

What is Machine Learning

Machine learning (ML) is defined as a discipline of artificial intelligence (AI) that provides machines the ability to automatically learn from data and past experiences to identify patterns and make predictions with minimal human intervention.

Machine learning derives insightful information from large volumes of data by leveraging algorithms to identify patterns and learn in an iterative process, Its a branch in data science.

Below we learn the concepts of Machine Learning.

Clustering, Classification and Regression

In the field of machine learning we all know the type of problems are different, sometimes we predict the value on previous set of data - Where data learn from available dataset, Or sometimes grouping them into some cluster. So today we are going to see what these terms are - **Clustering, Classification and Regression** means in Data science field. let's dive into this concept.

Generally machine learning algorithms are categorized on the basis of output type and type of problem that need to be addressed. So these algorithm are divided into three categories -

1. Classification
2. Regression
3. Clustering

In above example Classification and Regression are the example of Supervised algorithm where Clustering is unsupervised algorithm.

In **supervised learning**, the algorithm "learns" from the training dataset by iteratively making predictions on the data and adjusting for the correct answer

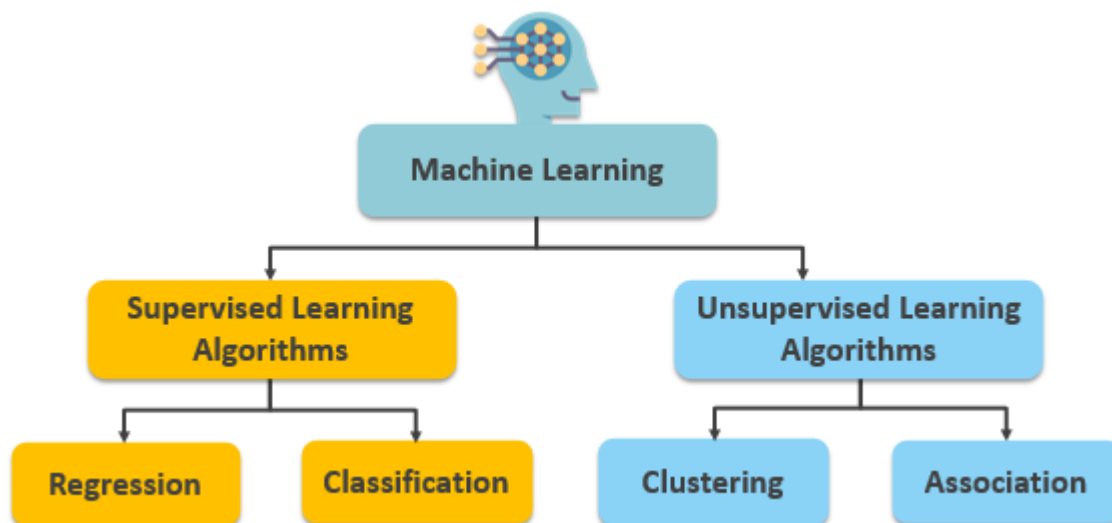
While supervised learning models tend to be more accurate than unsupervised learning models, they require upfront human intervention to label the data appropriately. For example, a supervised learning model can predict how long

your commute will be based on the time of day, weather conditions and so on. But first, you'll have to train it to know that rainy weather extends the driving time.

Unsupervised learning models, in contrast, work on their own to discover the inherent structure of unlabeled data. Note that they still require some human intervention for validating output variables. For example, an unsupervised learning model can identify that online shoppers often purchase groups of products at the same time. However, a data analyst would need to validate that it makes sense for an algorithm to put a shoe in a utensils group!



Supervised vs Unsupervised Learning.



When the output variables are continuous I.e age, weight, then it is a Regression problem whereas when it contain categorical I.e Color, Town, Gender value it is Classification problem. Clustering algorithms are generally used when we need to create cluster based on the characteristics of data points. Let's see above points in details.



