**CLASSIFICATION OF SKY OBJECTS**

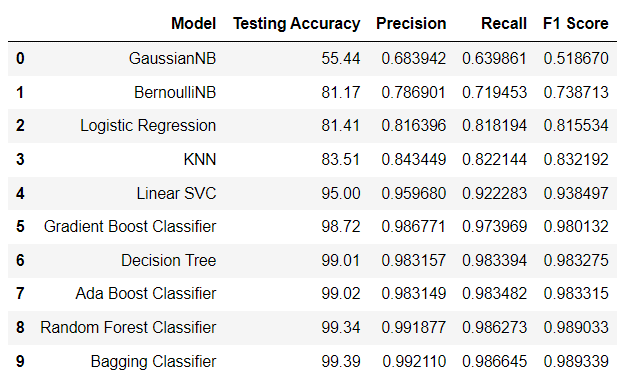
“All models are wrong, but some are useful.” You just have to find the most useful model for your problem & data.

**Project Description:**

This project attempted to use multiple classification algorithms to identify sky objects such as stars, galaxies, and quasars based on their spectroscopic and photometric properties, and to select the best performing among them. The data set consists of 22 columns and 500000 rows with non-missing values. It is having three unique values in the target column: Galaxy, Star, and Quasar. The balance between the three classes of the target variable was 54% Galaxy, 35.4% Star, and 10.6% Quasar. To construct a well-working classification model, 11 features were identified as critical.

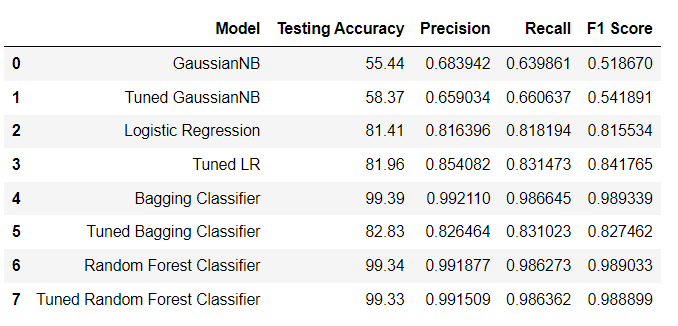
**Algorithms used:**

1. Logistic Regression
2. Gaussian Naïve Bayes
3. Bernoulli Naïve Bayes
4. Linear SVC
5. Decision Tree
6. KNN Classifier
7. Bagging Classifier
8. Random Forest Classifier
9. AdaBoost Classifier
10. Gradient Boosting Classifier
11. Which algorithm provided the best results for multi-class classification?

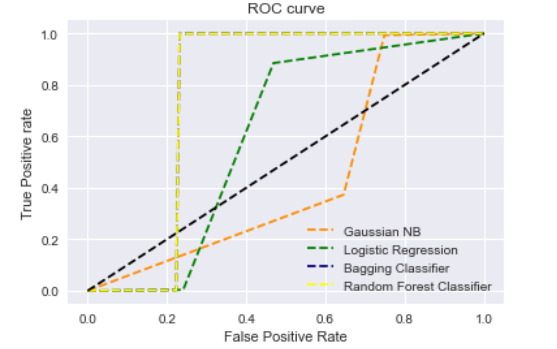


The accuracy of categorization, rather than minimizing False Negatives, is the most relevant information in this dataset. As a result, we can observe that Random Forest Classifier and Bagging Classifier perform the best based on the table obtained after all algorithms ran their predictions.

1. Was hyperparameter tuning successful in improving the metrics?



On the two algorithms that performed the worst and best, we tried tuning the hyperparameters. As can be seen, the accuracy of algorithms that performed poorly in their original form has improved. The tuned Bagging algorithms formed poorly compared to its base version and there is a slight decrease in accuracy for the random forest classifier algorithms that did well with the base model.



**Final Conclusions:**

The best results that we got came from ensemble models. Naive Bayes and KNN models had relatively smaller accuracy values in this project.