Model Optimization and Tuning Phase Report

Date	15 March 2024
Team ID	740095
Project Title	Smart Lender
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 Perform ancemetrics, and justifying the final mode lselection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation(6Marks):

Model	Tuned Hyperparameters	Optimal Values

Logistic Regression	Building The Machine Learning Model
	Logistic Regression
	In [24]:
	`log_reg=LogisticRegression(max_iter=800)`
	`log_reg.fit(X_train,Y_train.ravel())`
	Out[24]:
	`LogisticRegression(max_iter=800)`
		Testing The Model
		In [25]:
		`Y_pred_log_train=log_reg.predict(X_train)`
		`Y_pred_log_test=log_reg.predict(X_test)`
		In [26]:
		`pd.DataFrame(Y_pred_log_train).value_counts()`
		Out[26]:
		0.0 7706
		1.0 1278
		dtype: int64

Performance Metrics Comparison Report (2 Marks):

Logistic Regression	Evaluating The Model Using Metrics Classification Report n [27]: `print(classification_report(Y_test,Y_pred_log_test))` precision recall f1-score support 0.0 0.97 0.95 0.96 1973 1.0 0.69 0.77 0.73 274 accuracy 0.93 2247 macro avg 0.83 0.86 0.84 2247 weighted avg 0.93 0.93 0.93 2247

Model	Optimized Metric

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Logistic Regression	The Logistic Regression 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.