**Machine Learning**

**What is Machine Learning and What is Its Future?**

“Machine learning (ML) is an umbrella term that refers to a broad range of algorithms that perform intelligent predictions based on a data set. These data sets are often large, perhaps consisting of millions of unique data points. Recent progress in machine learning has attained what appears to be a human level of semantic understanding and information extraction, and sometimes the ability to detect abstract patterns with greater accuracy than human experts”

\.Artificial Intelligence is the combination of perception, cognition and action demonstrated by machines. Any system that relies on detection and computation can possess artificial intelligence. What makes it different from natural intelligence is it is created and developed by another intelligent and sentient entity. It involves several technologies like data mining, language processing and speech recognition.

Machine Learning is an artificial intelligence that enables software and hardware it is attached with to learn from data and become more accurate. The main purpose of machine learning is to maximise the self-cognition of a machine with little to no human intervention. Unlike other types of artificial intelligence, machine learning does not require intensive programming and it allows a machine to learn by itself. **(1)** This method trains machines through experience.

In supervised learning, a subject is given information and being taught with a certain logic to learn the issue. In machine learning, a subject is given information and the issue first, then it creates its own logic. An automated system capable of self-learning can predict the result of a situation, an event or a task based on the relevant information available. It uses historic data to foresee the future.

Over the recent years, machine learning diversified and each diversion created new branches. Automated machine learning, neural networks and transfer learning are currently some of the most advanced machine learning technologies and applications.

Automated machine learning simplifies data selection, processing and extraction. This method reduces the time and resources needed to achieve the desired results. It also enables people who do not possess the knowledge or skills in machine learning to apply this technology to their field of work.

Neural networks have similar structures to the brains of animals and humans. Organic brains have neurons(nerve cells) to process information, artificial neural networks are composed of nodes that compute every information. Classical learning machines learn from provided data but neural networks learn by classifying data after processing it through their nodes.

Transfer learning is a method in machine learning that enables the data from a particular task to be carried to another related task. This method provides the opportunity for a machine to gain more knowledge and experience, thus making it more effective in future tasks.

Codeless models of machine learning can be developed to minimise the length of preparation stages like pre-processing, designing algorithms and debugging. A smaller team can manage the development and by focusing more on the results they can increase their productivity.

Reducing the size of the scale of applications can allow a learning machine to reach its designated server with lower latency and collect the required data quicker. This method would reduce the power and time consumption of the machine and lower the bandwidth requirements of the devices and components of the system.

Data and algorithms are the two main parts of machine learning technology. **(2)** The sophistication of algorithms determines the path a machine will follow while training itself and the quality of data drastically affects the content created by a self-learning system. Implementing more mathematical and geometrical applications like statistics, probability and charting will increase the intelligence of learning machines. Further developments in data science will provide data for learning machines with higher quality and quantity. Traning and employing more data analysts will help machines sort information faster and more accurately.

Deep Learning is a sub-type of Machine Learning technology and over the recent years, it has gained substantial improvement. **(3)** It mainly benefits from image/audio processing, artificial neural networks, both supervised and unsupervised learning styles. Traditional learning machines would require an expert to set their definitions. Machines with deep structured learning can differ an object from another by analysing their appearance and voice. It follows similar learning patterns to humans' when processing raw data.

**Machine Learning in Our Daily Lives**

Although at an early stage, deep learning technology is already used in digital vocabularies, translators, self-driving vehicles and video streaming platforms. Industries like finance, electronic commerce, logistics and healthcare are widely benefitting from deep learning systems. When we browse shopping websites and view an item, similar items displayed by the web browser use deep learning technology to find those items. Another example is the anti-fraud security systems of financial organisations that detect suspicious activities by analysing live transactions and comparing that information with past transactions.

Machine learning will enhance organisations' data processing capabilities and thus increasing the productivity and profitability of their businesses. Marketing departments will have more specific information on what kind of people would be interested in their products and they will have more up to date statistics about markets. Production departments will have vast technical data about the materials and techniques they will use to manufacture goods. Automated assembly lines will be assisted with not only human operators but also learning machines that will optimise power usage and material distribution. Logistic companies will have navigation systems augmented with learning machines that will create delivery routes with live traffic information to reduce the time and fuel consumption of their shipments.

As this technology develops and becomes more frequent, the number of employment opportunities for people who are experts in this field will certainly increase. On the other side, the need for people who provide these services manually will likely decrease as automated systems reach maturity. Organisations adopting deep learning or a different type of machine learning technology will constantly be challenged with obstacles in development, cost of maintenance and experimentation in real-life scenarios. In time new methods and techniques will rise that will enhance machine learning in every aspect and make it more affordable and feasible for individuals and organisations.

**Our Relationship with Machine Learning**

Today, virtual assistants in websites are already powered by machine learning. When we enter our questions into their chatboxes they can understand what our inquiry is about by detecting and processing keywords. This service saves the customers and workers a significant amount of time by avoiding phone calls, pressing numbers on the number pads of the phones and waiting in the queue.

Due to being at an early phase, learning machines cannot fully comprehend our meaning at the moment but in near future, as they develop, they will become much more efficient assistants. When we make research about an item we are planning to acquire, they will bring more relevant search results containing more useful information. This will prevent us from choosing the wrong product that seems similar to what we exactly need or want.

The goods we purchase from web-stores will reach our homes quicker by optimised routes of delivery. We will have more approximate notices and we will even be able to live-track an item that is on the way to us. These features will help us deliver gifts for our cared ones on special days like birthdays.

When protective programs that defend our IT devices from malicious software will be augmented with deep learning machines, they will have a broader field of defence. They will be learning how ill-intended hackers infiltrate systems by collecting and analysing information from live date databases. By being one step ahead of attackers these programs will not only be protective but also preventative.

Artificial Intelligence, Machine Learning and Deep Learning are inter-related technologies. As one advances so, the others benefit from that advancement. Developments in these areas will make our digital and personal lives faster, safer and more affordable. They will also create new fields for innovation in other areas of Information Technology.

**(1)** <https://www.ibm.com/cloud/learn/machine-learning>

**(2)** <https://towardsdatascience.com/overview-state-of-the-art-machine-learning-algorithms-per-discipline-per-task-c1a16a66b8bb>

**(3)** <https://www.mastersindatascience.org/learning/data-science-vs-machine-learning/>