**Model Development Phase Template**

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| Date | 18 June 2025 |
| Team ID | SWTID1749709635 |
| Project Title | Mental Health Prediction |
| Maximum Marks | 6 Marks |

**Model Selection Report**

In the forthcoming Model Selection Report, various models will be outlined, detailing their descriptions, hyperparameters, and performance metrics, including Accuracy or F1 Score. This comprehensive report will provide insights into the chosen models and their effectiveness.

**Model Selection Report:**

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| **Model** | **Description** | **Hyperparameters** | **Performance Metric (e.g., Accuracy, F1 Score)** |
| Logistic Regression | A linear model suitable for binary classification tasks. | max\_iter=1000, random\_state=42 |  |
| K- Nearest Neighbors | Instance-based learner that classifies based on majority vote of nearest neighbors. | Default (n\_neighbors=5) |  |
| Decision Tree | A tree-based model that splits data using decision rules. | random\_state=42 |  |
| Random Forest | An ensemble of decision trees to improve accuracy and reduce overfitting. | random\_state=42, n\_estimators=100 (default) |  |
| Naïve Bayes | Probabilistic model based on Bayes' Theorem; assumes feature independence. | None (GaussianNB uses defaults) |  |
| Support Vector Machine | Constructs a hyperplane for optimal class separation in high-dimensional space. | probability=True, random\_state=42, default kernel (rbf) |  |
| Extreme Gradient Boosting | Gradient boosting framework optimized for speed and performance. | use\_label\_encoder=False, eval\_metric='logloss', random\_state=42 |  |
| Adaptive Boosting | Boosting technique that combines weak learners sequentially. | random\_state=42 |  |
| Gradient Boosting | Boosting method that optimizes via gradient descent on residuals. | random\_state=42 |  |