

EARLY DIAGNOSIS OF THE RISK OF SCHIZOPHRENIA USING HYBRID MACHINE LEARNING

Abstract—The critical issue in schizophrenia diagnosis is the ability to identify the disorder at an early stage to enhance clinical outcomes and decrease the cognitive and social impairments in the long term. Traditional diagnostic methods mainly rely on clinical judgments that are usually constraining accuracy and prompt intervention. In order to overcome these issues, this research proposes a hybrid machine learning architecture to the early detection of schizophrenia risk. The proposed method combines an autoencoder-based feature learning algorithm and an eXtreme Gradient Boosting (XGBoost) classifier to make predictions better. The autoencoder is useful in capturing meaningful latent representations as it removes redundancy in features thus while XGBoost is used to classify robustly using ensemble learning. The proposed hybrid model is assessed and compared to the standalone XGBoost and LightGBM classifiers in terms of conventional evaluation metrics, such as accuracy, precision, recall, and F1-score. The experimental findings indicate that the Hybrid Autoencoder-XGBoost model has a better performance being accurate at 97.69, which is higher compared to the comparative models. These results suggest that deep feature representation with ensemble learning provides an effective and consistent solution to early schizophrenia risk detection and this feature could be utilized in the clinical decision support systems.