Model Optimization and Tuning Phase Template

Date	11 July 2024
Team ID	SWTID1720096271
Project Title	Machine learning approach for Predicting the price of natural gas
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

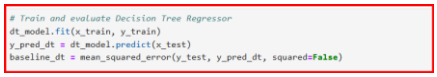
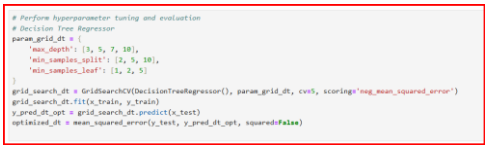
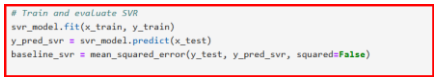
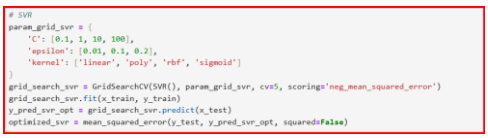
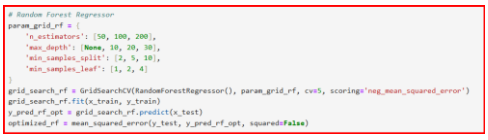
The Model Optimization and Tuning Phase involves refining machine learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (6 Marks):

Model	Tuned Hyperparameters	Optimal Values
Decision Tree Regressor	max_depth, min_samples_split, min_samples_leaf	
SVR	c, epsilon, kernel	

Random Forest Regressor	n_estimators, max_depth, min_samples_split, min_samples_leaf	

Performance Metrics Comparison Report (2 Marks):

Model	Baseline Metric	Optimized Metric
Decision Tree Regressor	 Baseline RMSE for Decision Tree: 0.0 20540231956418322	 Optimized RMSE for Decision Tree: 0.0172498 06930300513
SVR	 Baseline RMSE for SVR: 0.128735588 75775146	 Optimized RMSE for SVR: 0.10890416589873 322
Random Forest Regressor	 Baseline RMSE for Random Forest: 0. 01611641473655759	 Optimized RMSE for Random Forest: 0.016227 91715705109

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
DesicionTreeRegressor	I chose the Decision Tree Regressor for predicting natural gas prices because it handles non-linear relationships well, is easy to interpret, and requires minimal data preprocessing. Its ability to model complex patterns in data and provide clear visualizations makes it a suitable choice for this regression task.