RESEARCH PAPER

TITLE: Artificial Intelligence and Machine Learning

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ABSTRACT

The main purpose of this paper is to review the concept of AI and ML along with several features or characteristics. In this paper, I will present initially the background details of the ML and AI and then later will discuss all the applications here. Here, I will define the general definition of AI and ML and later discuss what is its main types and how it is impacting the business entity.

1. INTRODUCTION

In today's scenario, the majority of firms have started to work on the Artificial Intelligence (AI) concept and several have already employed the same in their business scenario. So, AI is a branch of computer science that mainly emphasizes the capability of the machine to generate rational behavior from external inputs. The main objective of AI is to provide software that may reason on input as well as explain on output.

Currently, AI has appeared as one of the hottest buzzwords with a good reason. With the advancement of AI technology, several new techniques also emerged aiming to solve several complex tasks. But, the experts think over it in some other ways. AI may aid the firm in performing the task efficiently and later may introduce new sources of growth. As per the report, it is expected that AI could enhance the productivity of labor by 40% or more by 2035.

In 1956, John McCarthy had coined the term AI. AI may have the ability to grab two distinct perspectives at the same time and may perform the function properly. But, one important aspect that AI must include is that it should learn from experience, how to make a decision relatively, quick response, or inference power. Based on priorities, it must be able to make decisions and even able to tackle ambiguity or complexity.

2. AIM AND OBJECTIVES

AIM – The study aims to review general concepts of AI and Machine Learning.

OBJECTIVES – Various objectives are:

a) Discussing the concept of AI and ML?

b) Reviewing the application of AI and ML

3. RELATED WORK

Here, I am presenting several works of various researchers as described below:

S. No.	***Researcher***	***Description***
	Russell et al.	In this paper, the author had employed the basic perspectives of AI. The author had concluded that AI is an integration of problem-solving, linguistic approach, learning perception, or reasoning.

	Niklas et al.	In this paper, the researcher has described the supervised type of ML. The main objective of this paper was to discuss several concepts of ML – for instance – reinforcement supervised, or unsupervised, etc. In this review, the author had explored several applications of AI or ML.
	George et al.	In this paper, the author had described strategies or structures for AI. The review also contains methods of AI – such as Weak AI or Strong AI. The paper also reviews current processes in AI and assumes the current real-world applications.

4. ARTIFICIAL INTELLIGENCE

It was Join McCarthy who had coined the term of AI in 1956. The author had defined the term AI as follows – It is an integrated form of science as well as engineering for making devices intelligent for human welfare.

As per the researcher (Russell et al.), AI is an intellect that is much smarter than the best human brain in every field proactively incorporating linguistic logic and computer science. In the case of machines, it is an advanced method that does muscle work as well as represents complex questions in an intellectual manner. Another significant aspect that is concerned is as follows – Sociology, Neuron Science, Biology, Linguistics, Mathematics, Computer Science, Philosophy, etc. Here are more lists wherein AI plays a significant role is as follows – (a) providing advice to users. (b) demonstrating (c) learning (d) Exhibiting intelligent behavior.

If I talk about AGI (Artificial General Intelligence), it is a system that describes that the machine may do intellectual behavior as the humans may do several processes at a time. Broadly, AI is the combination of problem solving, perception, learning, or opting for new solutions to the system. Besides, it incorporates reasoning as well as logic. AI is of types as follows – (a) Weak AI (b) Strong AI.

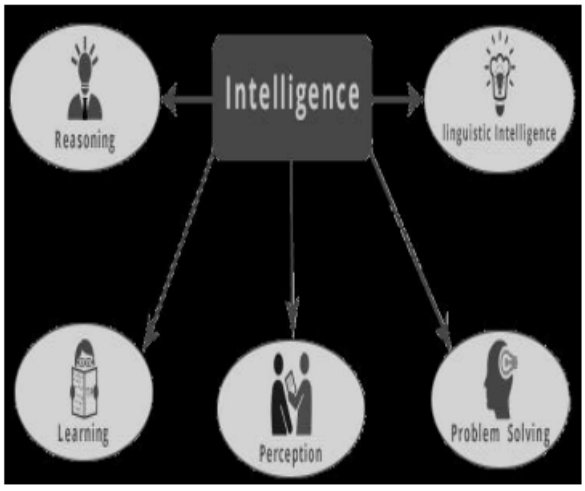

Figure 1: Diagram of sectors in AI

4.1. Weak AI

The basic principle of this aspect is that the machines behave as if they are intelligent. Besides, it also proves that virtual abilities (for instance – moving, talking, or thinking, etc) may be done by the machine if they are programmed in that manner. For example – the computer may play as well as move players automatically in the chess game. Using machine programming, one may add thinking ability to the system, so that system always takes the right step.

4.2. Strong AI

The basic principle of strong AO is that the machines do calculations and then themselves and later predict the answer in the future. For instance – WATSON was invented by IBM which is an AI supercomputer. Therefore, there will be surely such machines in the future or humanoid that will do their work as well as think more powerful than human beings.

