Artificial Intelligence

Before leading to the meaning of artificial intelligence let understand what is the meaning of Intelligence-

Intelligence: The ability to learn and solve problems. This definition is taken from Webster's Dictionary.

The most common answer that one expects is **“to make computers intelligent so that they can act intelligently!”**, but the question is how intelligent? How can one judge intelligence?

…as intelligent as humans. If computers can, somehow, solve real-world problems, by improving on their own from past experiences, they would be called “intelligent”.

Thus, the AI systems are more generic(rather than specific), have the ability to “think” and are more flexible.

Intelligence, as we know, is the ability to acquire and apply knowledge. Knowledge is the information acquired through experience. Experience is the knowledge gained through exposure(training). Summing the terms up, we get **artificial intelligence** as the “copy of something natural(i.e., human beings) ‘WHO’ is capable of acquiring and applying the information it has gained through exposure.”

Intelligence is composed of:

- Reasoning
- Learning
- Problem Solving
- Perception
- Linguistic Intelligence

Many tools are used in AI, including versions of search and mathematical optimization, logic, methods based on probability and economics. The AI field draws upon computer science, mathematics, psychology, linguistics, philosophy, neuroscience, artificial psychology, and many others.

Need for Artificial Intelligence

1. To create expert systems that exhibit intelligent behavior with the capability to learn, demonstrate, explain, and advise its users.

2. Helping machines find solutions to complex problems like humans do and applying them as algorithms in a computer-friendly manner.

Applications of AI include **Natural Language Processing, Gaming, Speech Recognition, Vision Systems, Healthcare, Automotive**, etc.

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Computer vision and Natural Language Processing is often considered as a subset of Machine Learning and is used with Machine Learning more than with AI.

An AI system is composed of an agent and its environment. An agent(e.g., human or robot) is anything that can perceive its environment through sensors and acts upon that environment through effectors. Intelligent agents must be able to set goals and achieve them. In classical planning problems, the agent can assume that it is the only system acting in the world, allowing the agent to be certain of the consequences of its actions. However, if the agent is not the only actor, then it requires that the agent can reason under uncertainty. This calls for an agent that cannot only assess its environment and make predictions but also evaluate its predictions and adapt based on its assessment. Natural language processing gives machines the ability to read and understand human language. Some straightforward applications of natural language processing include

information retrieval, text mining, question answering, and machine translation. Machine perception is the ability to use input from sensors (such as cameras, microphones, sensors, etc.) to deduce aspects of the world. e.g., Computer Vision. Concepts such as game theory, decision theory, necessitate that an agent is able to detect and model human emotions.

Many times, students get confused between Machine Learning and Artificial Intelligence, but Machine learning, a fundamental concept of AI research since the field's inception, is the study of computer algorithms that improve automatically through experience. The mathematical analysis of machine learning algorithms and their performance is a branch of theoretical computer science known as a computational learning theory.

Stuart Shapiro divides AI research into three approaches, which he calls computational psychology, computational philosophy, and computer science. Computational psychology is used to make computer programs that mimic human behavior. Computational philosophy is used to develop an adaptive, free-flowing computer mind. Implementing computer science serves the goal of creating computers that can perform tasks that only people could previously accomplish.

AI has developed a large number of tools to solve the most difficult problems in computer science, like:

- Search and optimization
- Logic
- Probabilistic methods for uncertain reasoning
- Classifiers and statistical learning methods
- Neural networks
- Control theory
- Languages

High-profile examples of AI include autonomous vehicles (such as drones and self-driving cars), medical diagnosis, creating art (such as poetry), proving mathematical theorems, playing games (such as Chess or Go), search engines (such as Google search), virtual assistants (such as Siri), image recognition in photographs, spam filtering, prediction of judicial decisions[204] and targeted online advertisements. Other applications include Healthcare, Automotive, Finance, Video games, etc

Are there limits to how intelligent machines – or human-machine hybrids – can be? A superintelligence, hyperintelligence, or superhuman intelligence is a hypothetical agent that would possess intelligence far surpassing that of the brightest and most gifted human mind. ‘‘Superintelligence’’ may also refer to the form or degree of intelligence possessed by such an agent.

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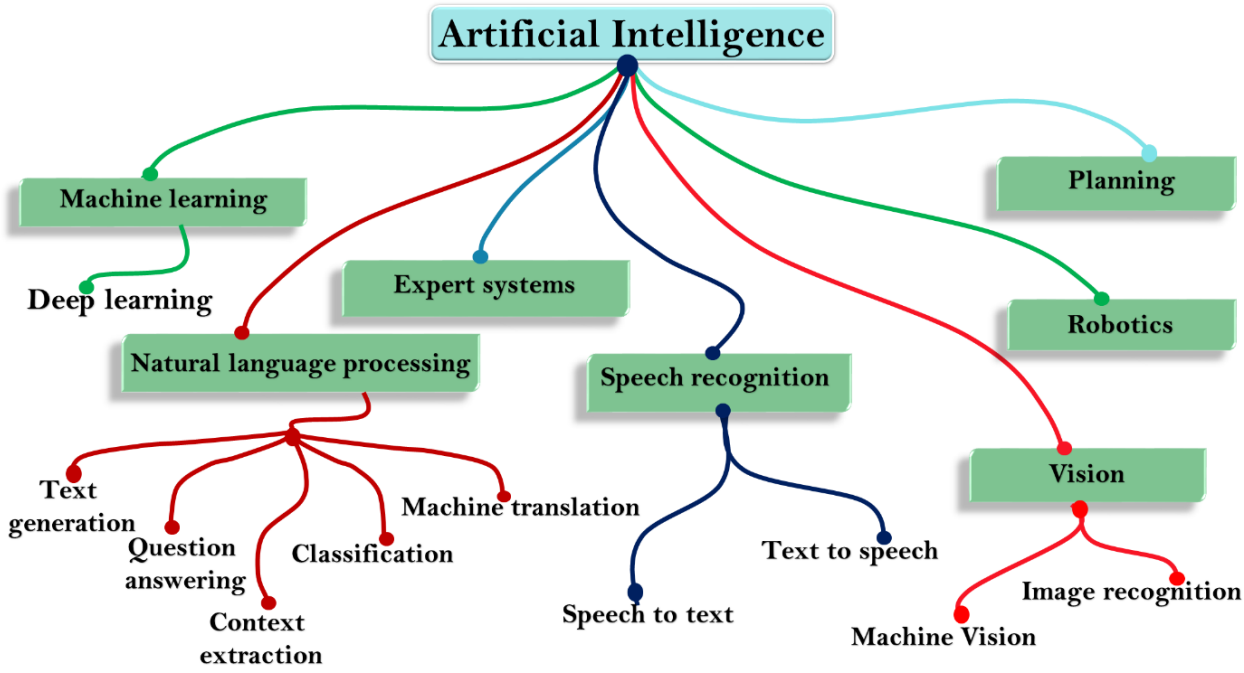
Artificial Intelligence
Machine learning
Deep learning
Expert systems
Natural language processing
Text generation
Question answering
Context extraction
Classification
Machine translation
Speech recognition
Speech to text
Text to speech
Planning
Robotics
Vision
Image recognition
Machine Vision