

Abstract—Mental health problems have become an important health issue around the world. Poor understanding as well as low mental health awareness contribute to mental health healing efforts. In particular, Social media is becoming a platform for people to convey feelings and emotions. A dataset of 20,000 English tweets, equally divided into 10,000 depressed and 10,000 non-depressed tweets, which were cleaned and processed using Term Frequency-Inverse Document Frequency (TF-IDF) for feature extraction. The method used in this sentiment analysis introduces an ensemble learning framework that combines Naïve Bayes, Support Vector Machine, and Random Forest classifiers, using majority voting for prediction. Each classifier was optimized using the best parameters, and the models were validated through 5-fold cross-validation. The experimental results show that Naïve Bayes with $\alpha = 1$ achieved an accuracy of 76.23% while Random Forest with 5000 trees at 76.77%, and Support Vector Machine with a linear kernel at 75.32%. By combining these classifiers, the ensemble model reached the highest accuracy of 77.88%, demonstrating the effectiveness of combining multiple models to improve performance.

Keywords: Ensemble Learning, Machine Learning, Mental Health, Sentiment Analysis, Social Media.