5. MACHINE LEARNING

If I talk about Machine Learning, it is a current application of AI that promotes reality just to be able to provide machines access to data for more ease in human work as well as learn them for themselves. In simple words, it is a key hallmark of AI. The machines may take real-time data as well as feedback and then improve performance over time. It is a type of AI that may learn as well as take the data to get good output. AI and ML combined very frequently if the concepts (big data, data science well as analysis) come to mind. In multinational industries, ML is a very efficient solution to handle such big data which work indeed like a supercomputer. Such machines are usually known as Humanoids are very perfect at their work. Such machines may talk, answer complex questions as well as multiple jobs at a time.

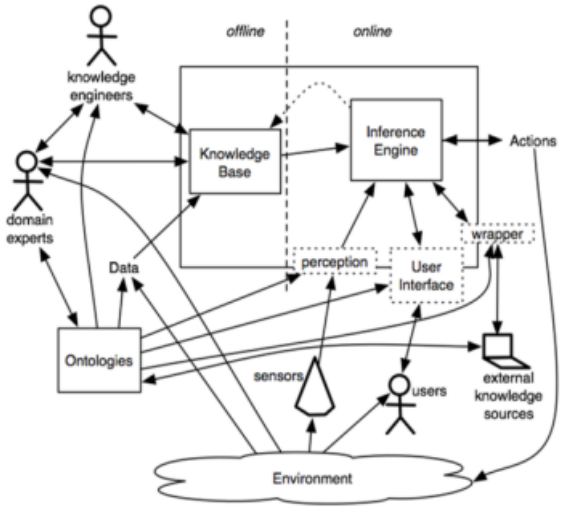

Figure 2: Diagram Representing Machine Learning Mechanism

The figure describes that ML does not only rely on how the knowledge engineer performs on training bases but also how he works for new experiments. ML is one of the most significant technical processes to AI as well as the basis of several recent advances as well as commercial applications of AI. If I talk about modern ML, it is a statistical process that aids to define the yield as well as future utilization of data. Here are the lists of ML as follows.

S. No.	***Learning Types***	***Description***
	Supervised Learning	In this case, what the correct answer is for a specific input if the researchers tell the machine. It is the most common method for training neural networks as well as other ML architecture. It incorporates learning a mapping from a set of inputs to a target variable. Here, the target is a real or discrete value. It is solved by naïve trees or decision trees, etc.
	Unsupervised/Predictive Learning	In this process, no labels are given to the learning algorithm, leaving it on its own for predicting structure in its input. It may be a hidden pattern as well as data. Research is still going on as researchers don't know how to do it at this moment. No target variables are offered. It is solved by grouping into K-groups.
	Reinforcement Learning	In this aspect, the AI agent describes how to behave to get most of the work is done. With the dynamic environment, a computer program interacts wherein it must perform a certain task for winning against the opponent.

6. APPLICATION OF AI AND ML

AI is turning into a vital staple of innovation, scarcely any masses understand the pros as well as cons of AI and ML innovations. While ML is sure to consider a key role in the making of cutting-edge frameworks in a wide assortment of industry fields sooner rather than later, it is especially applicable in quickly developing businesses, for instance, ICT, transportation, and manufacturing.

a) Virtual Stylist – As of now, a few retailers are directing AI/ML-based tools that perceive clients' appearances as well as the dress to make recommendations. In Hong Kong, fashion retailer Guess opened a pilot FashionAI idea shop at Hong Kong Polytechnic University. At the idea shop, ML and computer vision are deployed to "learn" from purchasers as well as designers inside the framework. Users looked into the store with facial recognition innovation. RFID-empowered dress rack alternatives appeared consequently on the smart mirror, which offered styling recommendations. Other AI/ML-based styling assistants give the data to sales associates so they may furnish personally clients with suggestions, making the shopping procedure effective and consistent progressively.

b) Intelligent Transportation Systems – Advances in ITS are prompting the introduction of an ever-increasing number of vehicles with autonomous driving abilities. Notwithstanding, intelligent automation in ITS isn't constrained to autonomous vehicles alone. There are endeavors in progress to build the effectiveness of traffic systems at a vital level, for instance, the structure of streets and relics, the control of traffic signals, and the setup of directions dependent on mobility pattern predictions.

c) Smart Agents Technology – It is a personalization innovation that makes a virtual portrayal of each entity and learns/builds a profile from the entity's actions and activities. In the payment business, for instance, a Smart Agent is related to every individual cardholder, dealer, or terminal. The Smart Agent related to an entity, (for example, a card or merchant) learns in real-time from each transaction made and constructs their particular and remarkable practices after some time. There is the same number of Smart Agents as dynamic elements in the framework.

d) Master Data Management – Utilizing AI/ML innovation, organizations can actualize an all-in-one server add-on that runs flawlessly in the background, examining and analyzing user entries in real-time. It can even be designed to block duplicate user sign-ins as they happen. The AI/ML solution does this via matching user data and comparing data, for example, username, email, telephone number, address, Social Security numbers, linked credit cards, IP information, and much more.

7. CONCLUSION

Thus, AI is not a new concept to the world but can be seen as growing continuously with the advancement of technology. Many firms already have started working with the AI concept and questing over the details of how it can be used efficiently to gain more benefits. In this paper, I have discussed what is this concept and what is its usage in the business world.

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