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History and Growth of Artificial Intelligence

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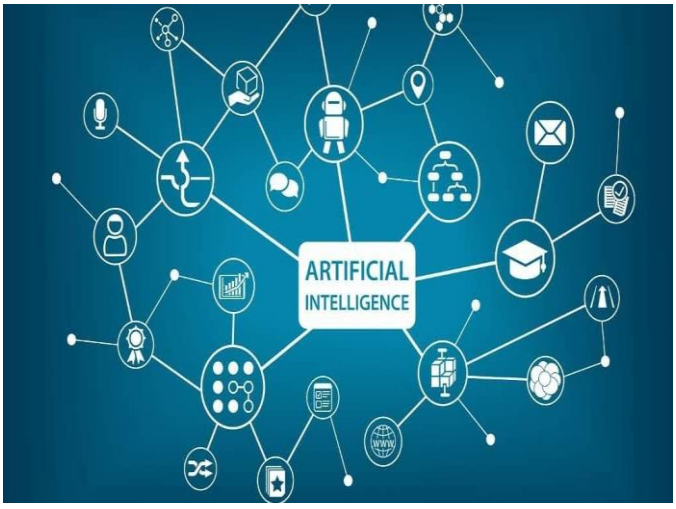
Abstract - Artificial intelligence is broadly characterized as the study of computations that allow for perception, reason and action**.** The goals of artificial intelligence include computer-enhanced learning, reasoning, and perception. AI is being used today across different industries from finance to healthcare. It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, to solve real-world issues, various types of AI such as analytical, functional, interactive, textual, and visual. AI can be applied to enhance the intelligence and capabilities of an application. AI is thus considered a branch of science and engineering that focuses on simulating a wide range of issues and functions in the field of human intellect. This paper presents introduction, definitions of AI, features of artificial Intelligence, growth, history, applications and achievements.

Key Words: Artificial intelligence, Machine learning, Intelligent computing, smart systems, NLP (Natural Language processing)

1. INTRODUCTION

AI is the science and engineering of making intelligent machines, especially intelligent computer programs. The central principles of AI include such as reasoning, knowledge, planning, learning, communication, perception and the ability to move and manipulate objects. When most people hear the term artificial intelligence, the first thing they usually think of is robots. Artificial intelligence is based on the principle that human intelligence can be defined in a way that a machine can easily mimic it and execute tasks, from the most simple to those that are even more complex.

The goals of artificial intelligence include mimicking human cognitive activity. The use of modern smart technologies enables making smarter, faster decisions regarding the business process, ultimately increasing the productivity and profitability of the overall operation, where Artificial Intelligence (AI) is known as a leading technology in the area. In other words, we can say that it aim is to make computers smart and intelligent by giving them the ability to think and learn using computer programs or machines, i.e., can think and function in the same way that people do.



From a philosophical perspective, AI has the potential to help people live more meaningful lives without having to work as hard, as well as manage the massive network of interconnected individuals, businesses, states, and nations in a way that benefits everyone. Therefore, AI based modeling is the key to building automated, intelligent and smart systems according to today's needs, which has emerged as the next major technological milestone, influencing the future of practically every business by making every process better, faster, and more precise. This paper will go into some of these themes to provide a better understanding for the field of AI and how it has developed over the years. In looking at some of the key areas of AI work and the forces that drove them, perhaps we can better understand future developments in the field.

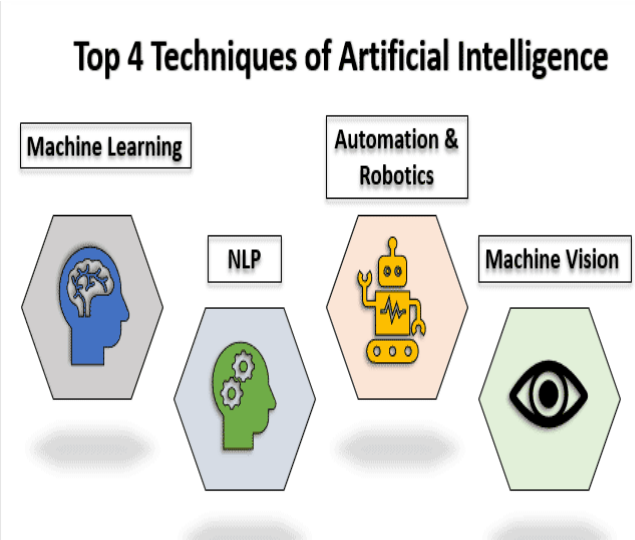
History of Artificial intelligence

The term artificial intelligence was first coined by John McCarthy in 1956 when he held the first academic conference on the subject. But the journey to understand if machines can truly think began much before that. In Vannevar Bush's seminal work As We May Think he proposed a system which

