

# Artificial Intelligence is Everywhere

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## Abstract

Artificial intelligence is the next stage of evolution. We are in an era in which we are surrounded by artificial intelligence knowingly or unknowingly. In this paper, we have discussed the overview of artificial intelligence starting from its history, goal, types, branches, applications to its misuse and threats. Artificial Intelligence has seen an immense progress in recent years. This progress is a result of various endeavours and diligent work contributed by many industrious scholars, mathematicians, analysts and various researchers. Artificial Intelligence (AI) technology can play an imperative role in economic development, resource conservation, and environmental protection by increasing efficiency. This paper gives us a better understanding of the field of Artificial intelligence and can be helpful in pursuing any branch of the same.

## Keywords.

Artificial Superhuman Intelligence (ASI), Neural Network, Data Mining, Expert System, Genetic Algorithm, Swarm Intelligence.

## I. Introduction.

Can Machines Think? [1]

In the first half of the 20th century, science fiction helps the world to make familiar with the concept of artificially intelligent robots. But going on further first we should discuss what is artificial intelligence. According to the father of Artificial Intelligence, John McCarthy, artificial intelligence is “The science and engineering of making intelligent machines, especially intelligent computer programs”. Artificial Intelligence can be defined as “Developing computer programs to solve complex problems by applications or processes that are analogous to human reasoning processes”.

By the time of the 1950s, we had a generation of scientists, mathematicians, and philosophers with the zeal of Artificial Intelligence (or AI). One such person was Alan Turing, even though the term artificial intelligence was not coined at that time, he was already thinking what if machines can solve the problems as the humans do or possibly even better. Turing suggested that humans use available information and reason in order to solve problems and make decisions, so why can't machines act in the same way? This was the idea behind his 1950 paper and as a thought needs to be backed by evidence so he corroborated this in his paper which was published in 1950 in which he proposed the idea of a test called ‘The Imitation Game’, which is now commonly known as the Turing Test. But still Early researchers and scientists accepted Turing's proposal as a real-world challenge, and the quest to engineer a thinking machine began. But there was another limitation to the researcher's works at that time. During that time computer lacked an important thing for intelligence that is they were not able to store commands but only execute them because of which they can only be told what to do and were not able to anything on their own and they were very expensive at that time too which was another problem they faced. But with time, as we all know Time Heals all Wounds researchers overcame these difficulties and in 1956 there was probably the first workshop of Artificial Intelligence and with it, the field of AI research was born.

## II. Goals of Artificial Intelligence

[2] The ‘final’ goal of artificial intelligence is to create an intelligent machine which is capable of reasoning, planning, solving problems, thinking abstractly, comprehending complex ideas, learning quickly and learning from experience. In practice, this emulated intelligence is to reflect a broad and deep ability to fathom its surroundings so as to figure out what to do in infinite possible situations.

In order to manage problems optimally, it needs to be able to execute creativity in its functioning. All of the stated properties are assigned to the long-term goal of AI studies – general intelligence. However, in order to achieve such a goal, scientists have to focus on a vast variety of complex concepts that are its building blocks, both individually and in correlation.

## III. Types [3].

### A. Reactive Machines AI

It is the fundamental type of artificial intelligence system. It doesn't store memories or past experiences. So, they are not able to use previous experiences to advise current decisions and to configure memories. Example: IBM's chess-playing computer, Deep Blue defeated Garry Kasparov who is an international grandmaster in chess.

### B. Limited Memory AI

It is mostly used in self-driving cars. They constantly detect the movement of vehicles around them. It uses pieces of past information or experiences to advise current decisions.

### C. Theory of Mind AI

It can understand thoughts and emotions which affect human behaviour. It has yet to build completely.

### D. Self-aware AI

It can configure representations about themselves. This type of AI is not developed yet. It means particular devices are tuned into hint from humans like attention spans, emotions, display self-driven reactions.

### E. Artificial Narrow Intelligence (ANI)

Cortana and Siri are the examples of this type of AI. They help users to respond to their problems on request. They are referred to as ‘weak AI’ as they are not strong enough as they need it to be.

### F. Artificial General Intelligence (AGI)

It works like humans and is called ‘strong AI’. Example: Pillo robot, it answers to all questions with respect to the health of the family.

### G. Artificial Superhuman Intelligence (ASI)

It has the ability to achieve everything that a human can do and more. The first humanoid robot developed for the family is Alpha 2. This robot can manage a smart home and can operate the things in your home.

## IV. Branches of AI

### A. Neural Networks [4]

It is inspired by the way biological nervous systems, such as the brain, process information. It consists of input and output layers, as well as (in most cases) a hidden layer that consists of units that transform the input into something that the output layer can use. They are excellent tools for finding patterns but are far too complex.

### B. Data Mining

It is an interdisciplinary subfield of computer science. Its overall goal is to extract information (with intelligent methods) from a data set and transform the information into a comprehensible structure for further use.

### C. Expert System

It is a computer system that simulates the judgment and behaviour of a human expert. Expert systems are designed to solve complex problems. They solve complex problems by reasoning through bodies of knowledge, represented mainly as if-then rules rather than through conventional procedural code. It is divided into two subsystems:

- The inference engine
- Knowledge base

The knowledge base represents facts and rules and the inference engine applies the rules to the known facts to deduce new facts.

