Mental Illness Detection using Machine Learning: Use of Artificial Intelligence to Predict Psychiatric Disorders

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Abstract

Mental health has emerged as a pressing concern worldwide, with epidemiological studies indicating that approximately 20% of the Indian population suffers from some form of mental disorder. The early detection of conditions like anxiety, depression, bipolar disorder, PTSD, and others is critical for initiating timely intervention, reducing severity, and improving quality of life. However, limited access to treatment and growing stress levels—exacerbated by global crises such as the COVID-19 pandemic—have further intensified the mental health burden. This research aims to develop a mental health monitoring system that leverages machine learning (ML) and artificial intelligence (AI) to assess an individual's mental state based on psychological, physical, and environmental factors. Various ML algorithms including Logistic Regression, Decision Trees, SVM, Random Forest, Stacking, Gradient Boost, AdaBoost, and Neural Networks were applied and compared to identify the most effective predictive model. In addition, we propose a mobile application integrated with an AI conversational agent to offer personalized recommendations and early interventions, potentially connecting users to self-help resources or mental health professionals. Our study also reviews existing literature on ML applications in diagnosing mental health conditions, identifying key challenges such as small datasets, limited validation, and underutilization of deep learning. Despite these challenges, ML models demonstrate high potential in improving diagnostic accuracy and treatment outcomes. Future research must address ethical concerns, data privacy, and the need for rigorous clinical validation. With appropriate safeguards, AI-based systems can enhance mental health care accessibility, support early diagnosis, and contribute to better patient outcomes.

Keywords

Mental Health Monitoring, Machine Learning Algorithms, Artificial Intelligence (AI), Early Diagnosis, Predictive Analytics, Mobile Health Application (mHealth), Clinical Decision Support Systems.