|  |  |  |
| --- | --- | --- |
| Linear Regression |  |  |

# Model Optimization and Tuning Phase Report

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| Date | 21 July 2024 |
| Team ID | 740037 |
| Project Title | Estimating Presence or Absence of smoking through bio signals |
| 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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| --- | --- | --- |
| KNN |  |  |
| Gradient  Boosting |  |  |

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

|  |  |
| --- | --- |
| **Model** | **Optimized Metric** |
| Decision Tree |  |

|  |  |
| --- | --- |
| Random Forest |  |
| KNN |  |
| Gradient Boosting |  |

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

|  |  |
| --- | --- |
| **Final Model** | **Reasoning** |
| Gradient Boosting | The Gradient Boosting 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. |