### D. Genetic Algorithm [5]

The genetic algorithm is a method for solving both constrained and unconstrained optimization problems that is based on natural selection and belongs to the larger class of evolutionary algorithms (EA). It repeatedly modifies a population of individual solutions. At each step it uses three main types of rules to create the next generation from the current population:

- **Selection rules:** It select the individuals(parents) that contribute to the population at the next generation.
- **Crossover rules:** It forms children for the next generation by combining two parents.
- **Mutation rules:** It is used to apply random changes to individual parents to form children.

### E. Swarm Intelligence [6]

It is biologically inspired artificial intelligence based on the behavioural models of social insects such as ants, bees, wasps, termites etc.

A Swarm is a collection of individuals that have chosen their own will to converge on a common goal. Swarm Intelligence is the Complex Collective, Coordinated, Self-Organized, Flexible and Robust Behaviour of a group following the simple rules.

### F. Fuzzy Logic [7-8]

Fuzzy Logic (FL) is a method of reasoning. Lotfi Zadeh, the inventor of fuzzy logic, observed that unlike computers, the human decision making includes a range of possibilities between YES and NO. Fuzzy logic is an approach to decision making based on "degrees of truth" rather than the usual "true or false".

### G. Pattern Recognition

Pattern recognition is concerned with the automatic discovery of patterns and regularities in data through the use of computer

algorithms and with the use of these regularities to take actions such as classifying the data into different categories.

### H. Statistical AI [9]

It uses optimization techniques to automatically improve the performance of a piece of software, based on evidence present in measurement data. It is used to flesh out a quantitative theory of cognition, efficient learning, and accurate inference. Naive Bayes spam classifier is a form of these AIs that is used by almost all e-mail service providers to protect us from spam.

### V. Misuse and Threats

Since Artificial Intelligent is expanding its horizons, It can also facilitate hackers and intruders to organize attacks easily, Hackers could easily take help of such AI system to seize control of many types of equipment such as Drones, Missile or self-driving cars which can be turned into potential weapons. Traditionally, it takes a lot of time and man-effort to plan a Cyber-Attack, but these artificially intelligent systems can make such jobs quite easy.

AI has also made Phishing more effective than ever, One can figure out the pattern of user behaviour on various Social Networking Sites, and find where the user is most vulnerable and what are the areas in which users their guard down. And such areas can be bombarded with phishing Links which would finally tempt them to click on such links.

One of main feature of AI is that we just have to feed the destination, and it can use Machine Learning to figure out the path to reach there. But this also poses a threat, though we have programmed the System for a good purpose there is a possibility that the system would use devastating paths to achieve its Goal.

Since nowadays Military is finding ways to include AI in weapons to improve target efficiency, It also makes such weapons prone to cyber-attacks and internal bugs, which could result in catastrophic events. Today everyone is aware of extreme beneficial results AI can generate, But it is also beneficial to the criminals and attackers, This is the major concern that should be paid attention to.

## VI. Application

### A. Astronomy

AI can very efficiently be used to make more accurate predictions about various cosmic activities and phenomenon, We can use AI to find answers of numerous mysteries of our Universe that we know so little about.

### B. Weather Forecasting

Tough we have so much powerful supercomputers now, but still we cannot predict accurate weather not more than of few hours . The reason is the Huge amount of data and its processing, Using AI we can make this process simpler and make more accurate predictions

### C. Health Care

Currently AI is being used for detection of Cancer and its treatment, We can also use it to create Vaccines of diseases whose cure has not being found yet, Furthermore an AI system can take care of a patient who is in critical condition, It will take decisions better and faster than Humans and monitor patient and Medicine schedule in a more accurate manner.

#### D. Business and Marketing

AI system can be used to predict the current market inclination, trends and what is the best strategy for the current market scenario. This will help companies to reduce their losses and avoid financial blunders.

#### E. Sports and Entertainment

AI based applications are in huge demand in the sports sector. These advance features will make sports more interesting and help athletes to train better and figure out the areas they are lacking in to extract best out of them.

In Entertainment Industries such as gaming and movies, AI has a very vast scope, Gaming companies are trying to make their game elements more Intelligent and realistic. Human player playing against Computer bot is very common now, using AI these bots can be designed in such way that they will be practically undefeatable and will pose more challenge to the Gamer hence improving the intensity of the game.

#### VII. Conclusion

Artificial Intelligence is Everywhere, even if we are not always conscious of it, artificial intelligence is already a big part of our lives, having a crucial impact on how we live and how we work. From customer service applications to voice-powered assistants which we use such as Apple's Siri or Amazon's Alexa, there are amply examples of AI and automation tools in use today.

So what is in store for us in the future? In the coming future, AI language is looking like the next big thing. In fact, it's already advancing. I can't remember the last time I called a company and spoke with a human. In today's time, machines are even calling me!

As technological advancements continue, AI's role in our lives will grow bigger. There are even concerns arising that AI will soon make most human-filled jobs obsolete and ultimately leave millions of people unemployed. And according to the National Science and Technology Council's Subcommittee on Machine Learning and Artificial Intelligence, these concerns are not entirely baseless.

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