

## Project Development Phase Model Performance Test

Date	19 November 2023
Team ID	PNT2023TMID592150
Project Name	Online Payments Fraud Detection using ML
Maximum Marks	10 Marks

### Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot
1.	Metrics	<p><b>Regression Model:</b> MAE - , MSE - , RMSE - , R2 score -</p> <p><b>Classification Model:</b> Confusion Matrix - , Accuray Score- &amp; Classification Report -</p>	<p><b>Random Forest Classifier :</b></p> <pre> 1)Random Forest Classifier  [ ] from sklearn.ensemble import RandomForestClassifier from sklearn.metrics import accuracy_score rfc=RandomForestClassifier() rfc.fit(x_train,y_train) y_test_predict=rfc.predict(x_test) test_accuracy=accuracy_score(y_test,y_test_predict) test_accuracy  0.997  [ ] y_train_predict=rfc.predict(x_train) train_accuracy=accuracy_score(y_train,y_train_predict) train_accuracy  1.0  [ ] print(classification_report(y_test,y_test_predict))                precision    recall  f1-score   support   is Fraud      1.00      0.50      0.67         6  is not Fraud  1.00      1.00      1.00      994   accuracy              1.00      1000  macro avg           0.75      0.83      1000  weighted avg        1.00      1.00      1.00      1000  [ ] sns.heatmap(SF.corr(),annot=True)  &lt;class&gt; &gt; step - 1    0.011  0.11  0.11  0.11  0.085  0.035 amount    0.011  1    0.15  0.09  0.29  0.38  0.23 distbalanceOrig  0.11  0.15  1    0.99  0.27  0.22  0.0046 newbalanceOrig  0.11  0.09  0.99  1    0.28  0.22  0.038 distbalanceDest  0.11  0.29  0.27  0.28  1    0.57  0.029 newbalanceDest  0.065  0.38  0.22  0.22  0.92  1    0.0062 isFraud  0.035  0.23  0.0046  0.038  0.029  0.0062  1 </pre> <p><b>2) Decision Tree Classifier:</b></p> <pre> 2)Decision Tree Classifier  [ ] from sklearn.tree import DecisionTreeClassifier from sklearn.metrics import accuracy_score 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  0.998  [ ] y_train_predict2=dtc.predict(x_train) train_accuracy=accuracy_score(y_train,y_train_predict2) train_accuracy  1.0 </pre>

			<pre>[ ] print(classification_report(y_test,y_test_predict2))</pre> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>is Fraud</td><td>1.00</td><td>0.67</td><td>0.80</td><td>6</td></tr><tr><td>is not Fraud</td><td>1.00</td><td>1.00</td><td>1.00</td><td>994</td></tr><tr><td>accuracy</td><td></td><td></td><td>1.00</td><td>1000</td></tr><tr><td>macro avg</td><td>1.00</td><td>0.83</td><td>0.90</td><td>1000</td></tr><tr><td>weighted avg</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1000</td></tr></tbody></table> <pre>[ ]</pre>		precision	recall	f1-score	support	is Fraud	1.00	0.67	0.80	6	is not Fraud	1.00	1.00	1.00	994	accuracy			1.00	1000	macro avg	1.00	0.83	0.90	1000	weighted avg	1.00	1.00	1.00	1000
	precision	recall	f1-score	support																													
is Fraud	1.00	0.67	0.80	6																													
is not Fraud	1.00	1.00	1.00	994																													
accuracy			1.00	1000																													
macro avg	1.00	0.83	0.90	1000																													
weighted avg	1.00	1.00	1.00	1000																													
2.	Tune the Model	Hyperparameter Tuning - Validation Method -	<p>Test AUPRC Improved to 0.9035 from 0.8901</p> <p>Precision-Recall curve for Train Dataset. The y-axis is Precision (0% to 100%) and the x-axis is Recall (0% to 100%). Two curves are shown: XGB (Default Grid Search) in red and XGB (Deeper Model) in blue. The blue curve is consistently above the red curve, indicating better performance. The title states 'Test AUPRC Improved to 0.9035 from 0.8901'.</p>																														