Model Optimization and Tuning Phase Template

Date	11 July 2024
Team ID	SWTID1720162737
Project Title	Predicting Compressive Strength Of Concrete Using Machine Learning
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.

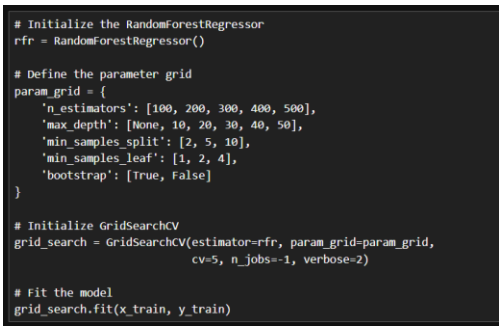
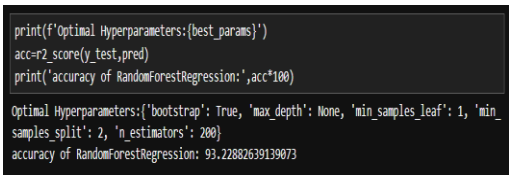
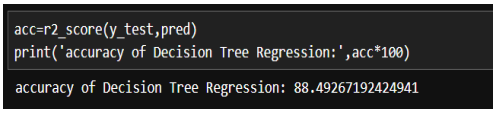
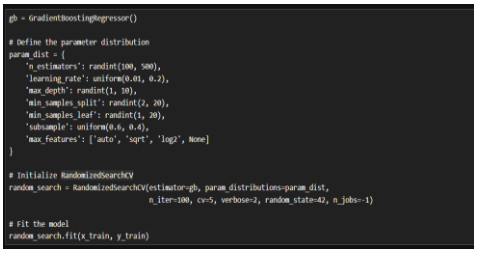
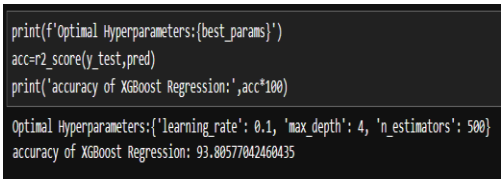
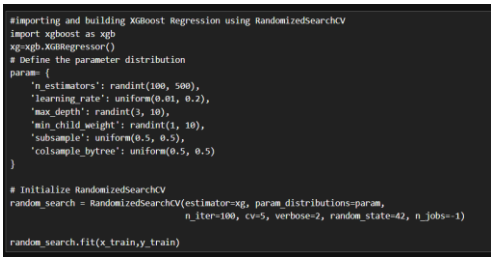
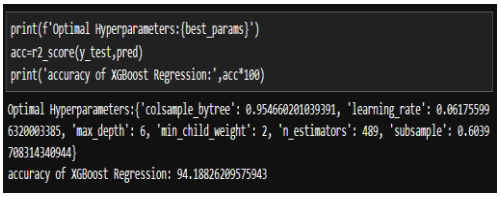
Hyperparameter Tuning Documentation (6 Marks):

Model	Tuned Hyperparameters	Optimal Values

Linear Regression	---	`acc=r2_score(y_test,pred)`
		`print('accuracy of linear regression Regression:',acc*100)`
		`accuracy of linear regression Regression: 58.61758560675364`

