

INTRODUCTION TO MACHINE LEARNING

What is Machine Learning?

Machine Learning is the field of study that gives computers the capability to learn without being explicitly programmed. This definition gives an intuition that machines no longer need human assistance to solve the problems, it should be capable of learning and improvising automatically.

Traditional programming Vs. Machine Learning

In traditional programming, data is fed into the machine along with a program to perform some tasks but in machine learning model data is fed along with the program which can learn and make machine learn and deal with future unseen data.

There are basically four types of Machine Learning:

Supervised Machine Learning: This type of learning is where machine is fed with the labeled data with the feature and its targeted output. For example this can be said as a student learning under the supervision of a tutor. The algorithm learns from the labeled data and then predicts based on what it learns.

Example: Consider below data is fed into the model for learning

TV advertising budget	Sales
1.1	2
0.6	1.7
2.3	2.2

Considering sales as target variable, the model now should be able to predict the sales when a TV advertisement budget is given. There are many models to choose based on the data to train the best model. For more details about training supervised models look [here](#).

Unsupervised Machine Learning: In this type of model the algorithm learns the models without any associated response hence the algorithm makes its own choice to predict and generate various patterns to make decisions.

Example: Best example would be the face book recommendation system where the model behind that tends to establish some patterns to find out the possible friends of you without explicitly mentioned.

Semi supervised model:

In real time not all the datasets have completely labeled data. For example, when we see the medical data with lot of scanned images of brain not all the cancerous scans are labelled hence the dataset might not be completely used to train a supervised model. In this scenario semi supervised learning takes place where different types of mechanisms like augmentation etc takes place to label the other data to train the model and predict the results.

Reinforcement model:

Active feedback based learning approach where a model is given a goal and is dynamically required to collect the feedback in terms of rewards and punishments to improve its performance.

Important aspects when building machine learning model:

Data: Data is very important in building models. Without proper data models tend not to give best results. Different kind of data is to be fed to machine learning model for more accurate results.

Selection of model: Not every model tend to perform well in all the scenarios. Selection of model should be wise according to the problem which is planned to solve.

Hyper parameter tuning: Hyper parameters are tuned when we are running the model, they cannot be learned they only can be adjusted according to the problem. It is very important to consider adjusting various hyperparameters to improve the model performance.

Important Terminology:

Model: Essentially known as hypothesis, insightful representation from data by applying machine learning algorithm.

Feature: An individual measurable property from the dataset is known as a feature. It is very important to quantify the feature set into feature vector which is then used by model. It is very important to select the right features to train the model.

Label: It is the value predicted by our model.

Parameters: Parameters are set of extra tools helpful to improve the model performance.

Training: Idea of the training a model is to feed the data with features and expected output so that the model can be able to predict unseen data.

Prediction: Based on set of inputs provided during training, model will be able to predict the new data.