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General Concepts of "Artificial Intelligence and Machine Learning"

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ABSTRACT

Long days ago, there were all kinds of work which is only done by humans. There were no such machines and technologies as today. At that time, science is not developed and technologies were not invented. So working is dependent on the people and humans have recognised that "Today"s science is tomorrow"s technology".

New superiorly advanced technologies are no less than the blessing of god. Adaptive inventions for reducing human work and bright future were invented which are simply called Artificial Intelligence and Machine learning. Even though there were many false assumptions at the early beginning, we are witnessing a new era of errorless technology and superior science. This review involves the general concepts of artificial intelligence and machine learning.

Keywords: *Digitalization, reasoning, general AI, supervised learning, unsupervised learning, humanoids.*

I. INTRODUCTION

As humans have proved their presence on the earth, every individual must understand what artificial intelligence and machine learning are going to mean for the human race. A nice poem summarized by W. H. Auden gives the relationship between human life and robotics:

- Those who will not reason
- Perish in the act;
- Those who will not act
- Perish for that reason.

The poem explains that "Fittest survival" i.e. only those humans/machines will survive who prove their existence by their best performance, high intelligence and maximum capacity. Hence it"s high time and precipice of one of the most magnificent discoveries of supremacy since man learnt to create tools and fire. It is a road that once we walk ahead; there will be no turning back, once we achieve machine super intelligence which will be self-learning,

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completely automatic and self-improving.

As we see in any sci-fi movie like iron man, star wars, terminator etc. Which vary from completely equipped superheroes ‟s to world-destroying super robots. Even if anyone has seen a missile or space shuttle launching, automatically driven cars, or simple robots which help in household chores to hard power full muscle works, which are very great examples of human intelligence. No doubt that artificial intelligence and machine learning are the two hottest buzzwords all over the world right now, and often seem to be used interchangeably.

II. Related work

Peter Norvig and Stuart Russell [1] in their research paper “Artificial intelligence: A modern approach” have implemented the basic perspectives of artificial intelligence. They concluded that artificial intelligence is a combination of reasoning, learning, perception, linguistic approach and problem-solving.

Niklas Lavesson[3] also described the supervised type of machine learning. The ambition of this review is to introduce the types of machine learning such as supervised, unsupervised and reinforcement etc. The review also explores the applications of AI and machine learning in real-time.

George F Ludger [10] described structures and strategies for artificial intelligence. The review also contains the methodologies of artificial intelligence such as weak artificial intelligence and strong artificial intelligence. It also considers the current real-world applications and current processes in artificial intelligence.

III. Artificial intelligence (AI)

The father of artificial intelligence John McCarthy, who coined the term “Artificial intelligence” in 1956, said that “It is the combination of science and engineering to make intelligent devices for human welfare.”

“Artificial intelligence is an intellect [13] that is much smarter than the best human brain in practically every field, including computer science and linguistic logic.”It is a modern method of machines which will do muscle work and illustrate complex questions in an “intellectual” manner. It is concerned with the basic and most important aspects of our life i.e. philosophy, computer science, mathematics, linguistics, biology, neuron science, sociology etc. AI plays a very important role to exhibit intelligent behaviour, learning, demonstrating and giving advice to the 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. A broader view of

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artificial intelligence is that it can be the combination of learning, perception, problem solving and adapting new solutions to the system. It also involves linguistic logic and reasoning [1].

Artificial intelligence has 2 types:

1. Weak AI.

2. Strong AI.

1. Weak AI.

The principle of Weak AI is that the machines behave as if they are intelligent. Weak AI proves that virtual abilities like thinking, talking, and moving can be done by machines if they are programmed in that manner. E.g. In a chess game, the computer can play and move players automatically. The computer does not have thinking ability but in actuality, it is programmed so that the computer always takes the right step.

