

DEMENTIA PREDICTION USING ML

Abstract: Dementia Prediction Using Machine Learning

Dementia is a neurodegenerative disorder that affects millions of people globally, with early detection being crucial for better management and treatment.

However, diagnosing dementia at an early stage remains a challenge due to its gradual onset and the complex interplay of risk factors. Machine learning (ML) techniques offer a promising approach to address this issue by analyzing vast amounts of clinical, genetic, lifestyle, and neuroimaging data.

This study explores the application of various machine learning algorithms, including logistic regression, decision trees, support vector machines, random forests, and deep learning models, for predicting dementia risk. The dataset utilized includes demographic information, cognitive test results, medical history, and brain imaging data. Feature engineering and selection techniques are employed to identify the most relevant predictors of dementia. Additionally, the study compares different algorithms based on accuracy, precision, recall, and computational efficiency to identify the most effective model for practical implementation in clinical settings.

Initial results demonstrate that machine learning can achieve high predictive accuracy, especially when using ensemble techniques and deep learning, with features such as age, family history, and neuroimaging markers being significant contributors to dementia risk prediction. The findings suggest that ML models can potentially be integrated into clinical decision-making tools to aid in the early detection and personalized treatment planning for dementia patients.

Keywords: dementia prediction, machine learning, neuroimaging, early detection, cognitive impairment, risk factors

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