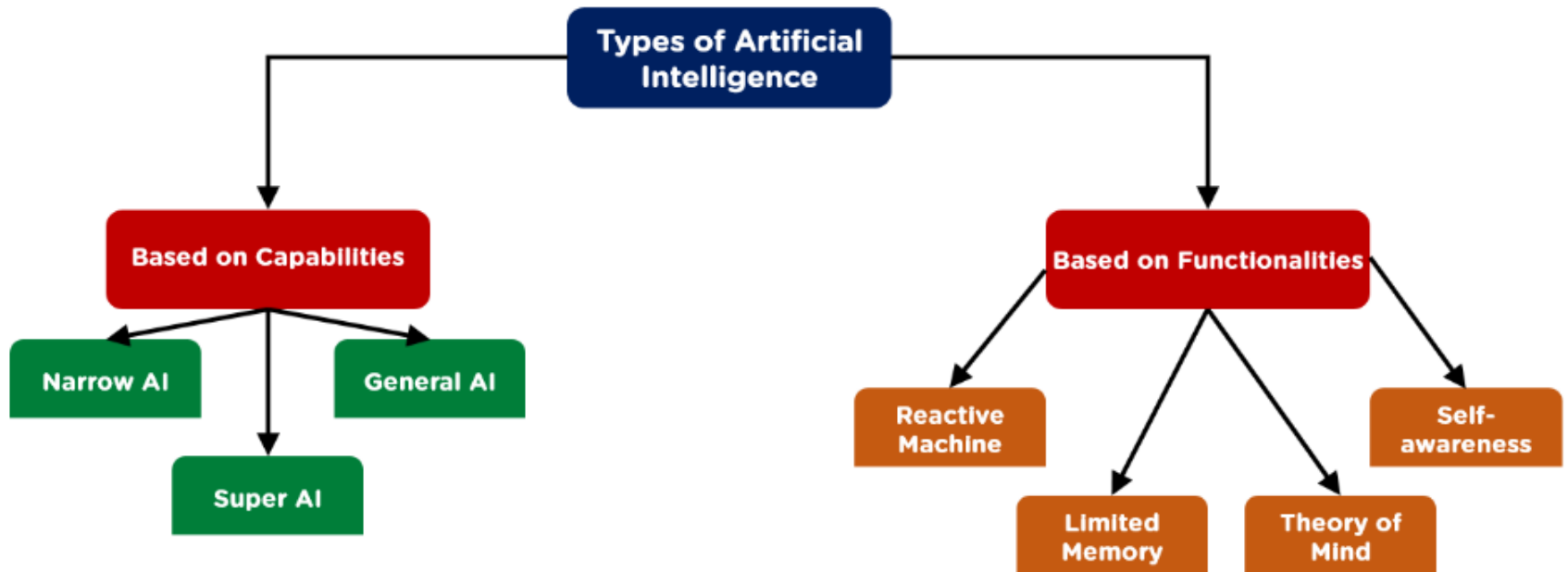


Types of AI



Classification based on Capabilities

Weak AI or Narrow AI

- It is able to perform a dedicated task with intelligence.
 - The most common and currently available AI is Narrow AI in the world of Artificial Intelligence.
- Narrow AI cannot perform beyond its field or limitations, as it is only trained for one specific task.
 - Hence it is also termed as weak AI. Narrow AI can fail in unpredictable ways if it goes beyond its limits.
- Some Examples of Narrow AI are playing chess, purchasing suggestions on e-commerce site, self-driving cars, speech recognition, and image recognition.





Classification based on Capabilities

General AI

- General AI is a type of intelligence which could perform any intellectual task with efficiency like a human.
- The idea behind the general AI to make such a system which could be smarter and think like a human by its own.
- Currently, there is no such system exist which could come under general AI and can perform any task as perfect as a human.
 - The worldwide researchers are now focused on developing machines with General AI.
 - As systems with general AI are still under research, and it will take lots of efforts and time to develop such systems.

