

What is Deep Learning?

Deep Learning is the subset of machine learning or can be said as a special kind of machine learning. It works technically in the same way as machine learning does, but with different capabilities and approaches. It is inspired by the functionality of human brain cells, which are called neurons, and leads to the concept of artificial neural networks. It is also called a deep neural network or deep neural learning.

In deep learning, models use different layers to learn and discover insights from the data.

Some popular applications of deep learning are self-driving cars, language translation, natural language processing, etc.

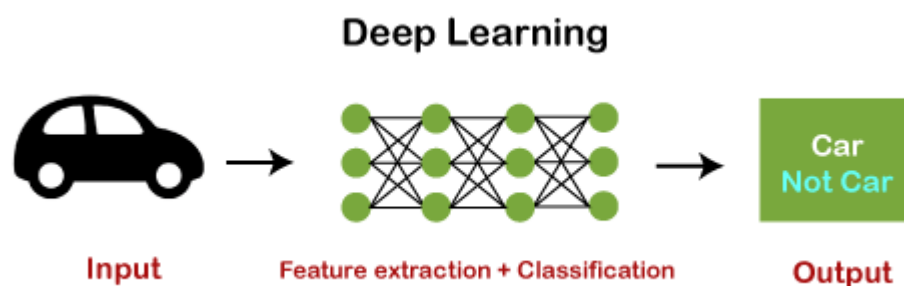
Some popular deep learning models are:

- **Convolutional Neural Network**
- **Recurrent Neural Network**
- **Autoencoders**
- **Classic Neural Networks, etc.**

How Deep Learning Works?

We can understand the working of deep learning with the same example of identifying cat vs. dog. The deep learning model takes the images as the input and feed it directly to the algorithms without requiring any manual feature extraction step. The images pass to the different layers of the artificial neural network and predict the final output.

Consider the below image:



Key comparisons between Machine Learning and Deep Learning

Let's understand the key differences between these two terms based on different parameters:

Parameter	Machine Learning	Deep Learning
Data Dependency	Although machine learning depends on the huge amount of data, it can work with a smaller amount of data.	Deep Learning algorithms highly depend on a large amount of data, so we need to feed a large amount of data for good performance.
Execution time	Machine learning algorithm takes less time to train the model than deep learning, but it takes a long-time duration to test the model.	Deep Learning takes a long execution time to train the model, but less time to test the model.
Hardware Dependencies	Since machine learning models do not need much amount of data, so they can work on low-end machines.	The deep learning model needs a huge amount of data to work efficiently, so they need GPU's and hence the high-end machine.
Feature Engineering	Machine learning models need a step of feature extraction by the expert, and then it proceeds further.	Deep learning is the enhanced version of machine learning, so it does not need to develop the feature extractor for each problem; instead, it tries to learn high-level features from the data on its own.
Problem-solving approach	To solve a given problem, the traditional ML model breaks the problem in sub-parts, and after solving each part, produces the final result.	The problem-solving approach of a deep learning model is different from the traditional ML model, as it takes input for a given problem, and produce the end result. Hence it follows the end-to-end approach.
Interpretation of result	The interpretation of the result for a given problem is easy. As when we work with machine learning, we can interpret the result easily, it means why this result occur, what was the process.	The interpretation of the result for a given problem is very difficult. As when we work with the deep learning model, we may get a better result for a given problem than the machine learning model, but we cannot find why this particular outcome occurred, and the reasoning.
Type of data	Machine learning models mostly require data in a structured form.	Deep Learning models can work with structured and unstructured data both as they rely on the layers of the Artificial neural network.
Suitable for	Machine learning models are suitable for solving simple or bit-complex problems.	Deep learning models are suitable for solving complex problems.