

Model Optimization and Tuning Phase Report

Date	20 June 2024
ID	739813
Project Title	Optimizing Sleep Efficiency: Harnessing Machine Learning For Enhanced Restorative Rest
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.

Model	Tuned Hyperparameters	
LinearRegression	<pre>param_grid = { 'fit_intercept': [True, False], 'normalize': [True, False], 'copy_X': [True, False] }</pre>	<pre>lin_r2score=r2 lin_mse=mean_s print(lin_r2sc print(lin_mse)</pre> <p>0.790881333062 0.200903070625</p>

Decision Tree	<pre>from sklearn.tree import DecisionTreeRegressor dt = DecisionTreeRegressor() dt.fit(x_train,y_train) dt_pred = dt.predict(x_test)</pre>	<pre>dt_r2score = r2_score(dt_pred,y_test) dt_mse = mean_squared_error(dt_pred,y_test) print(dt_r2score) print(dt_mse)</pre> <p>0.7174345191273 0.2714643967055</p>
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Hyperparameter Tuning Documentation (6 Marks):

RandomForestRegressor	<pre>rf = RandomForestRegressor() rf.fit(x_train,y_train) rf_pred = rf.predict(x_test)</pre>	<pre>rf_r2score = r2_score(rf_pred,y_test) rf_mse = mean_squared_error(rf_pred,y_test) print(rf_r2score) print(rf_mse)</pre> <p>0.8482129316888438 0.14582384514745866</p>
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Performance Metrics Comparison Report (2 Marks):

Model	Optimized Metric
LinearRegression	It's not calculate to Optimized metric

Decision Tree	It's not calculate Optimized metric
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Final Model Selection Justification (2 Marks):

Final Model	Reasoning
RandomForestRegressor	The RandomForest model was selected for its superior performance, exhibiting high r2_score during hyperparameter tuning. Its ability to handle complex relationships, minimize overfitting, and optimize predictive r2_score aligns with project objectives, justifying its selection as the final model.