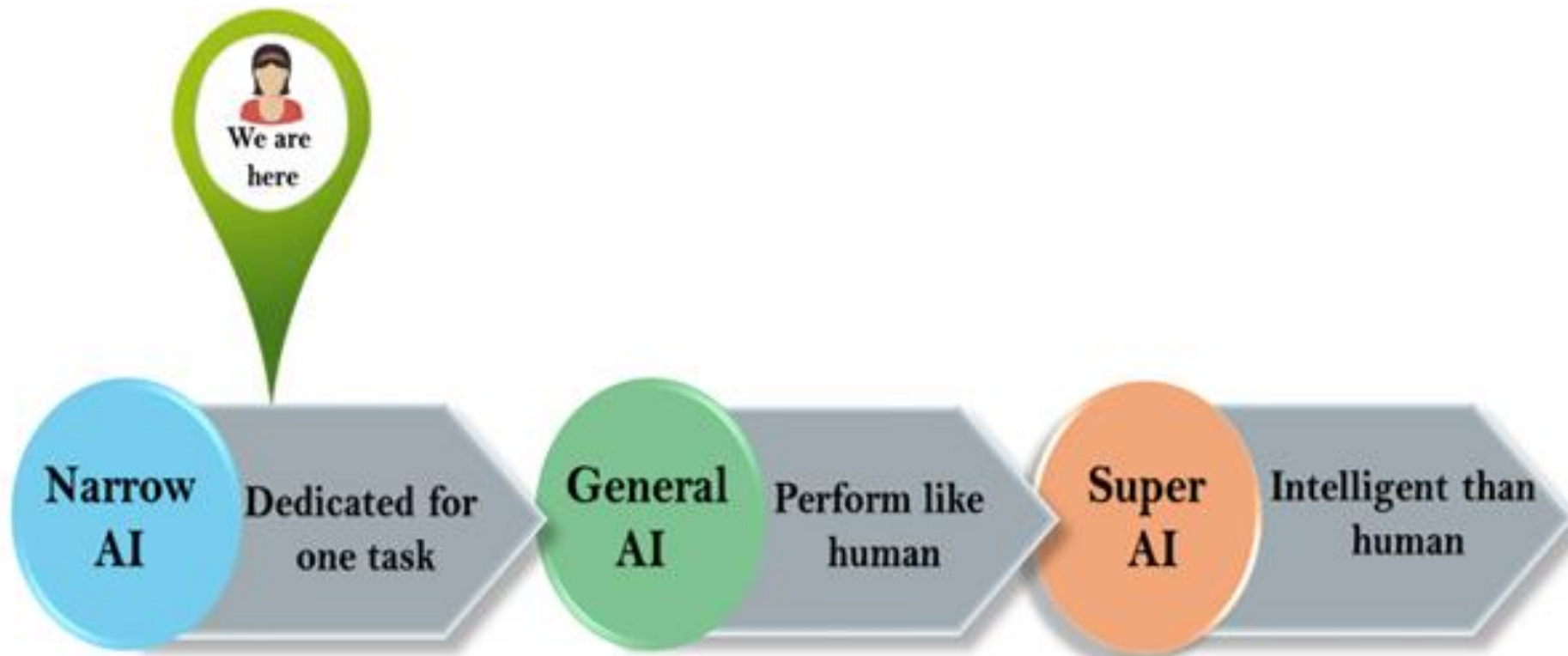


Classification based on Capabilities

Super AI or Strong AI

- Super AI is a level of Intelligence of Systems at which machines could surpass human intelligence, and can perform any task better than human with cognitive properties. It is an outcome of general AI.
 - Some key characteristics of strong AI include capability include the ability to think, to reason, solve the puzzle, make judgments, plan, learn, and communicate by its own.
- Super AI is still a hypothetical concept of Artificial Intelligence.

Classification based on Capabilities



Classification based on Functionality

Reactive Machines

- A reactive machine is the primary form of artificial intelligence that does not store memories or use past experiences to determine future actions.
- These machines only focus on current scenarios and react on it as per possible best action.
- IBM's Deep Blue that defeated chess grandmaster Garry Kasparov is a reactive machine that sees the chessboard pieces and reacts to them.



Classification based on Functionality

Limited Memory

- Limited Memory AI trains from past data to make decisions.
- The memory of such systems is short-lived.
- They can use this past data for a specific period of time, but they cannot add it to a library of their experiences.
- This kind of technology is used in self-driving vehicles.



