javatpoint.com

What is Machine Learning in TensorFlow - Javatpoint

5-7 minutes

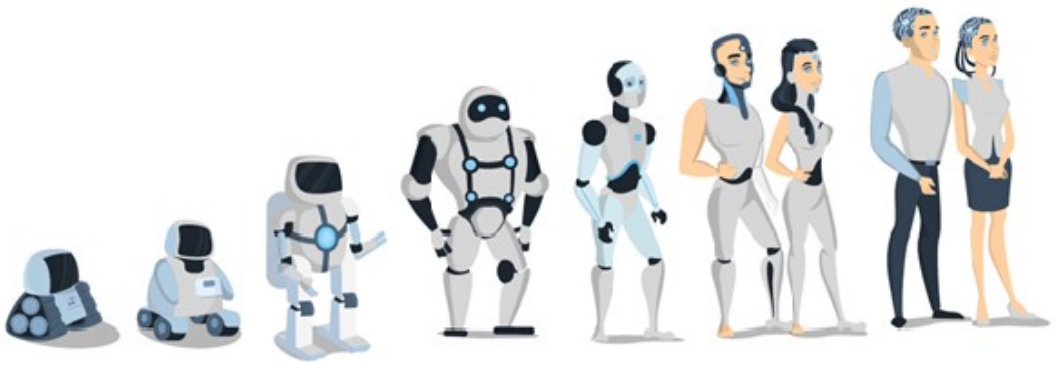
What is Machine Learning?

Machine learning is the branch of **artificial intelligence (AI)** which provide the ability to learning automatically learn and improve from experience. It was first introduced in **1959** by **Arthur Samuel**.

The primary aim is to allow the computer to learn automatically without human involvement or assistance and adjust actions accordingly. Many problems are historical very easy for humans, and very difficult for networks, Machine learning (**deep learning in particular**) is currently our best solution for many of those problems.

For example, medical diagnosis, **image processing**, prediction, **classification, regression** etc.

Evolution of Machines



Features of Machine Learning

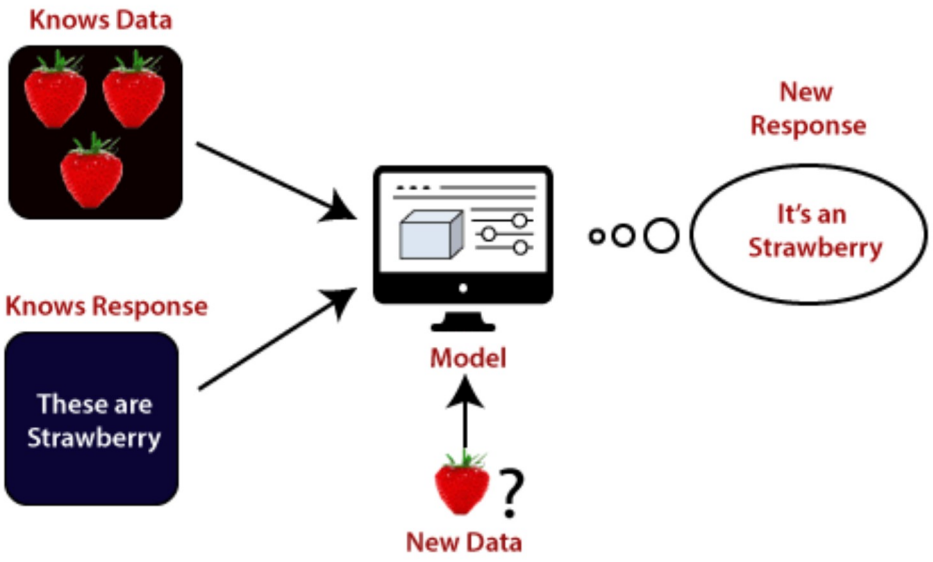
- Machine learning uses data to detect a various pattern in any dataset.
- It is a data-driven technology.
- It learns from past data and improves it automatically.
- Machine learning is similar to data mining, as it deals with a considerable amount of the data.

Need of Machine Learning

The demand for machine learning is rapidly increasing day by day. As a human, we have many limitations as we cannot access a large amount of data manually, so for that, we need some computer systems. And machine learning to make things easy for us.

