI specializes in single tasks.

**General AI**

Strong AI matches human intellect broadly.

**Super AI**

Superintelligent AI may surpass all human abilities.



# 3. Super AI

Super AI is the AI version that surpasses human intelligence and can perform any task better than a human. Capabilities of a machine with super AI include thinking, reasoning, solving a puzzle, making judgments, learning, and communicating on its own. Today, super AI is a hypothetical concept but represents the future of AI.

the real-life examples of artificial super intelligence include the concept of recursive self-improvement, scientific discoveries, creative innovations, and its potential role in addressing global challenges like climate change and pandemic response.

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➢ **the types of AI based on functionality.**

# 1. Reactive machines

Reactive machines are basic AI types that do not store past experiences or memories for future actions. Such systems zero in on current scenarios and react to them based on the best possible action. Popular examples of reactive machines include :

Here are some examples of reactive machines:

IBM Deep Blue: A chess-playing supercomputer created by IBM

Spam filters: An example of reactive AI.

Netflix recommendation engine: An example of reactive AI.

## 2. Limited memory machines

Limited memory machines can store and use past experiences or data for a short period of time. For example, a self-driving car can store the speeds of vehicles in its vicinity, their respective distances, speed limits, and other relevant information for it to navigate through the traffic.

## 3. Theory of mind

Theory of mind refers to the type of AI that can understand human emotions and beliefs and socially interact like humans. This AI type has not yet been developed but is in contention for the future.
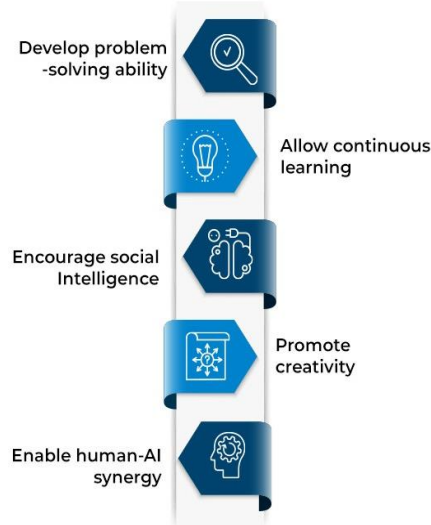
## 4. Self-aware AI

Self-aware AI deals with super-intelligent machines with their consciousness, sentiments, emotions, and beliefs. Such systems are expected to be smarter than a human mind and may outperform us in assigned tasks. Self-aware AI is still a distant reality, but efforts are being made in this direction.

# Goals of Artificial Intelligence

AI reads human behavior to develop intelligent machines. Simply put, the foundational goal of AI is to design a technology that enables computer systems to work intelligently yet independently. The essential goals of AI are explained below.



GOALS OF ARTIFICIAL INTELLIGENCE

Develop problem-solving ability

Allow continuous learning

Encourage social Intelligence

Promote creativity

Enable human-AI synergy

# 1. Develop problem-solving ability

AI research is focused on developing efficient problem-solving algorithms that can make logical deductions and simulate human reasoning while solving complex puzzles. AI systems offer methods to deal with uncertain situations or handle the incomplete information conundrum by employing probability theory, such as a stock market prediction system.

The problem-solving ability of AI makes our lives easier as complex tasks can be assigned to reliable AI systems that can aid in simplifying critical jobs.

# 2. Allow continuous learning

Learning is fundamental to AI solutions. Conceptually, learning implies the ability of computer algorithms to improve the knowledge of an AI program through observations and past experiences. Technically, AI programs process a collection of input-output pairs for a defined function and use the results to predict outcomes for new inputs.

AI primarily uses two learning models—supervised and unsupervised—where the main distinction lies in using labeled datasets. As AI systems learn independently, they require minimal or no human intervention. For example, ML defines an automated learning process.

# 3. Encourage social Intelligence

Affective computing, also called 'emotion AI,' is the branch of AI that recognizes, interprets, and simulates human experiences, feelings, and emotions. With affective computing, computers can read facial expressions, body language, and voice tones to allow AI systems to interact and socialize at the human level. Thus, research efforts are inclined toward amplifying the social intelligence of machines.

# 4. Achieve general intelligence

AI researchers aim to develop machines with [general AI](#) capabilities that combine all the cognitive skills of humans and perform tasks with better proficiency than us. This can boost overall productivity as tasks would be performed with greater efficiency and free humans from risky tasks such as defusing bombs.