Model Optimization and Tuning Phase Report

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| Date | 03 October 2024 |
| Team ID | LTVIP2024TMID24947 |
| 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 |  |  |

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| KNN |  |  |
| XG Boost |  |  |

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

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

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| --- | --- |
| Random Forest |  |
| KNN |  |
| XG Boost |  |

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

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| **Final Model** | **Reasoning** |
| Random forest | After evaluating the models based on several metrics such as **accuracy**, **precision**, **recall**, and **F1-score**, all models demonstrated good performance. However, **Random Forest (RF)** was selected as the final model due to its combination of accuracy, robustness, and interpretability. While XGBoost showed competitive performance, RF was easier to interpret and required less computational overhead for deployment, making it more suitable for this application.  **Final Choice**: **Random Forest** was chosen as the model for predicting loan eligibility because of its high performance and the ability to generalize well to new, unseen data. |