Model Development Phase Template

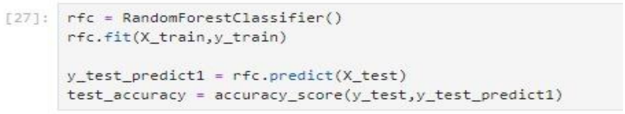
Date	20 Feb 2026
Team ID	LTVIP2026TMIDS80731
Project Title	Online Payments Fraud Detection using ML
Maximum Marks	10 Marks

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 a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

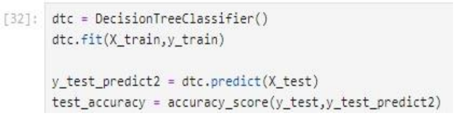
Initial Model Training Code (5 marks):

1.Random Forest



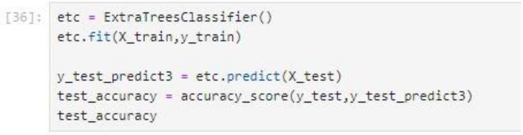
```
[27]: rfc = RandomForestClassifier()
      rfc.fit(X_train,y_train)

      y_test_predict1 = rfc.predict(X_test)
      test_accuracy = accuracy_score(y_test,y_test_predict1)
```

2.Decision Tree



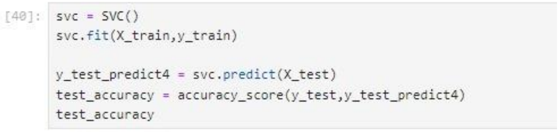
```
[32]: dtc = DecisionTreeClassifier()
      dtc.fit(X_train,y_train)

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

3.ExtraTrees Classifier



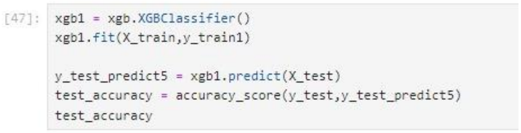
```
[36]: etc = ExtraTreesClassifier()
      etc.fit(X_train,y_train)

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

4.SupportVectorMachine Classifier



```
[40]: svc = SVC()
      svc.fit(X_train,y_train)

      y_test_predict4 = svc.predict(X_test)
      test_accuracy = accuracy_score(y_test,y_test_predict4)
      test_accuracy
```

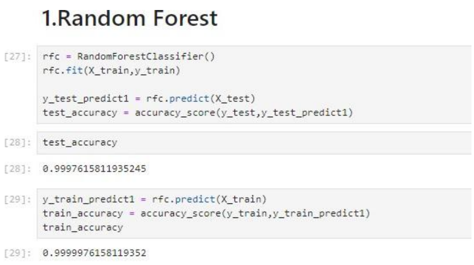
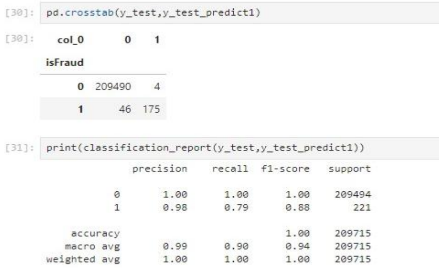
5.Xgboost Classifier

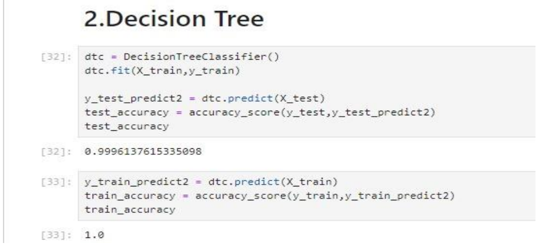
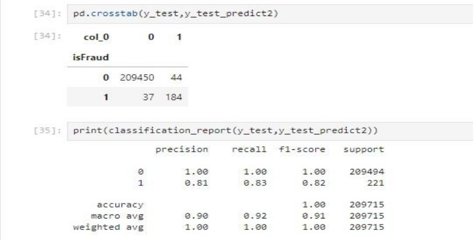


