**Model Optimization and Tuning Phase Template**

| Date | 21 JULY 2024 |
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| Team ID | Team-740025 |
| Project Title | 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 neural network 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 (8 Marks):

| **Model** | **Tuned Hyperparameters** |
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| Ridge Classifier | #importing the library for LogisticRegression  from sklearn.linear\_model import LogisticRegression  The LogisticRegression from sklearn.linear\_model, sets the solver to 'lbfgs' and the maximum number of iterations to 1000, and fits the model to data XXX and yyy. This configuration is important for training a logistic regression model with a specific solver and iteration limit, which can enhance model convergence. |
| Random Forest Classifier | The Random Forest Classifier is an ensemble learning method that constructs multiple decision trees during training and outputs the mode of their predictions, improving accuracy . random feature selection to reduce overfitting and handle large datasets |
| XGBoost Classifier | These pipelines are stored in a dictionary for easy access and comparison. The LogisticRegression model is then separately instantiated and fitted, demonstrating individual model training and usage. |

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

| **Final Model** | **Reasoning** |
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| **Random Forest** | Random Forest model is chosen for its robustness in handling complex datasets and its ability to mitigate overfitting while providing high predictive accuracy.    Above all the models Random Forest model have the highest accuracy among all the models. |