Classification is the process of predicting the class/labels of given data points. Classes are sometimes called as targets/ labels or categories. In this process we map input variables (X) to discrete output variables (y) which takes value in one of the possible classes. For example, spam detection can be identified as a classification problem with only 2 classes as spam and not spam, another example is image classification where given an input image we may have to identify the object in the image such as car, tree, house etc.

Classification belongs to the category of supervised learning where the targets/classes are also provided with the input data. A classifier utilises training data to understand how given input variables relate to the class. In this case, known spam and non-spam emails have to be used as the training data. When the classifier is trained accurately, it can be used to detect an unknown email. Some of the applications of classification include credit approval, medical diagnosis, target marketing etc.

The training data used for building classifiers have many different features/attributes that decide the output class of the input. The classifier learns to classify using these attributes, for example to classify the email the email address, the subject etc are important attributes. Once the classifier/model is built/trained, then it can be used to prediction on new unseen data. The classifier accuracy and prediction depends a lot on how the attributes relate to the output class, if certain features/attribute that is unnecessary for making prediction is present then it might result in inaccurate and faulty predictions. It is therefore necessary to perform a preliminary data analysis of the feature set to eliminate those features which do not contribute significantly to the classifier. In some cases there are too many features in the dataset in such cases also we need to reduce the number of features as training would become unnecessarily heavy and time consuming. There are many different algorithms that can accomplish the required task and they are each studied and applied for getting the best results.

Some of the supervised classifiers are Naive Bayes and Decision Trees which can be trained to predict the output class for the input. Opposed to supervised training where the output class for each input is also present, there are classifier/clustering algorithms that do not require the output class/label of the input for their training, this type of training is called unsupervised training.

The accuracy of the predicted output class depends on the dataset and the features present in the dataset, the classifier used and the training technique. A comparison of performance on the dataset is done for better insight about the class prediction task.