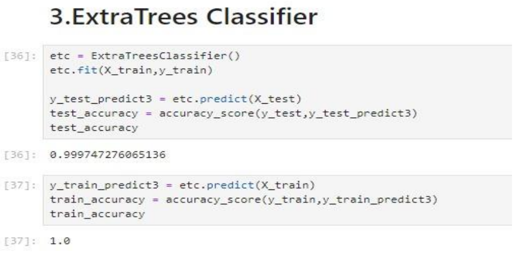
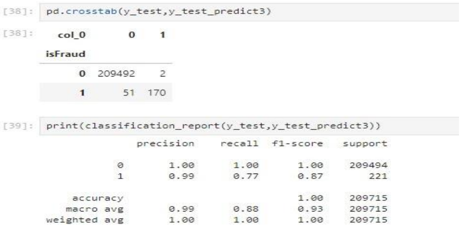
```
[47]: xgb1 = xgb.XGBClassifier()
      xgb1.fit(X_train,y_train1)

      y_test_predict5 = xgb1.predict(X_test)
      test_accuracy = accuracy_score(y_test,y_test_predict5)
      test_accuracy
```

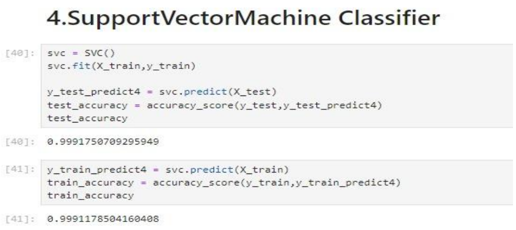
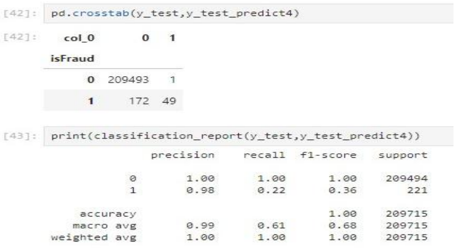
Model Validation and Evaluation Report (5 marks):

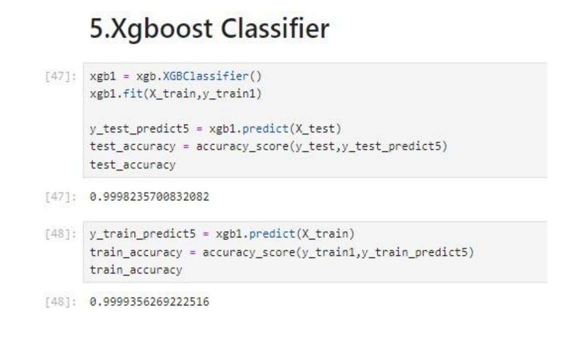
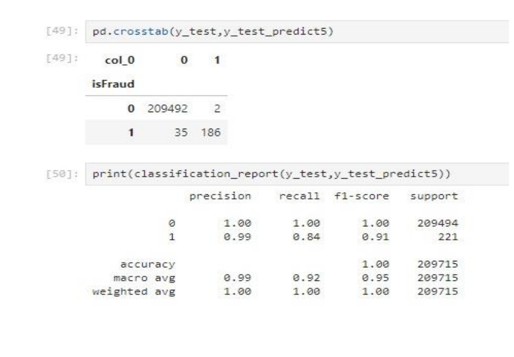
Model	Summary	Training and Validation Performance Metrics

Random Forest classifier	
	1.Random Forest
	`[27]: rfc = RandomForestClassifier()`
	`rfc.fit(X_train,y_train)`
	`y_test_predict1 = rfc.predict(X_test)`
	`test_accuracy = accuracy_score(y_test,y_test_predict1)`
	`[28]: test_accuracy`
	`[28]: 0.9997615811935245`
	`[29]: y_train_predict1 = rfc.predict(X_train)`
	`train_accuracy = accuracy_score(y_train,y_train_predict1)`
	`train_accuracy`
	`[29]: 0.9999976158119352`
		
		`[30]: pd.crosstab(y_test,y_test_predict1)`
		`[30]:   col_0       0    1`
		`isFraud`
		`0  209490    4`
		`1      46  175`
		`[31]: print(classification_report(y_test,y_test_predict1))`
		`              precision    recall  f1-score   support`
		`           0       1.00      1.00      1.00    209494`
		`           1       0.98      0.79      0.88       221`
		`    accuracy                           1.00    209715`
		`   macro avg       0.99      0.90      0.94    209715`
		`weighted avg       1.00      1.00      1.00    209715`