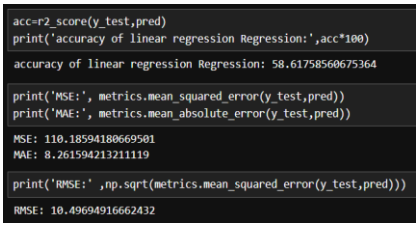
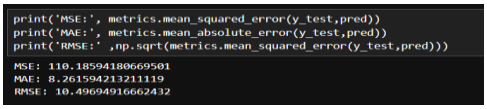
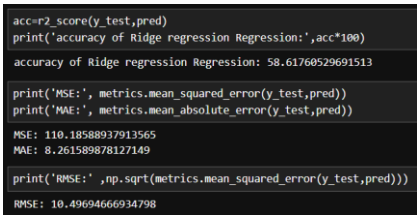
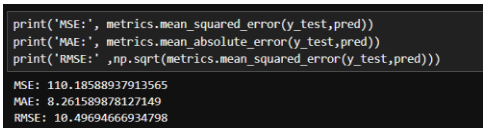
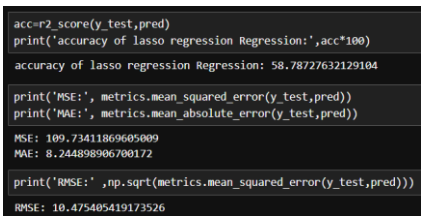
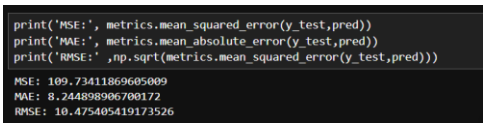
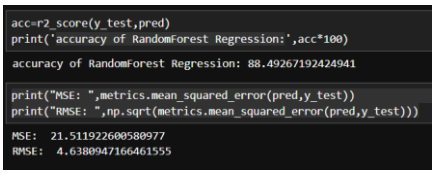
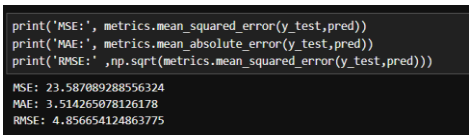
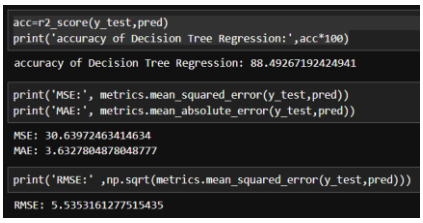
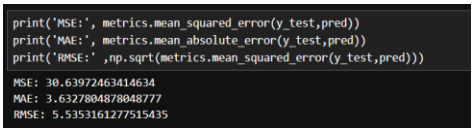
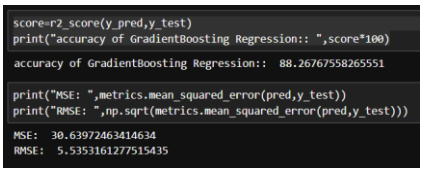
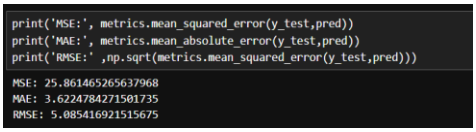
Ridge Regression	---	`acc=r2_score(y_test,pred)`
		`print('accuracy of Ridge regression Regression:',acc*100)`
		`accuracy of Ridge regression Regression: 58.61760529691513`

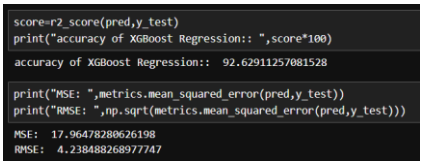
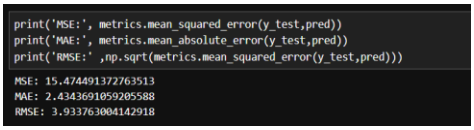
Lasso Regression	---	`acc=r2_score(y_test,pred)`
		`print('accuracy of lasso regression Regression:',acc*100)`
		`accuracy of lasso regression Regression: 58.78727632129104`

Random Forest Regression	 GridSearchCV got the higher accuracy.	
Decision Tree Regression	---	
Gradient Boosting regression	 RandomizedSearchCV got the higher accuracy.	
XGBoost Regression	 RandomizedSearchCV got the higher accuracy.	

Performance Metrics Comparison Report (2 Marks):

Model	Baseline Metric	Optimized Metric

Linear Regression		
Ridge Regression		
Lasso Regression		
RandomForest Regression		
Decision Tree Regression		
Gradient Boosting regression		

XG Boost Regression		

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
XG Boost Regression.	'XG Boost Regression' the best performance and generalizability on unseen data, considering factors beyond just raw accuracy.