Review on Applications of Artificial Intelligence

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Abstract - Artificial Intelligence (AI) is an area of computer science that deals with the research and development of computer systems that are smarter than humans. Humans have programmed Artificial Intelligence. We can improve AI's skills by training it supervised and unsupervised. Artificial Intelligence uses a pattern matching method to characterize objects, events, or processes in terms of their qualitative characteristics, logical relationships, and computational relationships. AI can also be used to create future predictions. Artificial Intelligence assists humans in doing jobs quickly and effectively. Intelligence is a way of thinking and acting in response to one's surroundings.

Keywords: AI, IQ, MI, Learning, Automation

I.   INTRODUCTION

Computer science, psychology, linguistics, mathematics, and engineering are all used to create artificial intelligence. It encompasses a variety of topics, ranging from machine vision to expert systems. It was accomplished by understanding how the human brain works, as well as how people learn, decide, and operate when attempting to solve a problem, and then leveraging the findings to construct intelligent software and systems. Artificial intelligence aids in the development of computer functions that are linked to human intellect, such as reasoning, learning, and problem solving. The following are some examples of definitions:

- "Artificial Intelligence" [1] is a branch of computer science that focuses on developing machines that can mimic human intelligence behaviors.
- Artificial intelligence (Charniak and McDermott, 1985) [1] is the study of mental qualities using computational models.
- Artificial Intelligence (AI) is the research of intelligent agents that interact with their surroundings [1].
- Artificial Intelligence is the ability of a computer to think for itself.

1.1. What is AI?

Artificial intelligence, in its most basic form, is a field that combines computer science with large datasets to solve problems. It also includes the sub-fields of machine learning and deep learning, both of which are usually referenced when discussing artificial intelligence. AI algorithms are used in these areas to develop expert systems that make predictions or classifications based on input data.

In 1956, John MC Carthy was dubbed the "Father of Artificial Intelligence" by the [2] Dartmouth Conference. AI may be traced back to ancient Egypt, but it wasn't until 1941, when the electronic computer was developed, that the technology was finally available to construct machine intelligence that was comparable to human intelligence. The biological motive of the human brain is AI. AI grew more quickly as a result of cognitive reasoning and natural language. Allen Newell, J.C. Shaw, and Herbert Simon wrote "The Logic Theorist," the first first AI program, in 1956 [2].

1.2. Types of artificial intelligence—weak AI vs. strong AI

Weak AI, also known as Narrow AI or Artificial Narrow Intelligence (ANI), is artificial intelligence that has been trained to execute specific tasks. The majority of today's AI is driven by weak AI. This form of AI is anything but weak; it allows for some very sophisticated applications, such as Apple's Siri, Amazon's Alexa, IBM Watson, and driverless vehicles.

Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI) make up strong AI (ASI). Artificial general intelligence (AGI), sometimes known as general AI, is a hypothetical version of AI in which a machine possesses the same intelligence as humans and has the ability to solve problems, learn, and plan for the future. Artificial Super Intelligence (ASI), sometimes known as super intelligence, would outperform the human brain's intelligence and abilities. While strong AI is currently purely theoretical, with no practical applications to yet, that doesn't mean AI researchers aren't working on it. In the meanwhile, science fiction may provide the best instances of ASI, such as HAL, the superhuman, rogue computer aide from 2001: A Space Odyssey.

1.3. Deep learning vs. machine learning

Because deep learning and machine learning are often used interchangeably, it's important to understand the differences. As previously stated, both deep learning and machine learning are artificial intelligence sub-fields, with deep learning being a sub-field of machine learning.
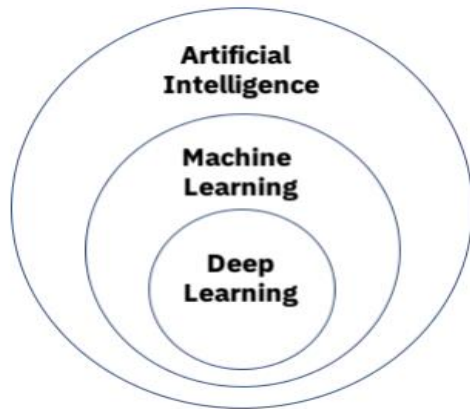
Figure 1. Hierarchy of A.I