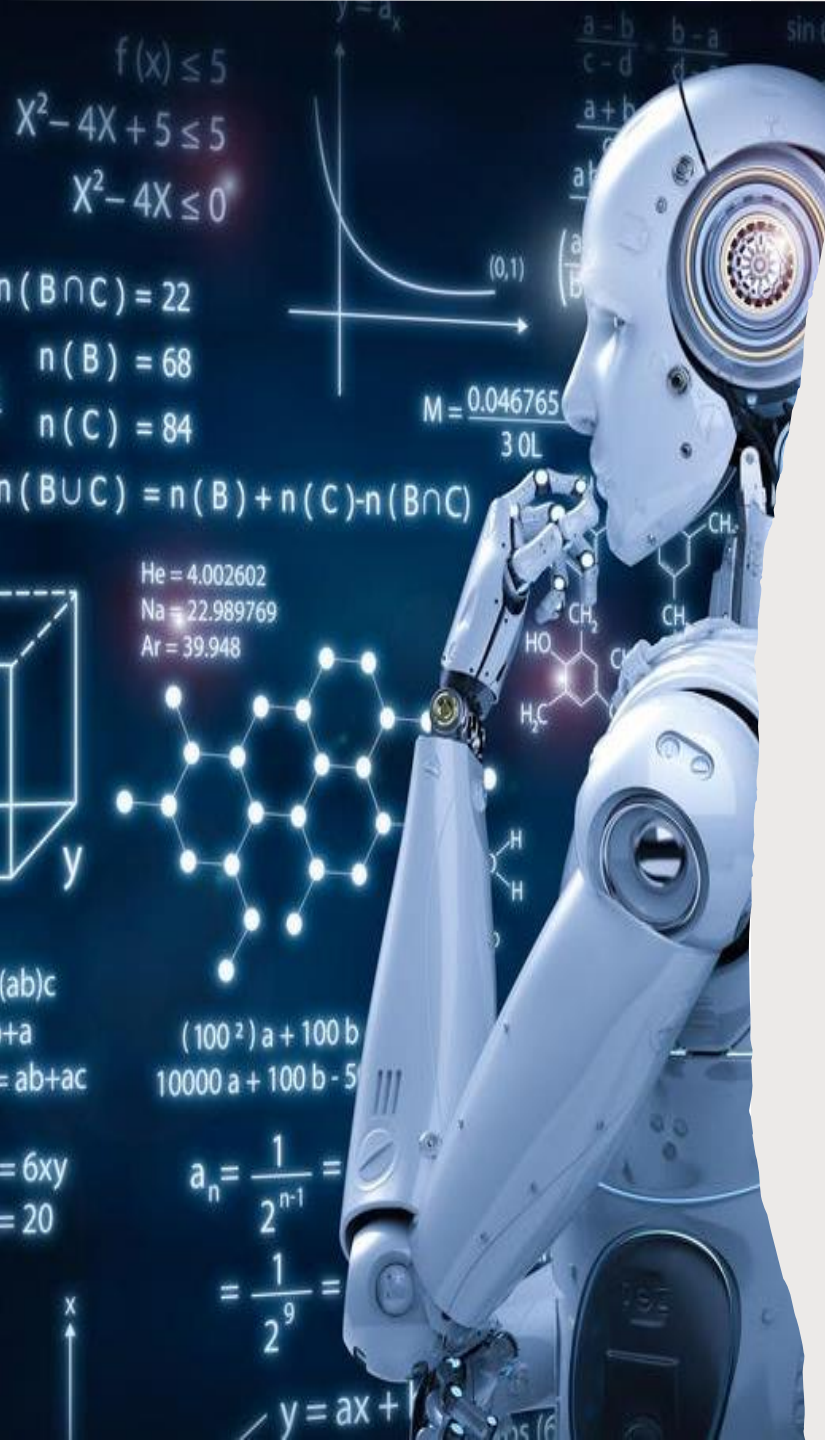
Classification based on Functionality

Theory of mind AI

- Represents an advanced technology and exists only as a concept.
- Such a kind of AI requires a thorough understanding that the people and things within an environment can alter feelings and behaviors. It should understand people's emotions, sentiments, and thoughts.
- Even though many improvements are there in this field, this kind of AI is not fully complete yet.

Sophia from Hanson Robotics is an example where the Cameras present in Sophia's eyes, combined with computer algorithms, allow her to see. She can sustain eye contact, recognize individuals, and follow faces.





Classification based on Functionality

Self Awareness AI

- Self-awareness AI only exists hypothetically.
- Such systems understand their internal traits, states, and conditions and perceive human emotions.
- These machines will be smarter than the human mind.
- This type of AI will not only be able to understand and evoke emotions in those it interacts with, but also have emotions, needs, and beliefs of its own.

AI Definitions

- Artificial Intelligence (AI), a term coined by emeritus Stanford Professor John McCarthy in 1955, was defined by him as “the science and engineering of making intelligent machines”
- Oxford Languages defines AI as “the theory and development of computer systems able to perform tasks that normally require human intelligence.”
- Britannica offers a similar definition: “the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.”

ML and DL

- Machine learning and deep learning are both types of AI.
- **Machine learning** is AI that can automatically adapt with minimal human interference.
- **Deep learning** is a subset of machine learning that uses artificial neural networks to mimic the learning process of the human brain.

