

**Model Optimization and Tuning Phase Template**

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| Date | 15 JULY 2024 |
| Team ID | 739721 |
| Project Title | Optimizing Food Delivery Using ML |
| Maximum Marks | 10 Marks |

**Model Optimization and Tuning Phase**

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| **Model** | **Baseline Metric** | **Optimized Metric** |
| Random Forest Regressor | Baseline value | Optimized value |
| XG Boost Regressor | Baseline value | Optimized value |
| Decision tree regressor | Baseline value | Optimized value |
| KNN | Baseline value | Optimized value |

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** |
| Random Forest Regressor | n\_estimators, max\_depth, min\_samples\_split | - |
| XG Boost Regressor | learning\_rate, n\_estimators, max\_depth | - |
| Decision tree regressor | A non-parametric model that predicts target values by learning decision rules from features. | - |
| KNN | A simple, instance-based learning algorithm that predicts based on the closest training examples. | - |

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

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| Random Forest Regressor | Baseline value | Optimized value |
| XG Boost Regressor | Baseline value | Optimized value |

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

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| --- | --- |
| **Final Model** | **Reasoning** |
| XG Boost Regressor | Gradient Boosting Regressor was selected as the final optimized model due to its superior performance in optimizing delivery times and customer satisfaction. It achieved a higher optimized metric compared to other models, indicating better predictive accuracy and efficiency for our specific problem domain. |