Neural networks are the building blocks of deep learning. A neural network with more than three layers—which would include the inputs and outputs—can be considered a deep learning method. The following diagram is a general representation of this:
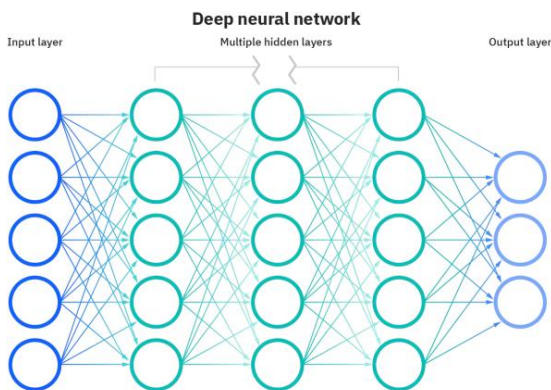

Figure 2. Sample architecture of Deep neural network

The way each algorithm learns is where deep learning and machine learning differ. Deep learning automates a substantial portion of the feature extraction process, removing some of the need for manual human involvement and allowing for the usage of bigger data sets. As Lex Fridman pointed out in the same MIT presentation, deep learning might be thought of as "scalable machine learning." Classical machine learning, often known as "non-deep" machine learning, is more reliant on human assistance to learn. To grasp the differences between data inputs, human professionals construct the hierarchy of characteristics, which normally necessitates more structured data to learn. Labeled datasets, also known as supervised learning, can be used to inform "deep" machine learning algorithms, but they aren't always required. It can absorb unstructured data in its raw form (for example, text and photos) and automatically discover the hierarchy of features that separate distinct kinds

of data. It does not require human intervention to interpret data, unlike machine learning, allowing us to scale machine learning in more exciting ways.

II.   ARTIFICIAL INTELLIGENCE APPLICATIONS

AI systems have a wide range of current applications in the real world. Here are a few typical examples:

2.1. Speech recognition

There are several names for this technology, including speech-to-text, automatic speech recognition (ASR), computer voice recognition (CSR), and speech-to-to-text. In order to conduct voice searches (such as Siri) or to make messaging more accessible, many mobile devices have speech recognition built in.

2.2. Customer service

Along the client journey, virtual agents on the internet are taking the place of real agents. For example, they can answer FAQs about shipping or offer personalized advise, cross-sell products, or recommend sizes for customers. This shifts how we view customer engagement across websites and social media platforms. An ecommerce site with virtual agents can use messaging bots to communicate. Other examples include Slack and Facebook Messenger, as well as activities that are often performed by virtual assistants and speech assistants.

2.3. Computer vision

It's an advancement in artificial intelligence (AI) that enables computers and systems to draw useful information from visual inputs such as digital photos, movies, and other media. Image recognition does not have this suggestion capability, however text recognition can. Computer vision, which uses convolutional neural networks, has applications in photo tagging on social media, radiological imaging in healthcare, and self-driving automobiles in the auto industry.

2.4. Recommendation engines

To generate more efficient cross-selling techniques, artificial intelligence (AI) algorithms can exploit prior consumer behavior data. This is utilized by online businesses to provide clients with suitable add-on recommendations throughout the checkout process.

2.5. Automated stock trading

AI-driven high frequency trading platforms execute thousands or even millions of deals every day without human interaction in order to optimize stock portfolios.