amplifies people's own knowledge and understanding. Five years later Alan Turing wrote a paper on the notion of machines being able to simulate human beings and the ability to do intelligent things, such as play Chess [Turing50]. No one can refute a computer's ability to process logic. But to many it is unknown if a machine can think. The precise definition of think is important because there has been some strong opposition as to whether or not this notion is even possible. The emergence of artificial intelligence officially in history dates back to 1956. In 1956, a conference artificial intelligence session at Dartmouth College was introduced for the first time. Marvin Minsky stated in his book "Stormed Search for Artificial Intelligence that "the problem of artificial intelligence modeling within a generation will be solved ". The first artificial intelligence applications were introduced during this period. These applications are based on logic theorems and chess game.

The programs developed during this period were distinguished from the geometric forms used in the intelligence tests; which has led to **the idea that intelligent computers can be create** water and steam power of cybernetic science, has made water-operated automatic controlled machines, calculator capable of four operations.

AI Techniques



Machine Learning

It is one of the applications of AI where machines are not explicitly programmed to perform specific tasks; instead, they learn and improve from experience automatically. Machine learning is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. Machine learning is an important component of the growing field of data science. Through the use of statistical methods, algorithms are trained to make classifications or predictions, and to uncover key insights in data mining projects.

NLP (Natural Language Processing)

1. Natural Language Processing involves programming computers to process human languages to facilitate interactions between humans and computers. Machine Learning is a reliable technology for Natural Language Processing to obtain meaning from human languages. In NLP, the machine captures the audio of a human talk. After the audio-to-text conversion, the text is processed and converted back into audio data. Then the machine uses the audio to respond to humans. Applications of Natural Language Processing can be found in IVR (Interactive Voice Response) applications used in call centers, language translation applications like Google Translate, and word processors such as Microsoft Word to check the accuracy of grammar in text.

Automation and Robotics

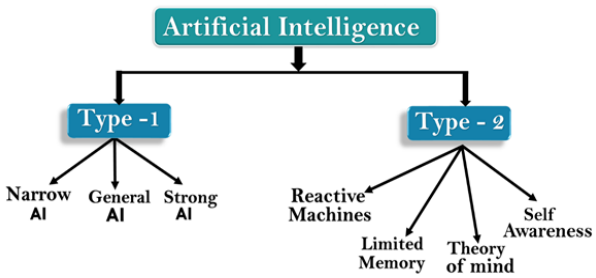
Automation aims to improve productivity and efficiency by having machines perform monotonous and repetitive tasks, resulting in cost-effective outcomes. Many organizations use machine learning, neural networks, and graphs in automation. Using CAPTCHA technology, such automation can prevent fraud issues during online financial transactions. Programmers create robotic process automation to perform high-volume repetitive tasks that can adapt to changes in different circumstances.

Machine Vision

Machines can capture visual information and then analyze it. This process involves using cameras to capture visual information, converting the analog image to digital data, and processing the data through digital signal processing. Then the resulting data is fed to a computer. In machine vision, two vital aspects are sensitivity, the ability to perceive weak impulses, and resolution, the range to which the machine can distinguish objects. The usage of machine vision can be found in signature identification, pattern recognition, medical image analysis, etc.

Types of Artificial Intelligence:

Artificial Intelligence can be divided in various types, there are mainly two types of main categorization which are based on capabilities and based on functionality of AI. Following is flow diagram which explain the types of AI.



AI type-1: Based on Capabilities

Weak AI or Narrow AI:

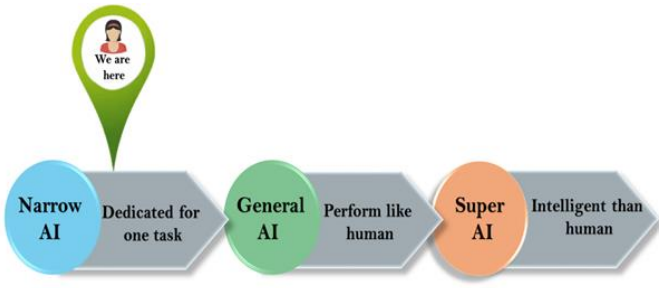
- Narrow AI is a type of AI which is able to perform a dedicated task with intelligence. The most common and currently available AI is Narrow AI in the world of Artificial Intelligence.
- Narrow AI cannot perform beyond its field or limitations, as it is only trained for one specific task. Hence it is also termed as weak AI. Narrow AI can fail in unpredictable ways if it goes beyond its limits.
- Apple Siriis a good example of Narrow AI, but it operates with a limited pre-defined range of functions.
- IBM's Watson supercomputer also comes under Narrow AI, as it uses an Expert system approach combined with Machine learning and natural language processing.
- Some Examples of Narrow AI are playing chess, purchasing suggestions on e-commerce site, self-driving cars, speech recognition, and image recognition.

