**Model Optimization and Tuning Phase Template**

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| Date | 10 July 2024 |
| Team ID | SWTID1720075414 |
| Project Title | Panic Disorder 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.

### Hyper parameter Tuning Documentation (6 Marks): (Not mandatory for this project)

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| --- | --- | --- |
| **Model** | **Tuned Hyperparameters** | **Optimal Values** |
| Decision Tree | pasted-movie.png | pasted-movie.png |
| Random Forest | pasted-movie.png | pasted-movie.png |
| XGBoost | pasted-movie.png | pasted-movie.png |
| KNN | pasted-movie.png | pasted-movie.png |

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

|  |  |
| --- | --- |
| **Model** | **Optimized Metric** |
| Decision Tree | **pasted-movie.png** |
| Random Forest | pasted-movie.png |
| KNN | pasted-movie.png |
| XGBoost | pasted-movie.png |

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

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| --- | --- |
| **Final Model** | **Reasoning** |
| Decision Tree | Decision Tree Model was chosen because it displayed an incredible amount of accuracy when run through hyperparameter tuning. It was able to reduce overfitting very well, which fits the project perfectly, making it the perfect for selecting it as the final model for this project. |