**Model Optimization and Tuning Phase Template**

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| Date | 18 June 2025 |
| Team ID | SWTID1749880888 |
| Project Title | Prosperity Prognosticator: Machine Learning for Startup Success Prediction |
| 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 |  |  |
| Knn model |  |  |

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

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| --- | --- |
| **Model** | **Optimized Metric** |
| Random forest |  |
| Decision tree |  |
| KNN model |  |

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

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| --- | --- |
| **Final Model** | **Reasoning** |
| Random Forest | It provides high accuracy, handles both classification and regression well, and is robust to overfitting due to its ensemble nature. It also performs well on structured/tabular data and gives insight into feature importance, making it ideal for our startup success prediction task. |