

# Difference Between Machine Learning and Deep Learning

In today's technology-evolving world, new technologies designed to make our lives easier are constantly being introduced to us. One of these critical technologies is AI or artificial intelligence. You may be familiar with artificial intelligence, machine learning, and deep learning. Sometimes, they're even used interchangeably. But those terms are related, and have their own distinct meaning and they're more than just buzzwords.

Deep learning is a subset of machine learning, and machine learning is a subset of artificial intelligence, also known as (AI). You can think of them as a series of working for concentric circles, with AI occupying the largest, followed by machine learning, then deep learning.

In simple words, deep learning is AI, but AI is not deep learning exactly. Machine Learning and Deep Learning are the two main concepts of Data Science and the segments of Artificial Intelligence.

Most people think that deep learning, machine learning,, and as well as artificial intelligence are the same things but in actuality, all these terms are different on their own but related to each other. In this article, we will learn the difference between machine learning and deep learning. But before learning the differences, let's first have an introduction to machine learning and deep learning.

## What is machine learning?

Machine learning refers to the study of computer systems that learn and adapt automatically from user experience, without being explicitly programmed and suggest to you the data.

With simple AI, a programmer can tell a machine how to respond to various sets of instructions by the hand-coding method. With machine learning models, computer scientists can “train” a machine by feeding it massive amounts of data.

The machine follows a set of rules known as an algorithm to analyze inferences from the provided data. The more data the machine parses, the better it can become at performing a task or making a decision.

## **How Machine learning works with an example**

Music streaming service is Youtube music which learns your music preferences to offer you new suggestions according to the song you are listening to.

Each time you indicate that you like a song by listening through to the end or adding it to your library, the service updates its algorithms to feed you more accurate recommendations according to that previous song. Netflix, Amazon and Hotstar use similar machine-learning algorithms to offer personalized recommendations.

Some useful ML algorithms are

- Decision Tree algorithm
- Naïve Bayes
- Random Forest
- K-means clustering
- KNN algorithm
- Apriori Algorithm, etc.

# What is deep learning?

Where machine learning algorithms generally need human correction to provide data when they get something wrong, deep learning algorithms can improve their outcomes through repetition, without human intervention.

A machine learning algorithm can learn from relatively small data sets, but a deep learning algorithm needs big data sets that might include diverse and unstructured data.

Deep learning is an evolution of machine learning. Deep learning is a machine learning technique that layers algorithms and computing units or neurons into what is known as an artificial neural network.

## How Deep learning works with an example

Deep learning uses both structured and unstructured data for training. Virtual Assistants are cloud-based applications that understand natural language voice commands and complete tasks for you. Amazon Alexa, Siri, and Google Assistant are typical examples of deep learning.

They need internet-connected devices to work. Each time a command is fed to the assistant, they tend to provide a better user experience based on past experiences using Deep Learning algorithms. Some more Practical examples of deep learning are a vision for driverless cars, money laundering, face recognition and many more.

Some popular deep-learning models are

- Convolutional Neural Networks
- Recurrent Neural Networks
- Autoencoders

- Classic Neural Networks, etc.

## Difference Between Machine Learning and Deep Learning

Parameter	Machine Learning	Deep Learning
1) Data Dependencies	Great performances on a small/medium data set.	Great performance on a big dataset.
2) Hardware Dependencies	Work on a low-end machine.	Requires a powerful machine, preferably with GPU: DL performs an amount of matrix multiplication.
3) Feature engineering	Understand the features that showcase the data.	No need to understand the feature that showcases the data.
4) Execution time	From a few minutes to hours.	Up to weeks. Neural Network needs to compute an important number of weights.
5) Execution time	Some algorithms are easy to interpret some are almost impossible (SVM, XGBoost)	Difficult to impossible

## Machine Learning and Deep Learning Future

The possibilities for machine learning and deep learning will be high! The increased use of robots is a given, not just in manufacturing but in ways that can improve our everyday lives.

Every industry will likely change, as deep learning helps things like a prediction.

On the financial front, machine learning and deep learning will help companies and even individuals save money, invest more wisely, and allocate resources more efficiently. And this is the beginning of future machine learning and deep learning trends. Many areas that will be improved are still only a spark in developers' imaginations right now.

## Conclusion

In this article we have given you all the basics regarding machine learning versus deep learning, its difference, meaning and future. Deep learning has attracted a lot of attention in those years, both in the academic and business sectors.

According to a survey about the state of AI in 2020 stated by McKinsey, AI adoption keeps adding value in ventures while deep learning use in business is still at an early stage.

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