Model Optimization and Tuning Phase Report

Model	Tuned Hyperparameters	Optimal Values
LOGISTICS REGRESSION	-	-

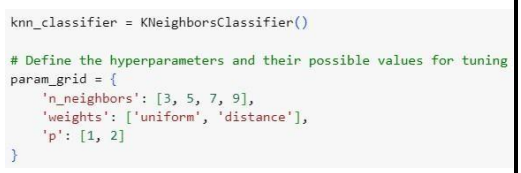
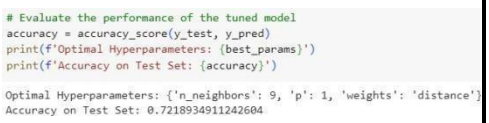
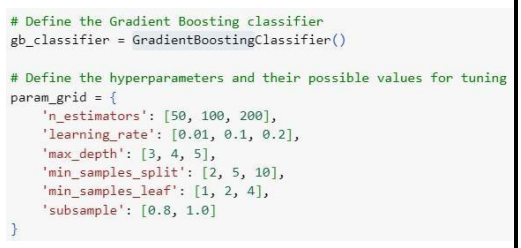
Random Forest	-	-

Date	06-06-2024
Team ID	740055
Project Title	DETECTION OF PHISHING WEBSITE FROM URLS
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):

KNN		
Gradient Boosting		

Performance Metrics Comparison Report (2 Marks):

Model	Optimized Metric

Decision Tree	`print(classification_report(y_test,y_pred))`
	
	precision recall f1-score support
	
	Loan will be Approved 0.67 0.68 0.68 75
	Loan will not be Approved 0.74 0.73 0.74 94
	
	accuracy 0.71 169
	macro avg 0.71 0.71 0.71 169
	weighted avg 0.71 0.71 0.71 169
	
	`confusion_matrix(y_test,y_pred)`
	
	array([[51, 24],
	[25, 69]])

Random Forest	`print(classification_report(y_test,y_pred))`
	
	precision recall f1-score support
	
	Loan will be Approved 0.71 0.83 0.77 75
	Loan will not be Approved 0.84 0.73 0.78 94
	
	accuracy 0.78 169
	macro avg 0.78 0.78 0.77 169
	weighted avg 0.78 0.78 0.78 169
	
	`confusion_matrix(y_test,y_pred)`
	
	array([[62, 13],
	[25, 69]])

KNN	`print(classification_report(y_test,y_pred))`
	
	precision recall f1-score support
	
	Loan will be Approved 0.73 0.59 0.65 75
	Loan will not be Approved 0.72 0.83 0.77 94
	
	accuracy 0.72 169
	macro avg 0.72 0.71 0.71 169
	weighted avg 0.72 0.72 0.72 169
	
	`confusion_matrix(y_test,y_pred)`
	
	array([[44, 31],
	[16, 78]])

Gradient Boosting	`print(classification_report(y_test,y_pred))`
	
	precision recall f1-score support
	
	Loan will be Approved 0.73 0.85 0.79 75
	Loan will not be Approved 0.86 0.74 0.80 94
	
	accuracy 0.79 169
	macro avg 0.80 0.80 0.79 169
	weighted avg 0.80 0.79 0.79 169
	
	`confusion_matrix(y_test,y_pred)`
	
	array([[64, 11],
	[24, 70]])

Final Model Selection Justification (2 Marks):

Final Model	Reasoning

Gradient Boosting	The Gradient Boosting model was selected for its superior performance, exhibiting high accuracy during hyperparameter tuning. Its ability to handle complex relationships, minimize overfitting, and optimize predictive accuracy aligns with project objectives, justifying its selection as the final model.