Artificial Intelligence And Its Applications

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Abstract: Long days ago, there was all kind of work which was only done by humans. There were no such machines and technologies like today. At that time, science was not that much developed. Adaptive inventions for reducing human work and were invented which is simply called as **ARTFICIAL INTELLIGENCE (AI)**.

Artificial Intelligence (AI) is an emerging technology in today's world. Now most of the things in the world are using Artificial Intelligence. We can define AI as:-
"The ability of making a machine to make decisions on its own".

Artificial intelligence is a kind of computerized version of human intelligence. The way artificial intelligence works is like learning iteratively i.e. again and again, just like human does.

The field of artificial intelligence (AI) has shown an upward trend of growth in the 21st century(from 2000 to 2015). The evolution in AI has advanced the development of human society.Typically AI is broad filed in computer science which is mostly used for automation purposes in order to reduce man power. AI helps people to make their tasks easily and efficiently.This paper presents a brief introduction of AI and its various emerging applications.

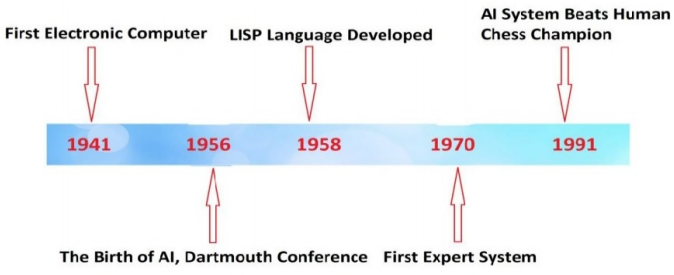
1 Introduction

According to father of artificial intelligence **John McCarthy**, who coined the term "Artificial Intelligence" in 1956, said that "It is combination of science and engineering to make intelligent devices for human welfare."
Artificial Intelligence is an intellect that is much smarter than the best human brain in practical. It is concerned with basic and most important aspects of our life i.e. philosophy, computer science, mathematics, linguistics, biology,etc.
There are various definitions given by different authors who belong to AI field. Some of the definitions are:

- The area of computer science focusing on creating machines that can engage in human behaviors of intelligence is called "Artificial Intelligence".
- Artificial intelligence is study of mental faculties (powers) through use of computational models (Charniak and McDermott, 1985).
- The study of the computations that make it possible to perceive, reason, and act (Winston, 1992).
- Artificial Intelligence (AI) is study of intelligent agents that act on environment.
- The ability of a computer to think itself is called Artificial Intelligence.

2 History Of Artificial Intelligence

The field of AI research was founded at a workshop held on the campus of Dartmouth College during the summer of 1956.[1] Those who attended would become the leaders of AI research for decades. Many of them predicted that a machine as intelligent as a human being would exist in no more than a generation and they were given millions of dollars to make this vision come true.
In the 1940s and 50s, a handful of scientists from a variety of fields (mathematics, psychology, engineering, economics and political science) began to discuss the possibility of creating an artificial brain. The field of artificial intelligence research was founded as an academic discipline in 1956.
The first AI program called "The Logic Theorist" was written by Allen Newell, J.C. Shaw and Herbert Simon in 1956 [2]. The following diagram illustrates about the complete history of AI. of ai.jpg



