Model Development Phase Template

Date	08 August 2025
Skill Wallet ID	**SWUID20250188325**
Project Title	Predictive Pulse: Harnessing Machine Learning for Blood Pressure Analysis
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	Description	Hyperparameters	Performance Metrics
Logistic Regression	A linear model for classification, suitable for linearly separable data, interpretable and efficient.	C, solver, max_iter	Train Accuracy: 0.9788 | Test Accuracy: 0.9644 | Cross-Validation Accuracy (mean of 5 folds): 0.8855
Random Forest	Ensemble of decision trees; robust, handles complex relationships, reduces overfitting, and provides feature importance for BP stage prediction.	n_estimators=100, max_depth=10, min_samples_split=5, random_state=42	Train Accuracy: 0.9986 | Test Accuracy: 1.0000 | Cross-Validation Accuracy (mean of 5 folds): 0.9595
Decision Tree	Simple tree structure; interpretable, captures non-linear relationships, suitable for initial insights into BP stage classification.	max_depth=5, min_samples_split=4, random_state=42	Train Accuracy: 0.9986 | Test Accuracy: 1.0000 | Cross-Validation Accuracy (mean of 5 folds): 0.9468

Gaussian NB	Probabilistic classifier based on Bayes theorem, assumes feature independence, effective for small datasets.	var_smoothing	Train Accuracy: 0.8952 | Test Accuracy: 0.8904 | Cross-Validation Accuracy (mean of 5 folds): 0.8937
Multinomial NB	Naive Bayes variant for multinomially distributed data; useful for count-based features but less suited to continuous BP readings.	alpha	Train Accuracy: 0.8055 | Test Accuracy: 0.8027 | Cross-Validation Accuracy (mean of 5 folds): 0.7633