

| Model         | Description  | Hyperparameters | Performance Metric(e.g., Accuracy,F1 Score) |
|---------------|--|-----------------|---|
| Random Forest | Randomforest:Ensemble learningmethodcombining multipledecisiontreestopredict mentalhealthoutcomes.Handles complexrelationshipsandavoids overfitting,achievinghigh accuracyindiversedatasets.         | -               | Accuracyscore = 78%                         |
| Decision Tree | Decisiontrees:Graphicalmodels thatpartitiondatabasedon featurestopredictmentalhealth outcomes.Intuitive,interpretable, andusefulforidentifying significantpredictorsincomplex datasets.              | -               | Accuracyscore = 73%                         |
| KNN           | K-NearestNeighbors(KNN):Nonparametricmethodpredicting mentalhealthbasedonsimilarity toneighboringdatapoints. Simple,interpretable,but sensitivetoirrelevantfeatures andrequirescarefulselectionof K. | -               | Accuracyscore = 51%                         |

|                     |  |  |                      |
|---------------------|--|--|----------------------|
| XGB Classifier      | XGBoost(Extreme Gradient Boosting) Classifier: Advanced machine learning algorithm for mental health prediction, optimizing decision trees sequentially to enhance accuracy, handling complex relationships,   |  | Accuracy score = 83% |
|                     | and avoiding overfitting with regularization techniques.   |  |                      |
| Logistic Regression | Logistic Regression: Statistical method modeling the probability of mental health outcomes based on input variables. Linear relationship assumption, interpretable coefficients, suitable for binary classification tasks with well-defined decision boundaries. |  | Accuracy score = 51% |

### Model Development Phase Template

|               |                          |
|---------------|--------------------------|
| Date          | 20 June 2024             |
| Team ID       | 740041                   |
| Project Title | Mental health prediction |
| Maximum Marks | 6 Marks                  |

Model Selection Report:

Compared logistic regression, XGBClassifier, and random forest for mental health prediction. XGBClassifier outperformed others with 83% accuracy, robust to overfitting and handling nonlinear relationships.