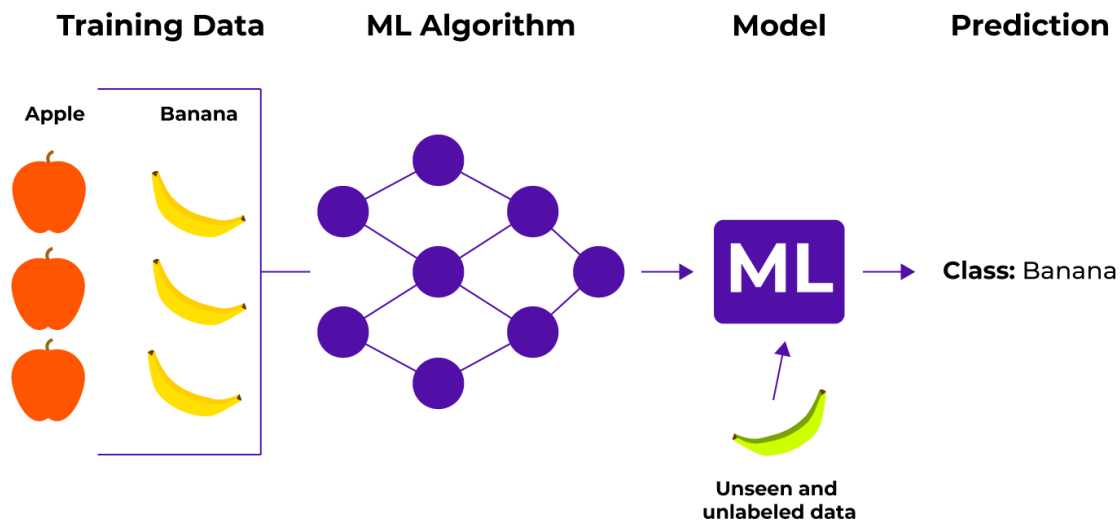
Classification.

Classification is the type of supervised machine learning, For any given input, the classification algorithm help in the prediction of the class of the output variables. there can be multiple type of classification are – binary classification, multi-class classification.

Types of classification -

- K - Nearest Neighbour
- Logistic regression
- Decision tree
- Random forest
- Naive Bayes
- SVM (Support vector machine)

Classification Example



Regression : -

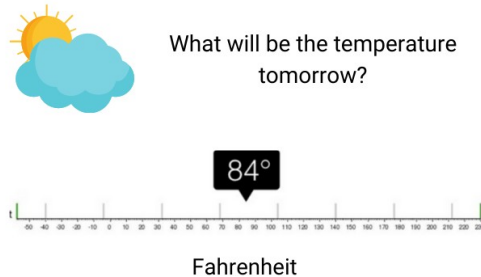
Regression is the type of supervised machine learning, When the output is continuous like age, height etc. one of very popular regression algorithm is **Linear Regression**.

Types of Regression -

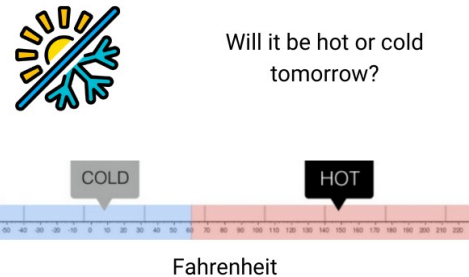
- Linear Regression
- K - Nearest Neighbour
- Decision tree
- Random forest

