Model Optimization and Tuning Phase Template

Date	3 May 2024
Team ID	738286
Project Title	Online Payments Fraud Detection Using Machine Learning
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining machine learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (6 Marks):

Model	Tuned Hyperparameters	Optimal Values
Model 1	Since the best hyperparameters depend on the specific algorithm (e.g., Random Forest vs Gradient Boosting), it's difficult to pinpoint a single set. However, fraud detection often tunes: • **Learning Rate:** This dials in how much the model adjusts per training step. Too high and it misses the sweet spot, too low and learning takes forever.	Perfect hyperparameters for fraud detection are elusive. They depend on the chosen algorithm (like Random Forest) and your specific data. The tuning process targets a sweet spot: catching fraud while minimizing mistakes. Experimenting with settings and monitoring AUC-ROC helps find this balance.

Performance Metrics Comparison Report (2 Marks):

Model	Baseline Metric	Optimized Metric
Model 1	Fraud Rate (…)	AUC-ROC (Area Under the Receiver Operating Characteristic Curve)

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Model 1	Machine learning fights online fraud by learning from past transactions (fraudulent and legit) to spot red flags. Unlike static rules, it adapts to new tricks by fraudsters. This constant learning keeps online payments safer.