



Model Optimization and Tuning Phase Report

Date	08-07-2024
Team ID	739733
Project Title	Fetal AI: Using Machine Learning to Predict and Monitor Fetal Health
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	-	-			
Random					
Forest	-	-			
KNN	-	-			





Logistic		
Regression	-	-

Performance Metrics Comparison Report (2 Marks):

Model	Optimized Metric					
Decision Tree						
	<pre>print(classit</pre>	fication_repo	ort(y_test	,pred))		
	accuracy scor					
	0.92957746478	887324				
	confusion mat	rix				
		precision	recall	f1-score	support	
	1	0.97	0.95	0.96	326	
	2		0.81			
	3	0.93	0.93	0.93	42	
	accuracy			0.93	426	
	macro avg	0.87	0.90			
	weighted avg					





Random Forest							
	print(confusion_m	atrix(v	test.pred			
	J (*		
	accura	cy score					
	Code ce	ell output actio	ons				
	confus	ion matrix					
		pre	cision	recall	f1-score	support	
		1	0.96		0.97	326	
		2	0.81	0.76	0.79	58	
		3	0.89	0.93	0.91	42	
	30	curacy			0.94	426	
		ro avg	0.89	0.89	0.89	426	
	weight		0.94	0.83	0.85	426	
KNN	print(classit	rication_rep	ort(y_test	.,pred))			
	accuracy scor 0.84272300469						
	confusion mat	niv					
	CONTUSTON MAC	precision	recall	f1-score	support		
	1	0.95	0.85	0.90	326		
	2	0.49			58		
	3	0.84	0.86	0.85	42		
	accuracy			0.84	426		
	macro avg	0.76	0.83	0.78	426		
	weighted avg		0.84	0.85	426		





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CIGSSII	ication_repo	rt(y_test	,pred))		
., 00, 323					
ion matr					
	precision	recall	f1-score	support	
1	0.94	0.79	0.86	326	
2					
3	0.62	0.83	0.71	42	
curacy					
			0.69		
ed avg	0.84	0.77	0.79	426	
	cy score 47887323 ion matr 1 2 3 curacy ro avg	cy score 478873239436 ion matrix	cy score 478873239436 ion matrix	478873239436 ion matrix	cy score 478873239436 ion matrix

Final Model Selection Justification (2 Marks):

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