Model Development Phase Report

Date	June 2025
Team ID	SWTID1749841176
Project Title	Online Payments Fraud Detection Using Machine Learning
Maximum Marks	6 Marks

Model Selection Report

In the forthcoming Model Selection Report, various models will be outlined, detailing their descriptions, hyperparameters, and performance metrics, including Accuracy or F1 Score. This comprehensive report will provide insights into the chosen models and their effectiveness.

Model Selection Report:

Model	Description
Random Forest Classifier	An ensemble learning method that builds multiple decision trees during training and outputs the mode (classification) of their predictions. It reduces overfitting and improves accuracy by averaging many deep decision trees.
Decision Tree Classifier	A tree-structured model that splits the data into branches based on feature values to make predictions. It's simple, interpretable, and prone to overfitting if not pruned.
ExtraTree Classifier	Similar to Random Forest but introduces more randomness by selecting split points randomly, not just the best ones. This often speeds up training and can reduce variance further.

Support Vector Machine Classifier	A powerful linear (and non-linear with kernel trick) classifier that finds the optimal hyperplane to separate data points of different classes with the maximum margin.
XgBoost Classifier	A highly efficient and scalable implementation of gradient boosting. It builds an ensemble of weak learners (typically decision trees) in a sequential manner, optimizing for speed and performance.

Model Performance Metrics:

Model	Precision	Recall	F1-Score	Macro Avg F1	Accuracy
Random Forest Classifier	0.98	0.79	0.88	0.94	1.00
Decision Tree Classifier	0.89	0.88	0.88	0.94	1.00
Extra Tree Classifier	0.99	0.78	0.87	0.93	1.00
Support Vector Machine Classifier	0.87	0.81	0.84	0.88	0.90
XgBoost Classifier	0.98	0.79	0.88	0.94	1.00