27. Classification Algorithm

- The classification algorithm is used to idenitfy the category of new observations on the basis of training data
- In classification, a program learns from the given dataset or observations and the classifies new observation into a number of classes or groups
- Such as, Yes or No, 0 or 1, Spam or Not Spam, cat or dog, etc. Classes can be called as targets/labels or categories
- The output is in discrete nature

There are two types of classifications:

1. **Binary Classifier:** If the classification problem has only two possible outcomes, then it is called as Binary Classifier.

- Example: Spam or Not spam, cat or dog etc.

2. **Multi-class Classifier:** If a classification problem has more than two outcomes, then it is called as Multi-class Classifier.

- Example: Classification of types of crops, classification of type of music

Types of ML Classification Algorithms

1. **Non-linear Models:**

- K-Nearest Neighbours
- Support Vector Machines (SVM)
- Naive Bayes
- Decision Tree Classification
- Random Forest Classification

2. **Linear Models:**

- Logistic Regression
- Support Vector Machines

Please note that Naive Bayes algo and Logistic Regression can only be used for classification. The rest of algos above can be used for classification as well as for regression

Evaluating a Classification Model

1. **Log Loss or Cross-Entropy Loss:** It calculates losses in the model and give output through gradient descent
2. **Confusion Matrix:** It is important. It gives reason why a model is reject even though it was showing accuracy
3. **AUC-ROC Curve:** It tells how good a particular model is working

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