World Academy of Science, Engineering and Technology
International Journal of Bioengineering and Life Sciences
Vol:11, No:02, 2017

Fast and Accurate Model to Detect Ictal Waveforms in Electroencephalogram Signals

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Abstract : Visual inspection of electroencephalogram (EEG) signals to detect epileptic signals is very challenging and time-consuming task even for any expert neurophysiologist. This problem is most challenging in under-developed and developing countries due to shortage of skilled neurophysiologists. In the past, notable research efforts have gone in trying to automate the seizure detection process. However, due to high false alarm detections and complexity of the models developed so far, have vastly delimited their practical implementation. In this paper, we present a novel scheme for epileptic seizure detection using empirical mode decomposition technique. The intrinsic mode functions obtained were then used to calculate the standard deviations. This was followed by probability density based classifier to discriminate between non-ictal and ictal patterns in EEG signals. The model presented here demonstrated very high classification rates (> 97%) without compromising the statistical performance. The computation timings for each testing phase were also very low (< 0.029 s) which makes this model ideal for practical applications.

Keywords : electroencephalogram (EEG), epilepsy, ictal patterns, empirical mode decomposition
Conference Title : ICAIHMLS 2017 : International Conference on Applied Informatics for Health, Medical and Life Sciences
Conference Location : London, United Kingdom
Conference Dates : February 16-17, 2017