Model Optimization and Tuning Phase Template

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Team ID	SWTID1720092248
Project Title	Revolutionizing Liver Care: Predicting Liver Cirrhosis Using Advanced Machine Learning Techniques
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
Logistic Regression	C, solver	1.0, liblinear
Logistic Regression CV	Cs, cv, solver	[1.0], 10, liblinear
XGBoost	n_estimators, learning_rate, max_depth	100, 0.1, 6
Ridge Classifier	alpha	1.0
KNN	n_neighbors	5

Random Forest	n_estimators, max_depth	100, None
Support Vector Classifier	C, kernel	1.0, linear

Performance Metrics Comparison Report (2 Marks):

Model	Baseline Metric	Optimized Metric
Logistic Regression	0.996606	0.996606
Logistic Regression CV	0.996606	0.996606
XGBoost	0.997738	0.997738
Ridge Classifier	0.977376	0.977376
KNN	0.935520	0.935520
Random Forest	1.000000	1.000000
Support Vector Classifier	0.997738	0.997738

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
logistic regression	Chosen for its high accuracy, simplicity, and ease of interpretation. Additionally, it performed consistently well across various metrics and is computationally efficient.