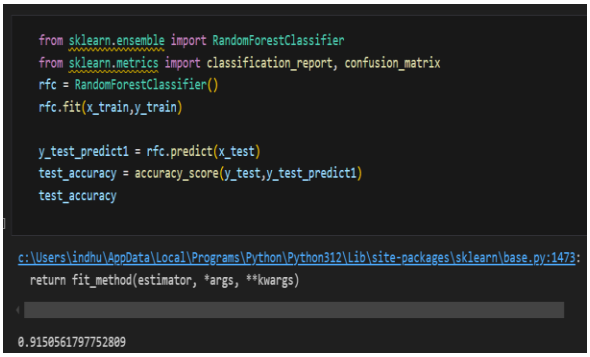
Model Optimization and Tuning Phase Template

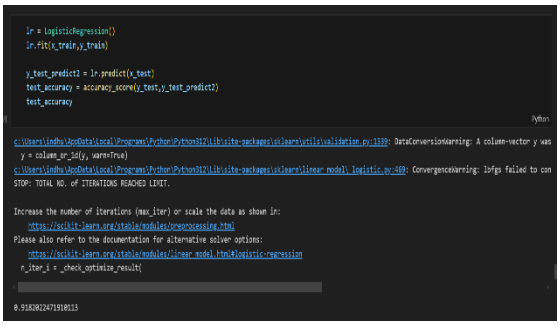
Date	15 July 2024
Team ID	740080
Project Title	Flight Delay Prediction using Machine Learning.
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining machine learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

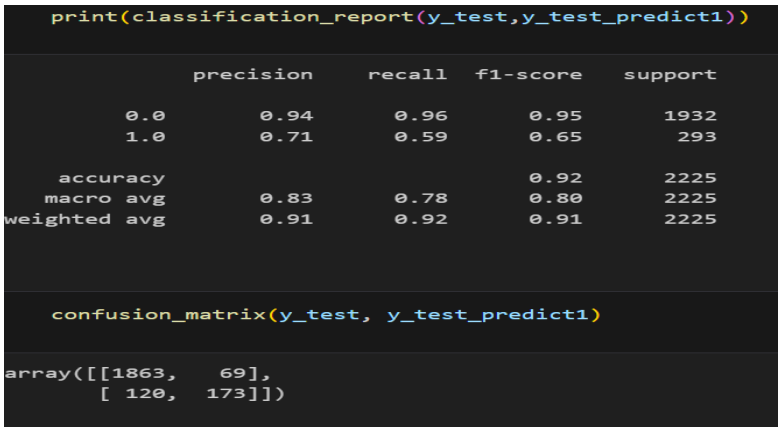
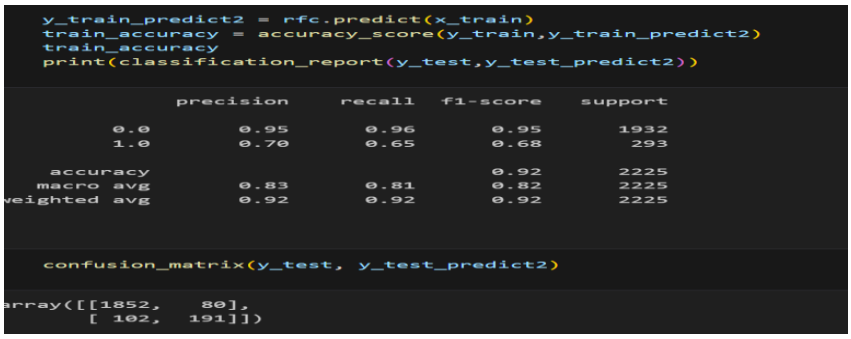
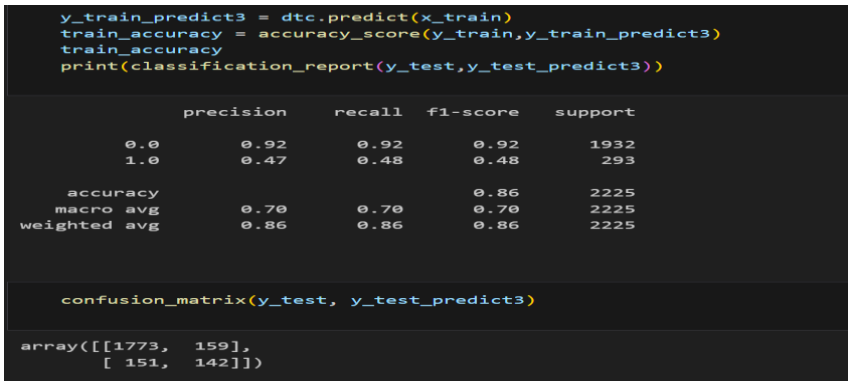
Hyperparameter Tuning Documentation (6 Marks):

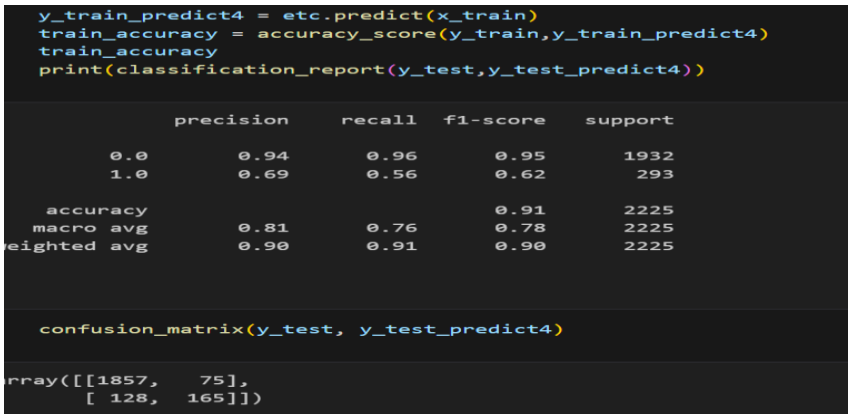
Model	Tuned Hyperparameters	Optimal Values
Random Forest Classifier	-----	

Logistic Regression	------	
Decision Tree Classifier	-------	
Extra Tree Classifier	------	

Performance Metrics Comparison Report (2 Marks):

Model	**Optimized Metric**

Random Forest Classifier	
Linear Regression	
Decision Tree Classifier	

Extra Tree Classifier	

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Random Forest Classifier	The Random Forest model was selected for its superior performance, exhibiting high accuracy during train and test. Its often more accurate than decision tree it builds multiple tree and averages their predictions,reducing the risk of overfitting.It can model non-linear relationships better than Linear Regression.Effective in detecting anomalies in datasets,useful in fraud detection and network security.