ABSTRACT

The rate of neurological and psychiatric disorders is increasing rapidly in our day to day life due to mental burden, neurological and behavioural disorders. Among the various neurological brain disorders, Epilepsy is a constant, persistent brain disorder which is characterized by abnormal electrical activity in the brain. The presence of recurrent seizures in the brain indicates the Epilepsy. Thus it does not mean that the occurrence of single seizure results in Epilepsy. The continuous occurrence of two or more seizures leads to Epilepsy. Thus the presence of seizures in the brain or the Epilepsy condition can cause unexpected muscular movements and variations in the mental state. This is the symptoms of an epileptic seizure and it may leads from short term loss to uncontrolled movements. It also results in unconsciousness state.

The seizures are caused due to discharge of huge electrical energy from the brain cells. This can take place in all over parts of the brain. The period of these seizures may be short or prolonged disturbances and it cannot be defined.

The seizure can be categorised into

(i) Focal seizure otherwise known as partial seizures and
(ii) Generalized seizures.

The occurrence of seizures are mainly due stress, restlessness, intake of meals in runtime, disclosure to heavy flashing lights and also due over ingestion of alcohol.
Epileptic seizures have important public health implications. It is one of the most physically and emotionally destructive neurological disorders affecting population of all ages. In the recent years, with the advance signal processing techniques and invasion of this expertise into the field of neurology, considerable effort is invested in detecting and forecasting epileptic patterns.

The detection of abnormality should be achieved at an early stage, so that proper and timely action may be taken to avert the impending seizure. An automated analysis and a reliable universal forecaster of seizures can be proving to be very efficient in prognosis of epilepsy. Moreover, by automating the detection of these types of neurological abnormalities, the burden of work on the neurologist can be significantly reduced, response time to the illness can be effectively improved, and suitable medical treatment can be administered within proper time. Also, an automatic seizure detection system if used in the diagnosis of epilepsy, can act as a second opinion tool apart from visual inspection of EEG by the physician.

Therefore the development of accurate computer aided diagnostic system for classification of brain disorders is strongly desired. There is a significant interest in the research community for development of reliable EEG-based automated tool. With the advancement of new signal processing techniques and mathematical algorithms in EEG analysis, supporting methods in medical decision and diagnosis can be developed to avoid tedious analysis of voluminous records and obtain clarity about the brain pathology. This work, therefore, investigates and develops a number of promising automatic computer aided diagnostic system for use in these automatic neurological event detection systems. Hence in order to make this process as efficient as possible, this work proposed a various computational intelligence methods for epileptic seizure detection.