Classification

Classification is a type of supervised learning which specifies the class to which data elements belong to and is best used when the output has finite and discrete values. It predicts a class for an input variable as well.

Here, computer program learns from the data given to it and make new observations or classifications. Classification is a process of categorizing a given set of data into classes. It can be performed on both structured or unstructured data.

The process starts with predicting the class of given data points. The classes are often referred to as targets, labels or categories. Example - Checking if an email is spam or not.

Types of classification algorithms :-

Linear Models :-
- Logistic Regression
- Support Vector Machine (SVM)

Nonlinear Models :-
- K-nearest Neighbours (KNN)
- Kernel Support Vector Machines
- Naive Bayes
- Decision Tree Classification
- Random Forest Classification.

Classification Terminologies In Machine Learning

- **Classifier** – It is an algorithm that is used to map the input data to a specific category.

- **Classification Model** – The model predicts or draws a conclusion to the input data given for training, it will predict the class or category for the data.

- **Feature** – A feature is an individual measurable property of the phenomenon being observed.

- **Binary Classification** – It is a type of classification with two outcomes, for eg – either true or false.

- **Multi-Class Classification** – The classification with more than two classes, in multi-class classification each sample is assigned to one and only one label or target.

- **Multi-label Classification** – This is a type of classification where each sample is assigned to a set of labels or targets.

- **Initialize** – It is to assign the classifier to be used for the

- **Train the Classifier** – Each classifier in sci-kit learn uses the fit(X, y) method to fit the model for training the train X and train label y.

- **Predict the Target** – For an unlabeled observation X, the predict(X) method returns predicted label y.

- **Evaluate** – This basically means the evaluation of the model i.e classification report, accuracy score, etc.

Types Of Learners In Classification

- **Lazy Learners** – Lazy learners simply store the training data and wait until a testing data appears. The classification is done using the most related data in the stored training data. They have more predicting time compared to eager learners. Eg – k-nearest neighbor, case-based reasoning.

- **Eager Learners** – Eager learners construct a classification model based on the given training data before getting data for predictions. It must be able to commit to a single hypothesis that will work for the entire space. Due to this, they take a lot of time in training and less time for a prediction. Eg – Decision Tree, Naive Bayes, Artificial Neural Networks.