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.

3. Super 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. Development of such systems in real is still world changing task.



Artificial Intelligence type-2: Based on functionality

Reactive Machines

- Purely reactive machines are the most basic types of Artificial Intelligence.
- Such AI systems do not store memories or past experiences for future actions.
- These machines only focus on current scenarios and react on it as per possible best action.
- IBM's Deep Blue system is an example of reactive machines.
- Google's AlphaGo is also an example of reactive machines.

2. Limited Memory

- Limited memory machines can store past experiences or some data for a short period of time.
- These machines can use stored data for a limited time period only.
- Self-driving cars are one of the best examples of Limited Memory systems. These cars can store recent speed of nearby cars, the distance of other cars, speed limit, and other information to navigate the road.

3. Theory of Mind

- Theory of Mind AI should understand the human emotions, people, beliefs, and be able to interact socially like humans.
- This type of AI machines are still not developed, but researchers are making lots of efforts and improvement for developing such AI machines.

4. Self-Awareness

- Self-awareness AI is the future of Artificial Intelligence. These machines will be super intelligent, and will have their own consciousness, sentiments, and self-awareness.
- These machines will be smarter than human mind.
- Self-Awareness AI does not exist in reality still and it is a hypothetical concept.

Applications of AI

The applications for artificial intelligence are endless. The technology can be applied to many different sectors and industries

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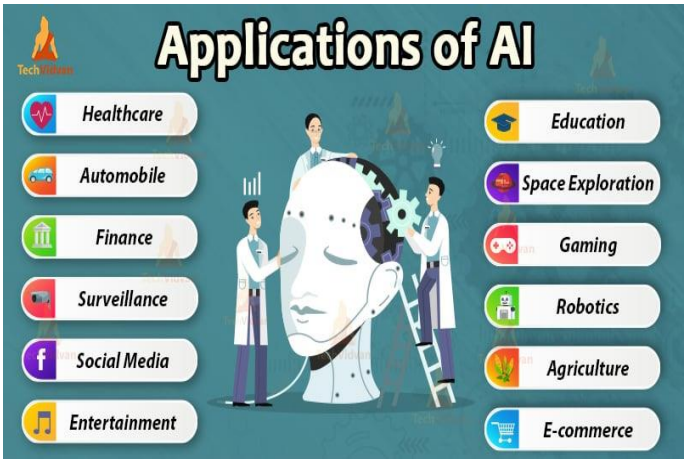

How Is AI Used Today?

AI is used extensively across a range of applications today, with varying levels of sophistication. Recommendation algorithms that suggest what you might like next are popular AI implementations, as are chat boxes that appear on websites or in the form of smart speakers (e.g., Alexa or Siri). AI is used to make predictions in terms of weather and financial forecasting, to streamline production processes, and to cut down on various forms of redundant cognitive labor (e.g., tax accounting or editing). AI is also used to play games, operate autonomous vehicles, process language, and more.

Future Scope

The scope of Artificial Intelligence is limited to domestic and commercial purposes as the medical and aviation sectors are also using AI to improve their services. If AI is outperforming human efforts, then opting for AI automation will reduce costs in the long run for a business. Artificial intelligence although is in the adoption stage in India, but is now utilized in most industries to solve complex problems. The major industries using Artificial Intelligence (AI) and Machine Learning (ML) include Agriculture, Education and Infrastructure, Healthcare, Transport, Banking, Cyber Security, Manufacturing, Entertainment, Hospitality, and others.

- Super AI is still a hypothetical concept of Artificial Intelligence. Development of such systems in real is still world changing task. Theory of Mind AI should understand the human emotions, people, beliefs, and be able to interact socially like humans.
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Scope of Artificial Intelligence

The goal is to create computer intelligence programs that can handle real-time problems and help organizations and everyday people achieve their goals. Machine games, speech recognition, language detection, computer vision, expert systems, robotics, and other fields have potential. The more you understand machine learning sciences, such as physics or biology, the better.

Conclusion

India is one of the countries with the most workforce and human resources in the world. As a result, it becomes critical to make the greatest possible use of this workforce at the appropriate moments. The world is currently at one of the most important junctures in technological history. Correct decisions and innovations have the power to alter the course of history. India is also helping to realize this innovative goal in a variety of ways. AI can be thought of as an exoskeleton for the human brain, with various dimensions that can be easily updated and added.

Today, the amount of data that is generated, by both humans and machines, far outpaces humans' ability to absorb, interpret, and make complex decisions based on that data. Artificial intelligence forms the basis for all computer learning and is the future of all complex decision making

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