Machine learning	Deep learning
A subset of AI	A subset of machine learning
Can train on smaller data sets	Requires large amounts of data
Requires more human intervention to correct and learn	Learns on its own from environment and past mistakes
Shorter training and lower accuracy	Longer training and higher accuracy
Makes simple, linear correlations	Makes non-linear, complex correlations
Can train on a CPU (central processing unit)	Needs a specialized GPU (graphics processing unit) to train



Artificial intelligence

Artificial intelligence uses computer science and data to enable problem solving in machines



Machine learning

Machine learning refers to the study of computer systems that learn and adapt automatically from experience, without being explicitly programmed



Deep learning

Deep learning is a machine learning technique that layers algorithms and computing units—or neurons—into artificial neural networks that mimic the human brain

Functions and Applications of AI

1. **Problem Solving and Decision Making:** AI can analyze complex data and make informed decisions. This includes applications like data analysis, optimization, and resource allocation.
2. **Natural Language Processing (NLP):** NLP enables machines to understand, interpret, and generate human language. This is used in chatbots, virtual assistants, language translation, sentiment analysis, and text summarization.
3. **Machine Learning:** Machine learning involves training algorithms to improve their performance on a specific task based on data. This includes tasks like image recognition, speech recognition, recommendation systems, and fraud detection.
4. **Computer Vision:** AI can process and interpret visual information from the world, enabling machines to understand images and videos. Applications include object detection, facial recognition, image classification, and autonomous vehicles.
5. **Healthcare Applications:** AI is being used for medical image analysis, drug discovery, disease prediction, and personalized treatment plans.

Functions and Applications of AI

6. **Robotics:** AI-powered robots can perform tasks in environments that are dangerous or challenging for humans. These tasks can range from manufacturing and assembly to exploring hazardous areas.
7. **Expert Systems:** These are AI systems designed to mimic the decision-making abilities of a human expert in a particular domain. They are used for tasks like medical diagnosis, technical support, and troubleshooting.
8. **Speech Recognition:** AI systems can convert spoken language into written text, enabling voice commands, transcription services, and voice assistants.
9. **Autonomous Systems:** AI-driven autonomous systems can operate without human intervention. Examples include self-driving cars, drones, and industrial automation.
10. **Cybersecurity:** AI can analyze network traffic, detect anomalies, and identify potential security threats to enhance digital security.
11. **Language Translation:** AI-powered translation tools can automatically translate text from one language to another, making communication across languages more accessible.

Functions and Applications of AI

- 12. Gaming and Entertainment:** AI can be used to create intelligent opponents in games, procedural content generation, and personalized recommendations for entertainment content.
- 13. Finance and Trading:** AI algorithms can analyze market trends, predict stock prices, and manage investment portfolios.
- 14. Virtual Assistants:** AI-powered virtual assistants like Siri, Google Assistant, and Alexa can perform tasks like setting reminders, answering questions, and controlling smart devices.
- 15. Creativity and Art:** AI can generate art, music, and literature. It's used in tasks like image style transfer, music composition, and generating text content.

Characteristics of AI

1. **Adaptability and Learning:** AI systems have the ability to learn from experience and improve their performance over time.
2. **Reasoning and Problem Solving:** AI can use logical reasoning to solve complex problems. It can analyze data, identify patterns, and make informed decisions based on available information.
3. **Autonomy:** Many AI systems can operate autonomously, performing tasks without continuous human intervention. Autonomous vehicles and drones are examples of AI systems that can make decisions in real-world environments.
4. **Perception and Interpretation:** AI can interpret and understand the world through sensors and data inputs. Computer vision and natural language processing allow AI to interpret visual and textual information.
5. **Natural Language Processing (NLP):** NLP enables AI systems to understand and generate human language. This includes tasks like speech recognition, language translation, sentiment analysis, and text generation.

Characteristics of AI

6. **Adaptation to Context:** AI systems can adapt their behavior based on the context of a situation. For instance, a virtual assistant can provide different responses based on the user's query and tone of voice.
7. **Parallel Processing:** AI systems can process large amounts of data in parallel, allowing them to perform complex computations and analyze vast datasets quickly.
8. **Emulation of Human Behavior:** Some AI systems aim to replicate human behavior, such as chatbots that engage in conversations, virtual characters in video games, and humanoid robots.
9. **Decision Making Under Uncertainty:** AI systems can make decisions even when dealing with incomplete or uncertain information. This is crucial for applications like autonomous driving, where the environment is dynamic and unpredictable.
10. **Generalization:** AI can generalize from specific examples to broader concepts. For example, a machine learning model trained on a dataset of various animals can generalize to identify new animals it hasn't seen before.

Characteristics of AI

- 11. Creativity and Innovation:** AI can generate novel solutions, ideas, and content. Creative AI applications include generating art, music, and even writing stories.
- 12. Continuous Improvement:** AI systems can continuously learn and improve as they gather more data and experience. This enables them to become more accurate and effective over time.
- 13. Scalability:** AI technologies can be applied to a wide range of domains and tasks, from small-scale applications to large-scale complex systems.
- 14. Interaction with Humans:** AI systems can interact with humans in various ways, from simple text-based interactions to more complex natural language conversations and gestures.