

## Model Optimization and Tuning Phase Template

Date	17 July 2024
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
Linear Regression	None	Default
Decision Tree Regressor	None	Default

#### Performance Metrics Comparison Report (2 Marks):

Model	Baseline Metric	Optimized Metric
Linear Regression	0.22	0.22

Decision Tree Regressor	0.98	0.98
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**Final Model Selection Justification (2 Marks):**

<b>Final Model</b>	<b>Reasoning</b>
Decision Tree Regressor	The Decision Tree Regressor was chosen as the final model because it produced a higher $R^2$ score (0.98) compared to the Linear Regression model's $R^2$ score (0.22). This indicates that the Decision Tree Regressor better captures the variance in the data and provides more accurate predictions.