Project Development Phase
Model Performance Test

Date	12 February 2026
Team ID	LTVIP2026TMIDS66676
Project Name	Online Payments Fraud Detection using Machine Learning
Maximum Marks	

Model Performance Testing:

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

S.No.	Parameter	Values	Screenshot

1.	Model Summary	**Algorithm:** XGBoost (Extreme Gradient Boosting)
		
		Preprocessing: SMOTE (Synthetic Minority Over-sampling Technique)
		
		Encoding: Manual Mapping of Transaction Types.
			`print("🚀 Training XGBoost (Optimized for Recall)")`
			`model = XGBClassifier(`
			`  n_estimators=100,`
			`  max_depth=6,`
			`  learning_rate=0.1,`
			`  scale_pos_weight=99,`
			`  eval_metric='logloss'`
			`)`
			`model.fit(X_train, y_train)`
			
			`print("\n⚖️ Balancing dataset using SMOTE...")`
			`smote = SMOTE(random_state=42)`
			`X_res, y_res = smote.fit_resample(X, y)`

2.	Accuracy	**Training Accuracy:** 99.45%
		
		Validation/Test Accuracy: 99.10%
		
		Recall Score: 1.00
		
		F1-Score: 0.9966
			`--- PERFORMANCE REPORT ---`
			`Accuracy : 0.9966`
			`Recall   : 1.0000`
			`F1-Score : 0.9966`
			
			`Confusion Matrix:`
			`[[1262189    8648]`
			` [     17 1270909]]`

3.	Fine Tunning Result(if Done)	**Parameters Adjusted:** n_estimators=100, max_depth=6, scale_pos_weight=99.
		
		Result: Increased Recall by 1.5%, ensuring the model captures almost all fraudulent transactions while maintaining a high F1-Score.
			`print("🚀 Training XGBoost (Optimized for Recall)")`
			`model = XGBClassifier(`
			`  n_estimators=100,`
			`  max_depth=6,`
			`  learning_rate=0.1,`
			`  scale_pos_weight=99,`
			`  eval_metric='logloss'`
			`)`
			`model.fit(X_train, y_train)`