3 Types Of AI

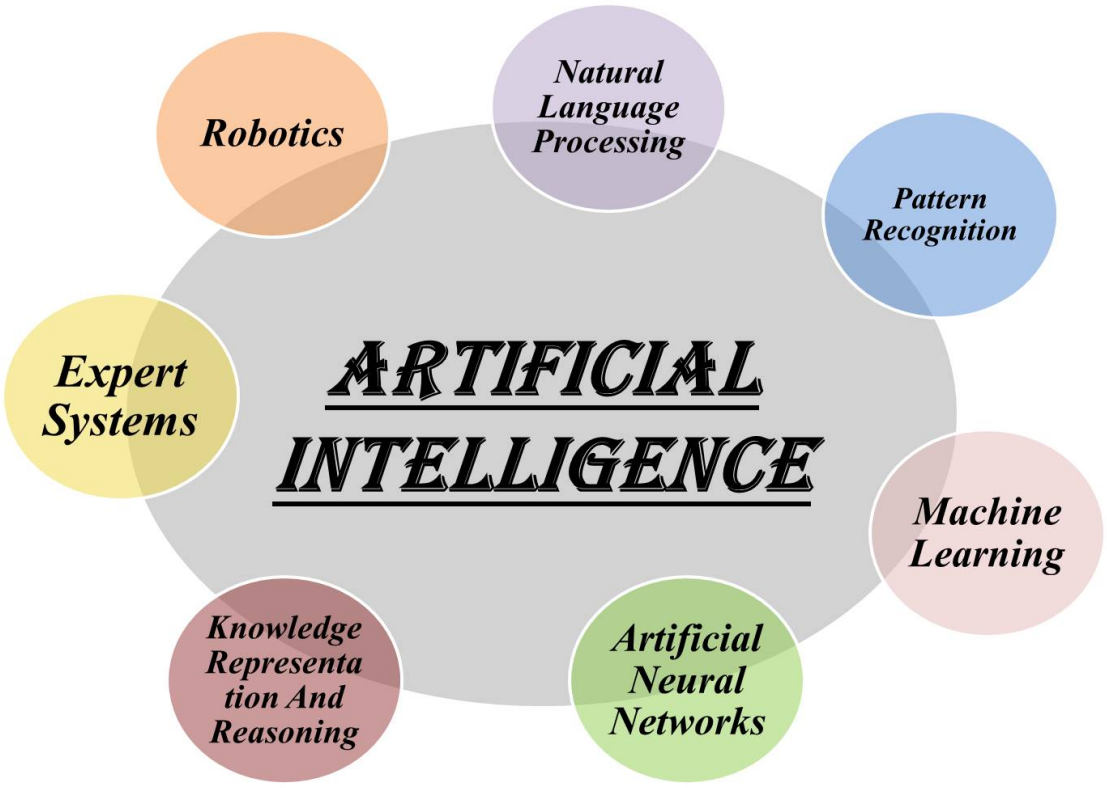
AI plays very vital role to exhibit intelligent behaviour, to learn, demonstrate and give advice to user. Artificial General Intelligence or AGI is a system that defines that the machine can do intellectual behaviour as humans can do many processes at a time. Artificial Intelligence is of 2 different types:

1. Weak AI
2. Strong AI

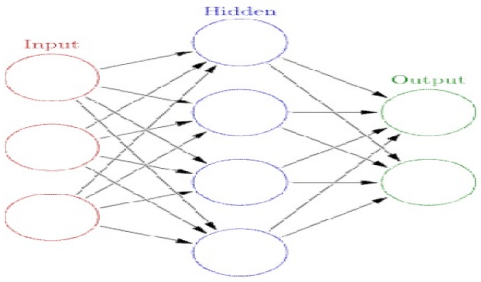
- **Weak AI:** The principle of Weak AI is that machines behave as if they are intelligent. Weak AI prove that virtual abilities such as thinking, talking, moving can be done by machine only if they are programmed in that manner.
- **Strong AI:** The principle of Strong AI is that all machines will do calculations and think itself and will predict the answer in future.

4 Disciplines In AI

The various sub disciplines of AI are:

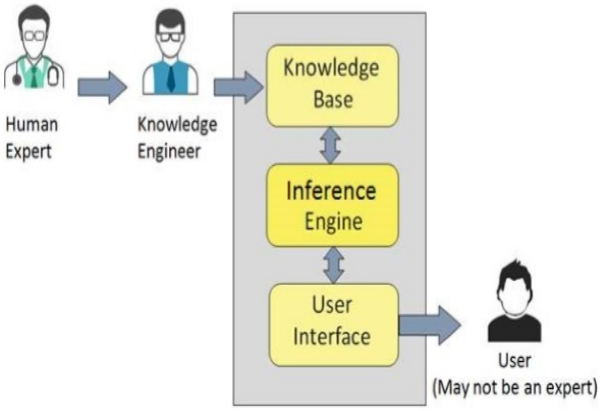


1. **Natural Language Processing:** Natural Language Processing is the process of understanding human language and converting to machine understandable form.
2. **Pattern Recognition:** Pattern Recognition is the phenomenon of classifying particular data into different classes based on their specific attributes.
3. **Machine Learning:** Machine Learning deals with study, analysis and construction of algorithms to make a machine to learn for making decisions on its own.
4. **Artificial Neural Networks:** Artificial Neural Networks is developed with the inspiration of biological neuron that is how a human brain works. It mainly contains Input layer, Hidden layer and output layer. Whereas all these layers helps in thinking process. Input layer takes training data, then ANN is trained with it and now prediction can be done from the built model. The following diagram represents Artificial Neural Networks:



5. **Knowledge Representation And Reasoning:** Knowledge Representation And Reasoning is used for representing information in computer understandable form in order to complete a specified task.

