



# **Model Optimization and Tuning Phase Template**

Date	15 July 2024
Team ID	team-739735
Project Title	Online Payments Fraud Detection
Maximum Marks	10 Marks

### **Model Optimization and Tuning Phase**

The Model Optimization and Tuning Phase involves refining neural network 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	-	1.Random Forest

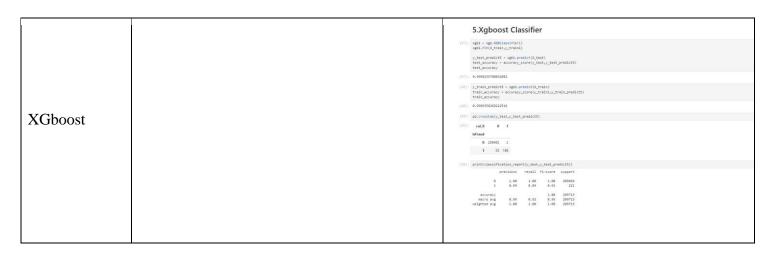




Decision Trees Classifier	2.Decision Tree    22
	0 20550 44  1 37 134  [13] print(ilastification_resort(_testtssttsstmemist2)) precision recall fiscore supert  0 1.00 1.00 1.00 300044  1 0.81 0.03 0.10 201  **COUNTY**
Extra Trees Classifier	3.ExtraTrees Classifier
SVM Classifier	### SPECT   SP







#### **Performance Metrics Comparison Report (2 Marks):**

```
Comparing the models

[51]:

def compareModel():
    print("train accuracy for rfc", accuracy_score(y_train_predictl,y_train))
    print("test accuracy for rfc", accuracy_score(y_test_predictl,y_test))
    print("test accuracy for det", accuracy_score(y_train_predict2,y_train))
    print("test accuracy for det", accuracy_score(y_train_predict2,y_train))
    print("train accuracy for etc", accuracy_score(y_test_predict2,y_train))
    print("train accuracy for etc", accuracy_score(y_train_predict3,y_train))
    print("train accuracy for set", accuracy_score(y_train_predict3,y_train))
    print("train accuracy for set", accuracy_score(y_train_predict3,y_train))
    print("train accuracy for set", accuracy_score(y_train_predict5,y_train)))
    print("test accuracy for xgb1", accuracy_score(y_train_predict5,y_train)))
    compareModel()

train accuracy for rfc 0.999976158119352

train accuracy for rfc 0.9999761581193525

train accuracy for det 0.999613781333398

train accuracy for etc 0.99974276065136

train accuracy for etc 0.999178065136

train accuracy for xc 0.999178083169408

test accuracy for xc 0.99917808329949

train accuracy for xc 0.99917808329949

train accuracy for xc 0.999178083293949

train accuracy for xc 0.999178083293949
```





# **Final Model Selection Justification (2 Marks):**

Final Model	Reasoning
Random Forest Classifier (RFC)	Performs exceptionally well with perfect accuracy metrics (Train accuracy: 1.000, Test accuracy: 1.000). It demonstrates excellent predictive performance and generalization ability, making it a robust choice for detecting fraudulent transactions.