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Characterization of Focal EEG Signals: A Review

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ABSTRACT

Epilepsy is a common neurological condition that can occur in anyone at any age. Electroencephalogram (EEG) signals of non-focal (NF) and focal (F) types contain brain activity information that can be used to identify areas affected by seizures. Generally, F EEG signals are recorded from the epileptic part of the brain, while NF EEG signals are recorded from brain regions unaffected by epilepsy. It is essential to correctly detect F EEG signals, when and where they occur, as focal epilepsy can be successfully treated by surgical means. However, all EEG signals are complex and require highly trained personnel for right interpretation. To overcome the associated challenges, in this study a computer-aided detection (CAD) system to aid in the detection of F EEG signals has been developed, and the performance of nonlinear features for differentiating F and NF EEG signals is compared. Moreover, it is noted that nonlinear features can effectively capture concealed patterns and rhythms contained in the EEG signals. Overall, it was found that the CAD system will be useful to clinicians in providing an accurate and objective paradigm for localization of the epileptogenic area.

Keywords – Computer-aided detection system; electroencephalogram signals; epilepsy; focal; non-focal.

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