Model Optimization and Tuning Phase Report

Date	15 july 2024
Team ID	740017
Project Title	Unveiling baldness: Genetic and environmental dynamics
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
Decision Tree	------	-----

Logistic Regression	-----	------
Ada Boost	--------	------
Random Forest	-----	----

Performance Metrics Comparison Report (2 Marks):

Model	Optimized Metric

Decision Tree	
	``
	Train Result:
	==
	92.86000260325406
	
	Test Result:
	==
	53.0
	
	Classification Report:
	              precision recall f1-score support
	
	           0 0.54 0.49 0.52 102
	           1 0.52 0.57 0.54 98
	
	    accuracy 0.53 200
	   macro avg 0.53 0.53 0.53 200
	weighted avg 0.53 0.53 0.53 200
	
	confusion_matrix:
	[[50 52]
	 [42 56]]
	``

Logistic Regression	
	``
	Train Result:
	==
	53.066332916145186
	
	Test Result:
	==
	57.499999999999
	
	Classification Report:
	              precision recall f1-score support
	
	           0 0.58 0.58 0.58 102
	           1 0.57 0.57 0.57 98
	
	    accuracy 0.57 200
	   macro avg 0.57 0.57 0.57 200
	weighted avg 0.58 0.57 0.58 200
	
	confusion_matrix:
	[[59 43]
	 [42 56]]
	``

KNN	-------
Ada Boosting	-----

Support vector machine	-------

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Support vector machine	The Support vector machine was selected for its superior performance exhibiting . Its ability to handle complex relationships, minimize overfitting, and optimize predictive accuracy aligns with project objectives, justifying its selection as the final model.