

CERTAIN INVESTIGATIONS ON THE METHODOLOGIES FOR AUTOMATIC EPILEPSY DETECTION FROM ELECTROENCEPHALOGRAM

ABSTRACT

Epilepsy is one of the most common chronic neurological disorder which affects about two percent of world population. Causes for epilepsy include brain tumors, brain injuries, infection of the brain, birth defects, developmental anomalies and genetic abnormalities etc. Diagnosis of epilepsy is done by analyzing electroencephalogram (EEG) signals. EEG is the record of the electrical activity of the brain and contains much valuable information for the understanding of this disease. In the clinical settings, the recorded EEG signal is analyzed for recognizing the various seizures present in the human brain by continuous monitoring and it is time consuming and tedious. Therefore, automatic detection of epileptic seizures through the analysis of EEG signals are of great importance for the diagnosis of epilepsy and its treatment.

In this thesis, five different methodologies are proposed to accomplish the automatic detection of epilepsy. Epilepsy detection has four important stages namely noise removal, feature extraction, feature selection and feature classification. This thesis uses the different detection methodologies like Support vector machine, complex wavelet transform with support vector machine, Multiclass Support Vector Machine, Improved Compositional Pattern-Producing Networks and Reactive Optimized Convolution Neural Networks for identifying the epileptic seizure from the captured EEG signal. The implemented automatic epilepsy detection system reduces the error rate and also, there is an increase in the accuracy and efficiency of the proposed methods compared with existing methods.

