**Model Optimization and Tuning Phase Template**

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| Date | 10 July 2024 |
| Team ID | 739923 |
| Project Title | Predicting the Compressive Strength of Concrete |
| 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):**

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| **Model** | **Tuned Hyperparameters** | **Optimal Values** |
| Linear Regression | No Hyperparameters used | ----------------------- |
| Gradient Boosting Regressor | No Hyperparameters used | ----------------------------- |

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| **Model** | **Accuracy** | **Metrics** |
| Linear Regression |  |  |
| Gradient Boosting Regressor |  |  |

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

**Final Model Selection**

**Justification (2 Marks):**

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| --- | --- |
| **Final Model Selection** | **Reasoning** |
| Gradient Boosting Regressor | The Gradient Boosting model was selected for its superior performance, exhibiting high accuracy than linear regression.  We chose the Gradient Boosting Regressor because it gives very accurate predictions, can handle complex patterns in data, and avoids overfitting. It works well with different types of data and allows us to see which features are most important. This makes it a reliable and effective model for our task |