It's use cases can easily understand machine learning. Right now, machine learning is used in **self-driving cars, cyber fraud detection, face recognition**, and **friend suggestion on Facebook**.

Some top companies, like **Amazon and Netflix**, have built machine learning models, who are using a large amount of data to analyze the user interest and recommend the product correctly. It is also used to finding a hidden pattern and extracting useful information from data.



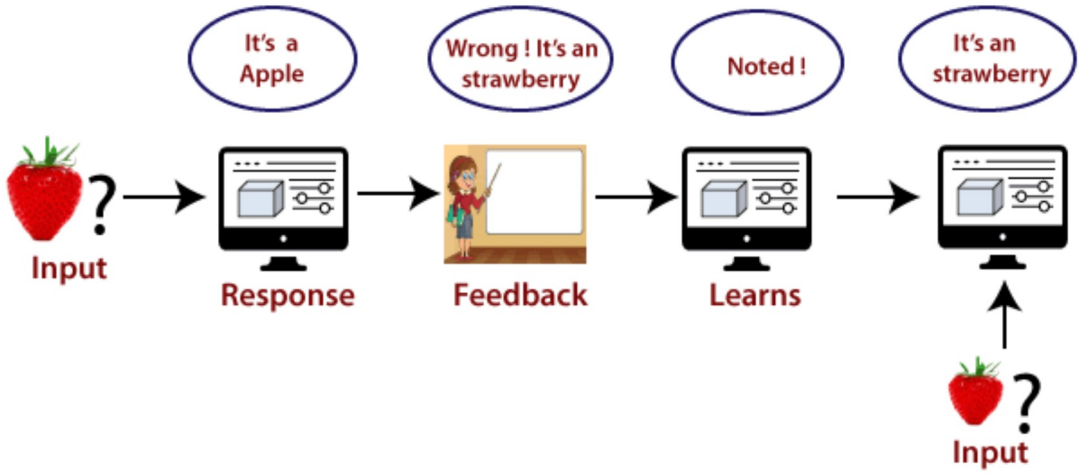
Types of Machine Learning

- Supervised Learning- **"Train me!"**
- Unsupervised Learning- **"I am self-sufficient in learning!"**
- Reinforcement Learning- **"My life my rules (Hit and Trial)!"**

Supervised Learning:

Supervised Learning is the type of machine learning, where we can consider a teacher guides the learning.

The dataset which we have will acts as a teacher and use to train the model and the machines. Once the model gets trained, it starts making the prediction or decision when new data is given to it.



It can be grouped into two types:

- Classification
- Regression

Classification

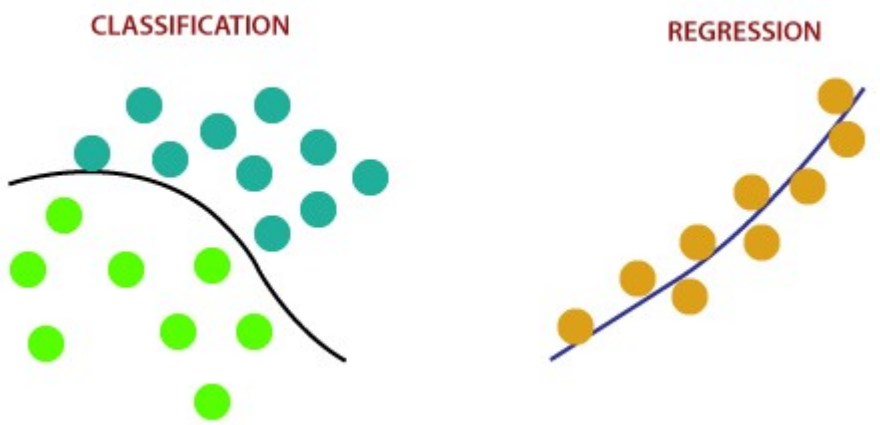
It is a technique that aims to reproduce class assignments. It produces the response value, and the data separated into "**classes**."

Example: Recognition of a type of car in a photo.

Regression

Regression is a technique which aims to produce the output value. We can use it.

