

Model Optimization and Tuning Phase Template

Date	15 March 2024
Team ID	SWTID1720171463
Project Title	Predicting The Energy Output Of Wind Turbine Based On Weather Condition
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
Random Forest	<pre>from sklearn.ensemble import RandomForestRegressor from sklearn.metrics import mean_absolute_error, r2_score forest_model = RandomForestRegressor(max_leaf_nodes =500, random_state=1) forest_model.fit(train_X, train_y)</pre> <div> RandomForestRegressor RandomForestRegressor(max_leaf_nodes=500, random_state=1) </div>	<pre>power_preds = forest_model.predict(val_X) print(mean_absolute_error(val_y, power_preds)) print(r2_score(val_y, power_preds))</pre> <p>162.90876721041636 0.9015207981707474</p>

Performance Metrics Comparison Report (2 Marks):

Model	Optimized Metric
Random Forest	<pre>power_preds = forest_model.predict(val_X) print(mean_absolute_error(val_y, power_preds)) print(r2_score(val_y, power_preds))</pre> <p>162.90876721041636 0.9015207981707474</p>

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Random Forest classifier	Random Forest classifier 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