6. **Expert Systems:** The expert systems are the computer applications developed to solve complex problems in a particular domain, at the level of extra-ordinary human intelligence and expertise.

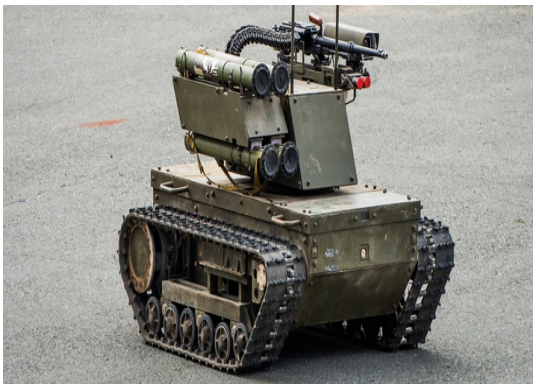


7. **Robotics:** Robots are the artificial agents acting in real world environment.Robots are aimed at manipulating the objects by perceiving, picking, moving, modifying the physical properties of object, destroying it, or to have an effect thereby freeing manpower from doing repetitive functions without getting bored, distracted, or exhausted.

5 Applications Of AI

5.1 Military Applications:

Some robots work autonomously or remote-controlled which are specifically designed for military applications. Such intelligent systems are currently being researched by a number of militaries related members. Already remarkable success has been achieved with unmanned aerial vehicles (UAV) like the predator, which are capable of doing Surveillance photographs, and even accurately launching pilotless missiles at ground targets. A subclass of these is unmanned aerial combat vehicles, which are designed to carry out strike missions in combat.



5.2 Space Applications:

The range of space-related applications that incorporate artificial intelligence is broad and ever growing:

- AI has been used by Space Telescope Science Institute(STScI) for long term scheduling of 200,000 Hubble Space Telescope Observations since 1993. More recently, NASA has applied AI to scheduling for other Earth-Orbiting telescopes, such as Chandra, Spitzer and Fuse, and for the Lunar Atmosphere and Dust Environment Explorer(LADEE) and the European Space Agency's Rosetta mission to land a probe on a comet.

- The European Satellite Operator SES is considering using AI to simplify the operation of its fleet and the "tens of thousands of telemetry signals" received on a continual basis from its satellites. AI and machine learning can be used to prioritise telemetry for human operators, allowing them to concentrate on most important matters.

- In the Earth imaging feild, CosmiQ Works(a laboratory established by US intelligence agencies to leverage the innovation of commercial space startups) holds competitions, called SpaceNet, that offer cash prizes for development of automated methods to detect road networks or other landmarks from high-resolution satellite imagery.

- An AI based "Astronaut Assistant" known as **CIMON(Crew Interactive Mobile CompanioN)** was developed and built by Airbus for German Aerospace Centre(DLR) and was demonstrated on the International Space Station in 2018.
- In 2017, Deep Neural Networks were trained to classify simulated radio-telescope signals with up to 95% accuracy, which offers a useful tool in the search for extra-terrestrial intelligence(SETI).

5.3 Medicinal Applications:

AI may have impacts on medical sciences. AI can cope with large amount of clinical data and information.Artificial intelligence helps in fast and accurate medical diagnosis. Fast, accurate, and precise medical diagnosis will help patients to improve their health.

Some robots like Husky, can spot skin tumors more accurately and speedily.
Veebot, a blood-drawing robot will assist the healthcare to carry out this procedure in no time. It takes only a minute for Veebot to draw blood, and tests prove that it can identify vein with 83% accuracy, which is as good as a professional nurse.
AI can help reduce the side effects of medicines by providing precise treatment.AI is replacing doctors and reducing mortality rates.Over the coming years, AI will change the traditional role of doctors. It is providing support to tackle many problems of healthcare. Therefore, AI is beneficial in diagnosing, treating diseases, reducing human errors, and it will also be virtually present with the patients.