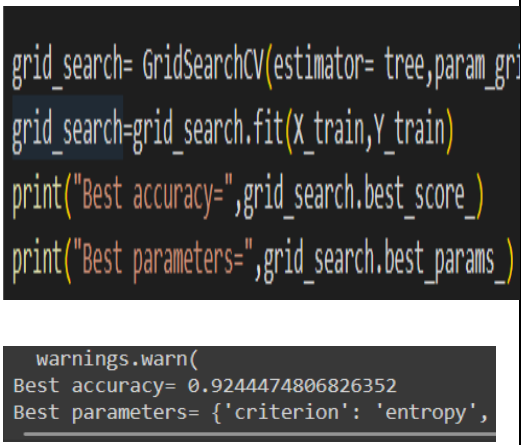
Model Optimization and Tuning Phase Template

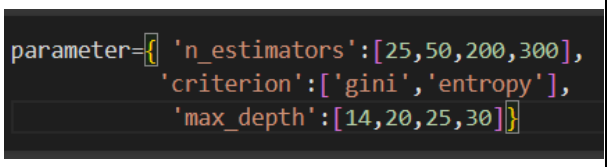
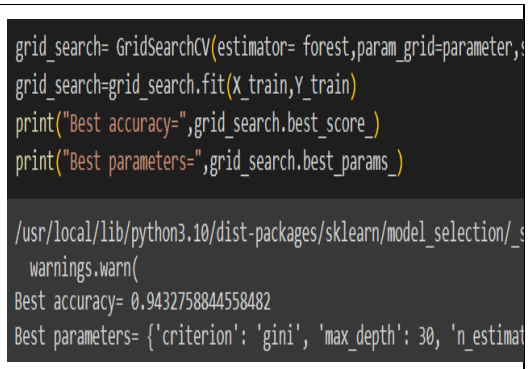
Date	7 July 2024
Team ID	team-739896
Project Title	Identifying Airline Passenger Satisfaction Using Machine Learning
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

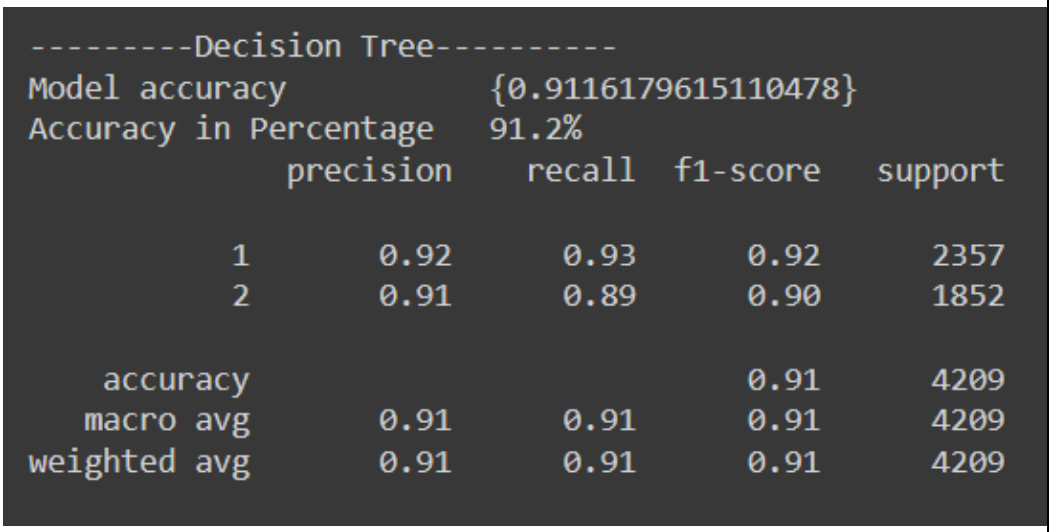
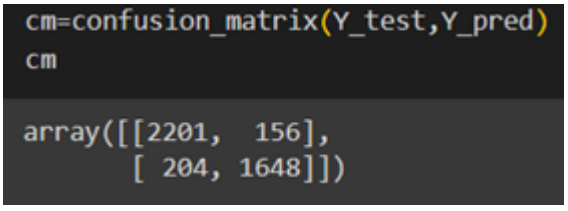
The Model Optimization and Tuning Phase involves refining machine learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (6 Marks):

Model	Tuned Hyperparameters	Optimal Values
Decision Tree		

Random Forest		

Performance Metrics Comparison Report (2 Marks):

Model	Optimized Metric
Decision Tree	 

Random Forest	``` ---------RandomForest classifier---------- Model accuracy {0.9453551912568307} Accuracy in Percentage 94.5% precision recall f1-score support 1 0.93 0.97 0.95 2357 2 0.96 0.91 0.94 1852 accuracy 0.95 4209 macro avg 0.95 0.94 0.94 4209 weighted avg 0.95 0.95 0.95 4209 ``` ``` cm=confusion_matrix(Y_test,Y_pred) cm ``` ``` array([[1119, 48], [88, 861]]) ```

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Random Forest	The Random Forest Boosting model was selected for its superior performance, exhibiting high accuracy during hyperparameter tuning. Its ability to handle complex relationships ,minimize overfitting, and optimize predictive accuracy aligns with project objectives, justifying its selection as the final model.