Abstract

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Automatic Seizure Detection in Long-Term Scalp EEG Using Weighted Permutation Entropy and Support Vector Machine Classifier

The automated epileptic seizure detection has emerged as an important field in the recent years this involves analyzing the Electroencephalogram (EEG) signals instead of the traditional visual inspection performed by expert neurologists in order to detect the epileptic activity. This paper introduces a model that integrates Weighted Permutation Entropy (WPE) as input feature to a Support Vector Machine (SVM) learning model to enhance the sensitivity and precision of the detection process. WPE is a modified statistical parameter of the permutation entropy (PE) that measures the complexity and irregularity of a time series. It incorporates both the mapped ordinal pattern of the time series and the information contained in the amplitude of its sample points. Experiments have been conducted to validate the model. Results showed that the model can classify recorded EEG segment into seizure and no-seizure classes with a considerably high accuracy level. A comparison study was conducted to validate the performance of the proposed seizure detection model against available work presented in literature.The new suggested scheme better tracks abrupt changes in the signal and assigns less complexity to segments that exhibit regularity are subject to noise effects