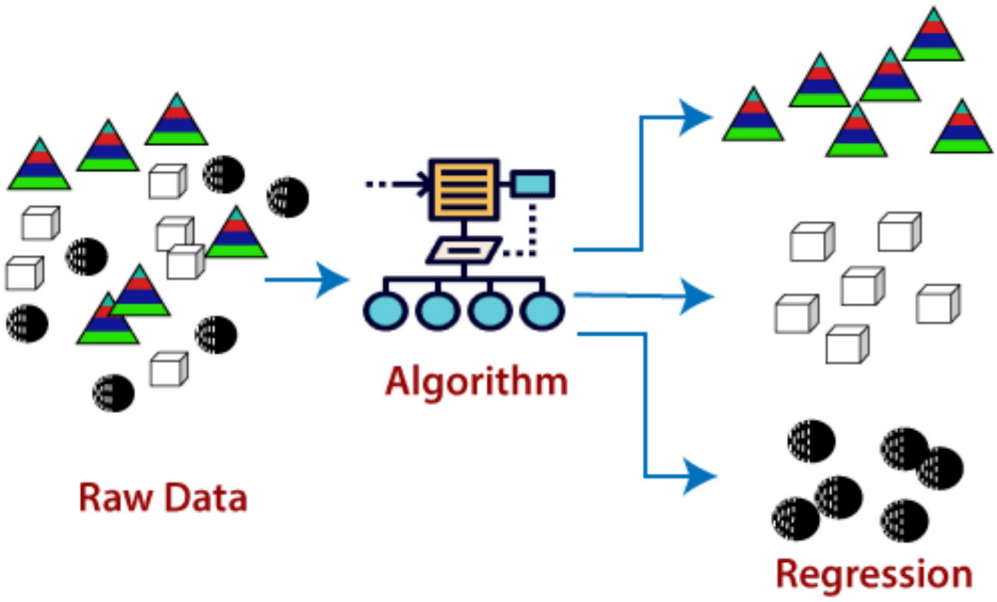
Example: Use to predict the price of a different product.



Unsupervised Learning:

The unsupervised machine learning algorithm is used when the train information is neither classified nor labelled. If the model is given a dataset, it automatically finds patterns and relationships in the dataset by creating clusters in it.

Supposed we presented images of apples, bananas, and mangoes to the model, based on some patterns and relationships it creates cluster and divides the dataset into clusters. Now if a new data is delivered to the model, it adds it to one of the generated groups.



It also has two types:

- Clustering
- Association

Clustering:

Clustering is used to find likeness and differences in a particular thing. It groups similar things. This algorithm can help us to solve many obstacles.

Example: Create clusters of similar tweets based on their content, find a group of photos with similar cars, or identify different type of news.

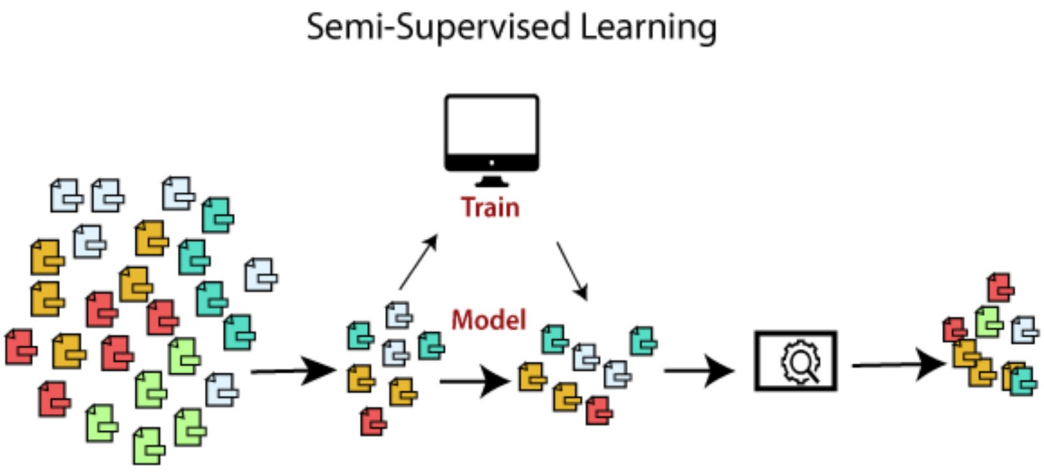
Association:

Association rules mining is another key of unsupervised data mining method, after clustering, which finds interesting associations (relationships, dependencies) in a large set of data items.