2. Strong AI:

The principle of Strong AI is that the machines will do calculations and think themselves and will predict the answer in future. E.g. The artificial intellectual supercomputer „WATSON‟ was invented by IBM. Thus in future, there will be such machines or maybe humanoids who will do their work and think more powerful than human beings.

IV. MACHINE LEARNING

Machine learning is a current application of AI which promotes reality just to be able to give machines access to data for more ease in human work and just to learn them for themselves. Learning [2] is a key hallmark of artificial intelligence. The machines can take real-time data and feedback and improve performance over time. Machine learning is a type of artificial intelligence which can learn and takes the data to get good output. Both the terms, Artificial intelligence and machine learning are combined very frequently when the concepts like big data, data science and analysis come to mind. Machine learning is a very efficient solution to handle such big data in multinational industries. They work like super-computer. These machines or generally known as “Humanoids” are very perfect at their work. These robots/machines can talk, answer complex questions, and do multiple jobs at a time.

The diagram explains that machine learning does not only depends on how the know ledged engineer performs on training bases but also on how he works for new experiments. Machine learning is one of the most important technical approaches to AI and the basis of many recent advances and commercial applications of AI. Modern machine learning is a statistical process that helps to define the output and future use of data [3].

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There are the following types of learning:

1. Supervised learning.

2. Unsupervised/predictive learning.

3. Reinforcement learning.

1. Supervised learning:

In this process, if the researchers tell the machine what the correct answer is for a particular input. It is the most common technique for training neural networks [4] and other machine learning architectures. It involves learning a mapping from a set of inputs to a target variable. The target is discrete and real value. It is solved by decision trees, naive trees [5], boosting and multi-layer [6] neutral networks.

2. Unsupervised/predictive learning:

In this method, no labels are given to the learning algorithm, leaving it on its own to find structure in its input. It can be a goal in itself i.e. hidden pattern[7] and data. Researchers don‟t know what to do at this moment, research is still going on. No target variables are provided. It is solved by grouping into K groups.

3. Reinforcement learning:

In this algorithm, The AI „agent [8] decides how to behave to get most of the work done. A computer program interacts with a dynamic environment in which it must perform a certain task to win against an opponent. The program gives feedback in terms of punishment or reward. The machine itself selects actions to be performed for better output.

V. APPLICATIONS OF AI AND MACHINE LEARNING

As we know that how AI is a most useful topic in human life. There are many day-to-day examples of AI. There is Siri by apple, google now by google, Watson by IBM and Cortana by windows mobile for various operating systems which are intelligent digital personal assistants [9] which have speech and gesture recognition system which helps the user to find and sort out all the needed things without any physical appearance.

It will give all the information to you like....” where is the nearest restaurant/college/bus station?” or it will remind your pending work, alarm clock, personal information as well as your friend‟s birthday or important meetings to handle, etc.

Many future and current researches are going on by scientists on humanoids i.e. robotics along with human behaviour and feelings. There are also high-performance cars along with automatic

driver assists, missiles with radar, satellites and navigation systems.

The self-driving car called Waymo [11] which is a google initiative drives on the road without a driver. Again NASA and GOOGLE are together for the first-ever humanoid astronaut known as Valkyrie [12] which is an absolute example of artificial intelligence.

VI. CONCLUSION

The entire world is on the way to Digitalization and for that purpose, artificial intelligence and machine learning concepts play an important role. Our research paper is based on, how intelligence and new machine technologies get invented in our day-to-day life.

Today‟s machines are ready to give knowledge-based education and are responsible for improving intelligence. In future, we don‟t think and imagine the progress of the world due to only Artificial Intelligence and Innovative Machines. We can‟t imagine what happens in the surroundings and in all over the world because of scientists and engineers. Scientists developed Robots who are working like a Human Beings and also research is going on to create the best world in future. Youth generation support is one of the most important parts to develop new technologies. A combination of Science and Engineering and quality machine learning will surely take the world at its highest fit.

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