III. HISTORY OF ARTIFICIAL INTELLIGENCE: KEY DATES AND NAMES

As far back as ancient Greece, the concept of 'a machine that thinks' has been floated. However, significant events and milestones in the development of artificial intelligence have occurred since the introduction of electronic computers (and in relation to some of the themes mentioned in this article) including the following:

- Computing Machinery and Intelligence, by Alan Turing, first published in 1950. Turing, the WWII hero who deciphered the Nazis' ENIGMA code, presents an answer to the question "Can computers think?" and introduces the Turing Test to see if a computer can display the same intelligence as a human (or the effects of the same intelligence). Since then, there has been much discussion about the Turing test's usefulness.

- In 1956, John McCarthy coined the phrase 'artificial intelligence,' at Dartmouth College's first-ever AI symposium. McGrath went on to create the Lisp programming language. Logic Theorist, the first operating AI software program, is developed later that year by Allen Newell, J.C. Shaw and Herbert Simon.

- Mark 1 Perceptron, Frank Rosenblatt's first neural network computer, is built in 1967 via trial-and-error learning. Following Perceptrons in 1969, Marvin Minsky and Seymour Papert write the seminal book on neural networks, The Perceptrons Paradox, which serves as an argument against further neural network research for the next decade or so.

- In the 1980s, neural networks with a backpropagation algorithm became widely employed in artificial intelligence (AI) applications.

- In a chess match, IBM's Deep Blue defeats former world champion Garry Kasparov in 1997.

- 2011: Ken Jennings and Brad Rutter lose to IBM Watson on Jeopardy!

- It's now 2015, and the Minwa supercomputer at Baidu employs a convolutional neural network, a type of deep neural network, to detect and classify images more accurately than a human.

- DeepMind's AlphaGo computer program defeats world champion Go player Lee Sodol in five games in 2016. Considering how far the game has progressed (nearly 14.5 trillion possible moves after only four moves!), the victory is substantial. Later, Google paid an estimated USD 400 million for DeepMind.

IV. APPLICATIONS OF ARTIFICIAL INTELLIGENCE

Today, artificial intelligence (AI) is applied in a wide range of applications [8]. Artificial intelligence (AI) has numerous applications. They are as follows:

- Military Use
- Applications in the Medical Field
- Applications for Space Travel
- Applications in Telecommunications

4.1. Military applications

Unmanned aerial, surface, and undersea vehicles, as well as military robotics and cruise missiles, can all benefit from AI's assistance in the creation of intelligent and autonomous weapon systems. Future military forces will utilize multi-agent robotic workforces for reconnaissance and surveillance, logistics and support, communication infrastructure, forward-deployed offensive operations, and tactical decoys to hide maneuvers by manned assets [13].

4.2. Medicinal applications

In today's cutting-edge medical robotics, this technique is used. Health care organizations, medical practitioners, small businesses, and educational institutions can benefit from our expert knowledge and experience by providing better information and treatment for patients.

4.3. Space applications

Currently, our exploration of the Solar System involves more orbiters and rovers than human astronauts thanks to artificial intelligence. It gives you more options on how to accomplish any activity quickly and easily. The reason for this is because more 'intelligent' or self-driving robots are required.

4.4. Telecommunication applications

Artificial intelligence (AI) has numerous applications in the telecommunications industry, including automating repetitive tasks. It makes it easier for people to communicate with one another. As an example, it enhances communication by providing stronger signal strength.

Using artificial intelligence as a tool, humans may focus on other aspects of their work while AI handles the heavy lifting for them. It cuts down on the amount of time needed to complete a task, produces better results, and offers more options for resolving an issue. Artificial intelligence (AI) enables robots to perform tasks that are more accurate than those performed by humans, making them valuable in sectors such as medicine and other fields.

In the current environment, the use of AI is fast rising, demonstrating that humans can make extensive use of AI in their professional lives. Robots will also be utilized in jobs which people are unable to do due to factors such as danger, repetition, expense, and precision. Everything will be powered by AI in the future, creating new career opportunities across a wide range of industries. It has the potential to assist us in resolving our problems in novel and straightforward ways.

V.   CONCLUSION

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