Semi-Supervised Learning:

It falls somewhere in between supervised and unsupervised learning. So, they use both labelled and unlabelled data for training where a small amount of labelled data and a big amount of unlabelled data is used.

Commonly, semi-supervised learning is chosen when the acquired labelled data requires skilled and significant resources to train it.



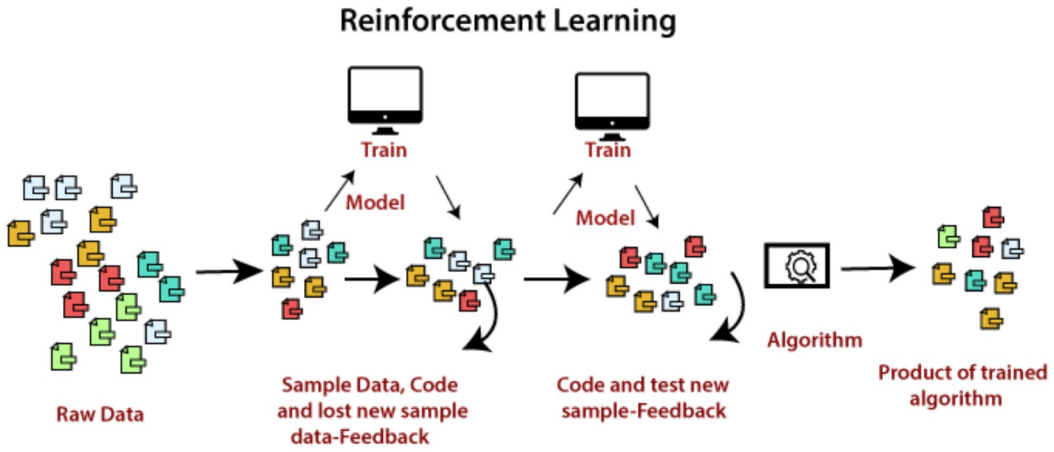
Reinforcement Learning:

Reinforcement learning is the ability of an agent to interact with the

environment and find out the best outcome.

It chases the concept of **hit and trial** method. The agent is rewarded or condemned with a point for a correct or a wrong answer, and based on the positive rewards points gained the model train itself. And once again it trained to predict the new data presented to it.

The goal of the agent is to get the most reward points and to improve its performance.



Components of Reinforcement Learning

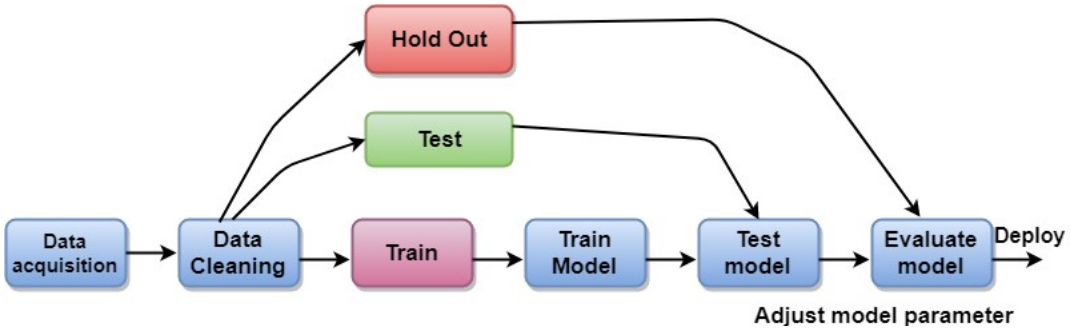
- **Decision making/ Agent learning**
- **Environment**- What agents interact with
- **Actions**- What the agent do!

Deep Learning

Deep learning is also a subset of Machine learning in artificial intelligence. Learning can be **supervised, semi-supervised, or unsupervised**.

Deep learning is a machine learning approach that prepares computers to achieve what comes naturally to humans. Deep learning is a crucial technology behind driverless cars, enabling them to recognize a stop sign.

Working of Deep Learning



In deep learning is getting lots of attention lately and for a good reason. A computer model learns to perform the classification tasks directly from any images, text, and sound in deep learning.

The term "**deep**" commonly refers to the number of hidden layer in the neural network. Conventional neural networks only contain 2-3 hidden layers, while deep networks can have 150.