**Model Optimization And Tuning Phase Report**

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| Date | 06 JULY 2024 |
| Team ID | 739909 |
| Project Name | Unlocking Silent Signals: Decoding  Body Language With Mediapipe |
| 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** |
| SVM |  |  |
| Logistic  Regression |  |  |
| Ridge  Classifier |  |  |
| Gradient  Boosting  Classifier |  |  |
| Random  Forest  Classifier |  |  |

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

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| --- | --- |
| **Model** | **Optimized Metric** |
| SVM |  |
| Logistic  Regression |  |
| Ridge  Classifier |  |
| Gradient  Boosting  Classifier |  |
| Random  Forest  Classifier |  |

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

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| --- | --- |
| **Final Model** | **Reasoning** |
| Random Forest | The Random Forest model was selected for its robust performance, demonstrating high accuracy during hyperparameter tuning. Its ability to handle complex relationships, reduce overfitting through ensemble learning, and provide feature importance aligns with project objectives, justifying its selection as the final model. |