Model Optimization and Tuning Phase Template

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Team ID	SWTID1720447482
Project Title	Thyroid Classification
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
Random Forest Classifier	max_depth , n_estimators	max_depth': None, 'n_estimators': 300
XGB Classifier	learning_rate, max_depth, n_estimators	'learning_rate': 0.3, 'max_depth': 3, 'n_estimators': 100
Support Vector Classifier	C, gamma, kernel	'C': 100, 'gamma': 'scale', 'kernel': 'linear'

Performance Metrics Comparison Report (2 Marks):

Model	Baseline Metric	Optimized Metric
Random Forest Classifier	Accuracy: 0.95	Accuracy: 0.9420

XGB Classifier	Accuracy: 0.94	Accuracy: 0.953125
Support Vector Classifier	Accuracy: 0.93	Accuracy: 0.8660714

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
XGB Classifier	This model is selected for its highest optimized accuracy (0.953125) among the evaluated models, and its robustness in handling imbalanced data. |