Model Development Phase Template

Date	17 June 2025
Team ID	SWTID1749662491
Project Title	Online Payments Fraud Detection using Machine Learning
Maximum Marks	4 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Initial Model Training Code:

1. Random Forest Classifier

```python
rfc = RandomForestClassifier()
rfc.fit(x_train,y_train)
y_test_predict1 = rfc.predict(x_test)
test_accuracy = accuracy_score(y_test,y_test_predict1)
test_accuracy
```

2. Decision Tree Classifier

```python
dtc = DecisionTreeClassifier()
dtc.fit(x_train,y_train)

y_test_predict2 = dtc.predict(x_test)
test_accuracy = accuracy_score(y_test,y_test_predict2)
test_accuracy
```

3. ExtraTrees Classifier

```
etc = ExtraTreesClassifier()
etc.fit(x_train,y_train)

y_test_predict3 = etc.predict(x_test)
test_accuracy = accuracy_score(y_test,y_test_predict3)
test_accuracy
```

4. Support Vector Machine Classifier

```
from sklearn.svm import LinearSVC
svc = LinearSVC()
svc.fit(x_train,y_train)
y_test_predict4 = svc.predict(x_test)
test_accuracy = accuracy_score(y_test,y_test_predict4)
test_accuracy
```

5. XGBoost Classifier

```
xgb1 = xgb.XGBClassifier()
xgb1.fit(x_train,y_train1)

y_test_predict5 = xgb1.predict(x_test)
test_accuracy = accuracy_score(y_test1,y_test_predict5)
test_accuracy
```

Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
Random Forest Classifier	precision recall f1-score support is Fraud 0.98 0.79 0.88 1641 is not Fraud 1.00 1.00 1.00 1270883 accuracy 1.00 1272524 macro avg 0.99 0.90 0.94 1272524 weighted avg 1.00 1.00 1.00 1272524	0.9997108109552354	confusion_matrix(y_test, y_pred) [[1270841 42] [570 1071]]

Classifier	Classification Report	Accuracy	Confusion Matrix
Decision Tree Classifier	precision recall f1-score support is Fraud 0.89 0.88 0.89 1641 is not Fraud 1.00 1.00 1.00 1270883 accuracy 1.00 1272524 macro avg 0.95 0.94 0.94 1272524 weighted avg 1.00 1.00 1.00 1272524	0.9997100251154398	confusion_matrix(y_test, y_pred) [[1270725 158] [606 1035]]
ExtraTrees Classifier	precision recall f1-score support is Fraud 0.99 0.78 0.87 1641 is not Fraud 1.00 1.00 1.00 1270883 accuracy 1.00 1272524 macro avg 0.99 0.89 0.94 1272524 weighted avg 1.00 1.00 1.00 1272524	0.9997029525572798	confusion_matrix(y_test, y_pred) [[1270869 14] [369 1272]]
Support Vector Machine Classifier	precision recall f1-score support is Fraud 0.22 0.35 0.27 1641 is not Fraud 1.00 1.00 1.00 1270883 accuracy 1.00 1272524 macro avg 0.61 0.67 0.63 1272524 weighted avg 1.00 1.00 1.00 1272524	0.9975466081582745	confusion_matrix(y_test, y_pred) [[1270880 3] [1295 346]]
XGBoost Classifier	precision recall f1-score support 0 0.96 0.87 0.91 1641 1 1.00 1.00 1.00 1270883 accuracy 1.00 1272524 macro avg 0.98 0.93 0.95 1272524 weighted avg 1.00 1.00 1.00 1272524	0.9997776073378577	confusion_matrix(y_test, y_pred) [[1270865 18] [599 1042]]