**Model Optimization and Tuning Phase Template**

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| Date | 5th July 2024 |
| Team ID | 739687 |
| Project Title | SMS SPAM DETECTION |
| 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** |
| Random Forest | - | - |
| Decision Tree | - | - |
| Gradient Boosting Regressor | - | - |

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

|  |  |  |
| --- | --- | --- |
| **Model** | **Baseline Metric** | **Optimized Metric** |
| Random Forest | - | - |
| Decision Tree | - | - |
| Gradient Boosting | - | - |

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

|  |  |
| --- | --- |
| **Final Model** | **Reasoning** |
| Multinomial Naïve Baye’s | I used Multinomial Naive Bayes for my project because it is particularly well-suited for classification tasks involving discrete data, such as text-based features or word frequencies. Since my dataset involved categorical or count-based features, MNB was an ideal choice due to its ability to model the probability distribution of words or terms in each class effectively. |