Decision Tree classifier	
	2.Decision Tree
	`[32]: 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`
	`[32]: 0.9996137615335098`
	`[33]: y_train_predict2 = dtc.predict(X_train)`
	`train_accuracy = accuracy_score(y_train,y_train_predict2)`
	`train_accuracy`
	`[33]: 1.0`
		
		`[34]: pd.crosstab(y_test,y_test_predict2)`
		`[34]:   col_0       0    1`
		`isFraud`
		`0  209450   44`
		`1      37  184`
		`[35]: print(classification_report(y_test,y_test_predict2))`
		`              precision    recall  f1-score   support`
		`           0       1.00      1.00      1.00    209494`
		`           1       0.81      0.83      0.82       221`
		`    accuracy                           1.00    209715`
		`   macro avg       0.90      0.92      0.91    209715`
		`weighted avg       1.00      1.00      1.00    209715`

ExtraTrees classifier	
	3.ExtraTrees Classifier
	`[36]: 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`
	`[36]: 0.999747276065136`
	`[37]: y_train_predict3 = etc.predict(X_train)`
	`train_accuracy = accuracy_score(y_train,y_train_predict3)`
	`train_accuracy`
	`[37]: 1.0`
		
		`[38]: pd.crosstab(y_test,y_test_predict3)`
		`[38]:   col_0       0    1`
		`isFraud`
		`0  209492    2`
		`1      51  170`
		`[39]: print(classification_report(y_test,y_test_predict3))`
		`              precision    recall  f1-score   support`
		`           0       1.00      1.00      1.00    209494`
		`           1       0.99      0.77      0.87       221`
		`    accuracy                           1.00    209715`
		`   macro avg       0.99      0.88      0.93    209715`
		`weighted avg       1.00      1.00      1.00    209715`

Support Vector Machine Classifier	
	4.SupportVectorMachine Classifier
	`[40]: svc = SVC()`
	`svc.fit(X_train,y_train)`
	`y_test_predict4 = svc.predict(X_test)`
	`test_accuracy = accuracy_score(y_test,y_test_predict4)`
	`test_accuracy`
	`[40]: 0.9991750709295949`
	`[41]: y_train_predict4 = svc.predict(X_train)`
	`train_accuracy = accuracy_score(y_train,y_train_predict4)`
	`train_accuracy`
	`[41]: 0.9991178504160408`
		
		`[42]: pd.crosstab(y_test,y_test_predict4)`
		`[42]:   col_0       0    1`
		`isFraud`
		`0  209493    1`
		`1     172   49`
		`[43]: print(classification_report(y_test,y_test_predict4))`
		`              precision    recall  f1-score   support`
		`           0       1.00      1.00      1.00    209494`
		`           1       0.98      0.22      0.36       221`
		`    accuracy                           1.00    209715`
		`   macro avg       0.99      0.61      0.68    209715`
		`weighted avg       1.00      1.00      1.00    209715`

Xgboost Classifier		

5.Xgboost Classifier

```
[47]: xgb1 = xgb.XGBClassifier()
      xgb1.fit(X_train,y_train1)

      y_test_predict5 = xgb1.predict(X_test)
      test_accuracy = accuracy_score(y_test,y_test_predict5)
      test_accuracy

[47]: 0.9998235700832082

[48]: y_train_predict5 = xgb1.predict(X_train)
      train_accuracy = accuracy_score(y_train1,y_train_predict5)
      train_accuracy

[48]: 0.9999356269222516
```

```
[49]: pd.crosstab(y_test,y_test_predict5)
```

[49]:

col_0	0	1
isFraud		
0	209492	2
1	35	186

```
[50]: print(classification_report(y_test,y_test_predict5))
              precision    recall  f1-score   support

           0       1.00      1.00      1.00    209494
           1       0.99      0.84      0.91       221

    accuracy                           1.00    209715
   macro avg       0.99      0.92      0.95    209715
weighted avg       1.00      1.00      1.00    209715
```