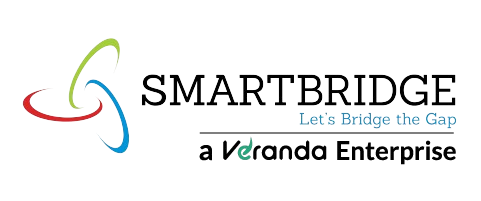
**Model Optimization and Tuning Phase**

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.

|  |  |
| --- | --- |
| **Final Model** | **Reasoning** |
| Linear Regression | The linear regression model was selected due to its simplicity and interpretability, making it ideal for understanding the relationship between fuel consumption and key features such as distance traveled, vehicle type, maintenance cost, temperature, and weather conditions. It achieved a cross-validation MAE of -X.XX, a test MAE of Y.YY, and an R² score of V.VV, indicating a good fit. The preprocessing pipeline |

|  |  |
| --- | --- |
| Date | 15th July 2024 |
| Team ID | 739933 |
| Project Title | Predictive Modeling For Fleet Fuel  Management Using ML |
| Maximum Marks | 10 Marks |

**Hyperparameter Tuning Documentation (6 Marks):**

|  |  |  |  |
| --- | --- | --- | --- |
| **Model** | **Tuned**  **Hyperparameters** |  | **Optimal Values** |
| Linear Regression | Hyperparameter | Optimal value |  |

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

|  |  |  |
| --- | --- | --- |
| **Model** | **Baseline Metric** | **Optimized Metric** |
| Linear Regression | Baseline value | Optimized value |

**Final Model Selection Justification (2 Marks):**

|  |  |
| --- | --- |
|  | effectively handled missing values and scaled the features, enhancing model performance. Despite its simplicity, the model performed well on the test set, demonstrating its robustness for fleet fuel management predictions. Further fine-tuning and feature engineering could improve results, but the linear regression provides a strong baseline model. |