Regression vs Classification Example

Regression



Classification



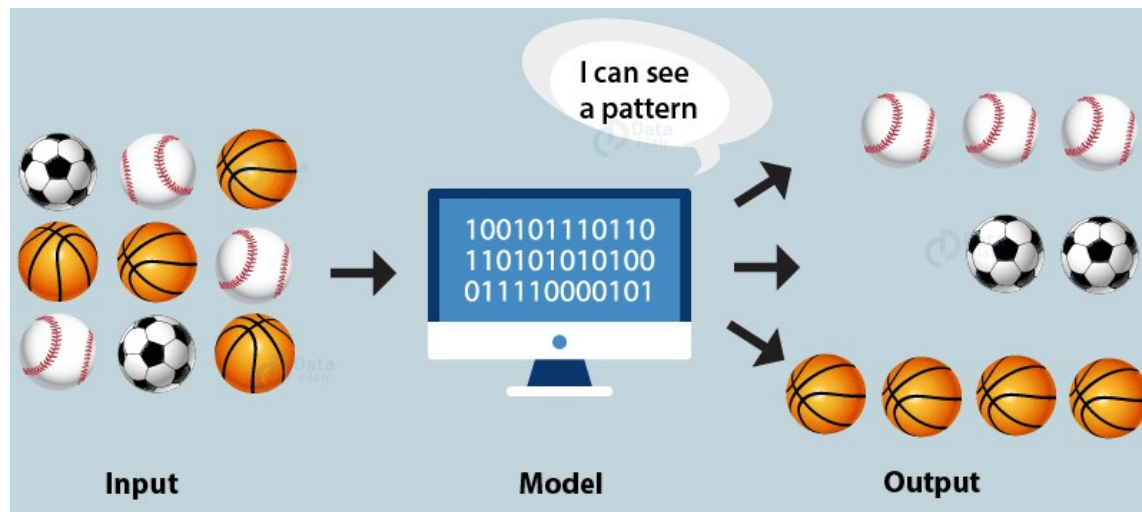
Finally, We highly recommend you to try [Google Quick Draw](#). It is an easy and intuitive way to understand how supervised learning works.

Clustering : - Clustering is unsupervised machine learning algorithm, it is used to group data point having similar characteristics as cluster.

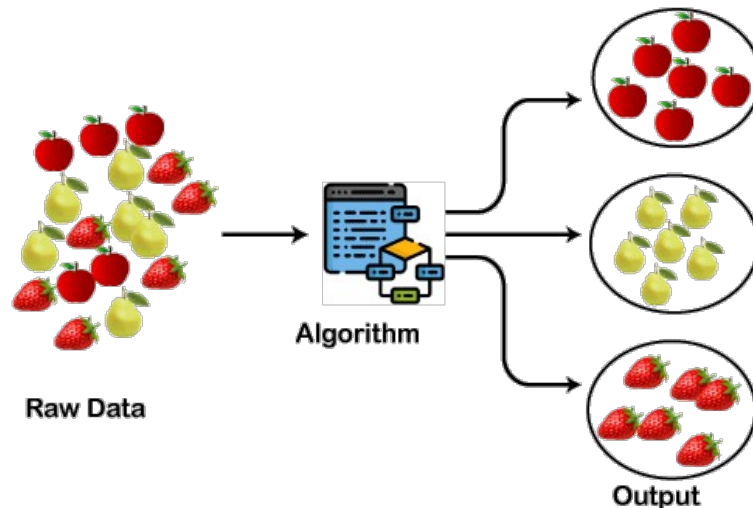
Types of clustering -

- K-Means

Clustering 1st Example



Clustering 2nd Example



In this data science we will do the practicals for Supervised and Unsupervised Learning.

Graphs

https://colab.research.google.com/drive/1nzb_zapo6tfVz6Y8yXcpm0m8EeSkIDOf?usp=sharing

Classification.

Can Machine Learning Make a Cake?

<https://www.youtube.com/watch?v=7sn8df97-JU>

<https://colab.research.google.com/drive/1tu0UvklfVsZdFlbLzBaO3ux1r9SZEwal?usp=sharing>

Regression

<https://colab.research.google.com/drive/1FdmvPBshuGra9VuuPj7ABoRb3lrUPvT5?usp=sharing>

Clustering

<https://colab.research.google.com/drive/1iac0cwqOISOlujwIIFiOE838PYPanysG?usp=sharing>

References

<https://scikit-learn.org/stable/>

https://en.wikipedia.org/wiki/Supervised_learning

https://en.wikipedia.org/wiki/Unsupervised_learning

<https://www.geeksforgeeks.org/supervised-unsupervised-learning/>

<https://www.guru99.com/unsupervised-machine-learning.html>

<https://www.guru99.com/supervised-machine-learning.html>