**Model Optimization and Tuning Phase Template**

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| **Date** | 11 July 2024 |
| **Team ID** | 739908 |
| **Project Title** | SmartLender - Applicant Credibility  Prediction for Loan Approval |
| **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** |
| Decision Tree | ……... | ……... |
| Random Forest | ……….. | ……... |
| KNN | …..…... | ……... |
| Gradient  Boosting | ……. …… | ……….. |

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### 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** |
| Random Forest | The Random Forest was selected for its superior performance, exhibiting high accuracy. Its ability to handle complex relationships, minimize overfitting, and optimize predictive accuracy aligns with project objectives, justifying its selection as the final model. |