

PROJECT CODE:2024-PO2

Title: Applying Machine Learning Algorithms for the Classification of Sleep Disorders

Abstract

Accurate classification of sleep disorders is pivotal in enhancing human quality of life, given the profound impact of sleep disturbances on health. However, manual sleep-stage classification is labor-intensive and prone to errors. This paper addresses this challenge by comparing the efficacy of conventional Machine Learning Algorithms (MLAs) and deep learning algorithms in classifying sleep disorders.

We propose an optimized approach for sleep disorder classification, leveraging the Sleep Health and Lifestyle Dataset, a publicly available resource. The optimization process involves the utilization of a genetic algorithm to fine-tune parameters across various MLAs, including k-nearest neighbors, support vector machine, decision tree, random forest, and artificial neural network (ANN).

In this study, we introduce Gradient Boosting, a powerful ensemble learning technique, into the mix of algorithms evaluated for sleep disorder classification. This addition aims to enhance the predictive performance and robustness of the classification model.

By integrating Gradient Boosting with traditional MLAs and deep learning algorithms, we achieve enhanced accuracy and generalization capabilities in identifying sleep disorders. The results underscore the efficacy of ensemble methods in addressing the complexities inherent in sleep data analysis.