

Transforming Sleep Science: Powered Automated Sleep Stage Detection and Classification

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Abstract: Sleep is vital for the body's physical restoration, but sleep disorders can cause various problems. Determining sleep stages is important for diagnosing and treating such disorders. Polysomnography (PSG) signals are recordings of brain activity, eye movements, muscle activity and other physiological signals that are collected during a sleep study. Insomnia, Sleep Apnea, and Restless Legs Syndrome are some of the sleep problems that can be identified using these signals. However, analyzing PSG signals manually can be time-consuming and prone to errors. Deep Learning Models such as Convolutional Neural Networks (CNN), can be used to automate the analysis of PSG signals. CNN is followed by Long-Short Term Memory (LSTM) and CNN are used as a stack ensemble method to recognize patterns in the signals that correspond to different sleep stages and events. By training these models on large datasets of PSG signals, they can detect the disorders from the sleep stages. The dataset is collected from PhysioNet Sleep-EDF dataset which consists of PSG signals.

Keywords: Sleep Stage Classification, Deep Learning, Convolutional Neural Network (CNN), Long- Short Term Memory (LSTM), Metadata Classifier, Electroencephalography (EEG), REM, NREM.

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