Within this result evaluation document, we are trying to select the best algorithm for predicting customer churn.

**RESULT EVALUATION**

What is Customer Churn ?

The churn rate, also known as the rate of attrition or customer churn, is the rate at which customers stop doing business with an entity. It is most commonly expressed as the percentage of service subscribers who discontinue their subscriptions within a given time period.

For the purpose of selecting the best algorithm, the two parameters that we are considering are AUC Score and Recall.

What does AUC Score tell us?

Higher the **AUC**, the better the model is at predicting 0 classes as 0 and 1 classes as 1. By analogy, the Higher the **AUC**, the better the model is at distinguishing between the clients who churn and who don’t churn.

The **ROC curve** is plotted with TPR against the FPR where TPR is on the y-axis and FPR is on the x-axis. Area under the ROC Curve is AUC or Area Under Curve.

What does Recall Score tell us?

Recall Score tells us that out of the classes that are actually positive, how many we have been able to predict as positive.

Since we have to predict rightly the maximum of customers who would churn, recall score is the ideal metric to consider

Since our objective is to correctly predict most of the clients that are likely to churn, we will first see the recall score and then will come to AUC Score.

**AUC AND RECALL SCORES OF DIFFERENT MODELS FOR THE TEST DATA ARE GIVEN BELOW**

|  |  |  |
| --- | --- | --- |
| **MODEL** | **AUC SCORE** | **RECALL SCORE** |
| LOGISTIC REGRESSION | 0.8294 | 0.76 |
| SGD CLASSIFIER | 0.8297 | 0.76 |
| DECISION TREE CLASSIFIER | 0.8190 | 0.81 |
| RANDOM FOREST CLASSIFIER | 0.8339 | 0.76 |
| KNN CLASSIFIER | 0.8166 | 0.76 |
| NAÏVE BAYES CLASSIFIER | 0.8152 | **0.84** |
| SVM CLASSIFIER | 0.8206 | 0.80 |
| **ADABOOST CLASSIFIER** | **0.8357** | 0.83 |
| XGBOOST CLASSIFIER | 0.8336 | 0.78 |

We take AdaBoost Classifier to be the best algorithm as it has best AUC Score and second highest Recall Score and both Recall and AUC Scores are high.