**Abstract**

Depression has become a global public health concern in recent years, affecting millions of people all over the world. That's why depression detection has become a crucial step in analyzing as well as diagnosing depression among patients, ensuring better treatment and support for their mental health condition. Our present study focuses on developing algorithms that can recognize depression patterns by studying Electroencephalogram (EEG) data and investigates the potential of Electroencephalogram (EEG) data in depression detection. Understanding and predicting depressive symptoms in patients is challenging because brain signals (EEG) are complicated and constantly changing. Additionally, differences in age and gender among patients add to the complexity. Creating an accurate and effective prediction, as well as visually representing depressive conditions in patients, becomes difficult due to these factors. Our EEG signal data are collected from Kaggle and are used to study depression which is a subcategory of mental diseases highlighted in the dataset. Here 5 minutes eye closed resting state EEG data collected from 19 channels with 500 sampling rate. In this study, we employed two robust machine learning models, Random Forest and XGBoost, to analyze the EEG data for depression. Among them XGBoost has shown 82.5% accuracy rate with the given dataset where Random Forest has 81.25% accuracy.

**Keywords:** Depression detection, Electroencephalogram (EEG), Machine learning, Random Forest, XGBoost, Depressive disorder.