

A SURVEY ON MACHINE LEARNING AND DEEP LEARNING TECHNIQUES IN EPILEPTIC SEIZURE PREDICTION

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Seizure is an abrupt, uncontrolled electrical activity in the brain, inducing alteration in behavior, movement, or consciousness. Epileptic seizures actually represent recurrent seizures caused by abnormal brain activity in an individual diagnosed with him for a neurological disorder called epilepsy. Epileptic seizure prediction is predicting future seizure attacks before their occurrence through specific advanced technologies, like Electroencephalogram (EEG) analysis and machine learning to detect patterns in brain activity that indicate the plausibility of a forthcoming seizure attack to prevent injury or other complications. The overall objective of this survey is to give a complete analysis of machine learning (ML) and deep learning (DL) techniques used to epilepsy detection in EEG signals. It deals with different approaches and methodologies that have been implemented in recent studies for detecting epileptic seizures. The methods include Bidirectional Long short-term memory (BiLSTM)-based models, Support vector machines (SVM)-based models, Convolutional neural networks (CNN)-based models, Approach of graph neural network, Optimization-based method, Long short term memory (LSTM)-based approaches, and auto encoder-based methods. The methods are evaluated and compared based on implementation platform, performances attained as well as data collection on which it is implemented. This work reviews the trends in improvement on EEG-based seizure detection and classification as deep learning architectures advance the diagnostic capability. A thorough analysis is provided for those methods while performance comparison across different datasets is made. The review provides insight on the effective techniques on epilepsy detection, implementation platforms, evaluation metrics, challenges, and future directions in the area.