Chapter 20

Intelligent Technique to Identify Epilepsy Using Fuzzy Firefly System for Brain Signal Processing

Sasikumar Gurumoorthy
Sree Vidyanikethan Engineering College (Autonomous), India

B. K. Tripathy
VIT University, India

ABSTRACT

In the new direction of understand the signal that is created from the brain organization is one of the main chores in the brain signal processing. Amid all the neurological disorders the human brain epilepsy is measured as one of the extreme prevalent and then programmed artificial intelligence detection technique is an essential due to the crooked and unpredictable nature of happening of epileptic seizures. We proposed an Improved Fuzzy firefly algorithm, which would enhance the classification of the brain signal efficiently with minimum iteration. An important bunching technique created on fuzzy logic is the Fuzzy C means. Together in the feature domain with the spatial domain the features gained after multichannel EEG signals remained combined by means of fuzzy algorithms. And for better precision segmentation process the firefly algorithm is applied to optimize the Fuzzy C-means membership function. This proposed algorithm result compared with other algorithms like fuzzy c means algorithm and PSO algorithm.

INTRODUCTION

Epilepsy captures is considered as the maximum collective neurological disorder that disturbs 1–3% of the world's inhabitants. This one is considered through the amount of two or supplementary meaningless epileptic captures that remain irregular rhythmic exoneration of electrical movement of the brain. This range of brain syndromes sorts from severe, life-threatening and spiking, to ones that are much

more beginning. Ahmed Fazle Rabbi and Reza Fazel-Rezai Fuzzy (2012) reported that in epilepsy; the standard pattern of neuronal action becomes uneasy, causing peculiar sensations, feelings and behavior or sometimes seizures, muscle ripples and loss of cognizance. There are many possible causes of epilepsy with several types of seizures. Whatever that interrupts the standard pattern of neuron action (from disease to brain injury to irregular brain enlargement) can tip to captures. Epilepsy might improve since of a difference in brain wiring, an unevenness of nerve signing chemicals named neurotransmitters, alterations in the dynamic structures of brain cells called channels or a combination of these factors and other possible features. Ensuring a particular seizure as the outcome of an extraordinary fever (named febrile seizure) mutual analytic tests for epilepsy are quantity of electrical action in the brain then brain shots such as magnetic resonance imaging (MRI) or computed tomography (CT).

Paroxysmal alteration of single or extra neurological occupations such as motor, behavior and autonomic occupations is definite as a seizure. Epileptic seizures remain episodic, quickly developing fleeting actions, normally enduring for less than a minute. There are numerous studies to understand the machine after epileptic capture and however it is not entirely known yet, a seizure event can be developed as the inflamed link excitation of the neural networks through synchronous release in addition to mutable transmission in the brain. In crucial epilepsy, a specific brain region may candidate for the epilepsy event, but in comprehensive epilepsy the complete brain might remain candidate aimed at seizure events.

The utmost broadly castoff quantity aimed at analysis of neurological syndromes such as epilepsy in medical backgrounds is electroencephalogram (EEG). Enduring intensive care of EEG is one of the best skilled conducts aimed at analysis of epilepsy. This one delivers evidence almost forms of brain electrical movement, category then occurrence of captures and seizure emphasis laterality. In abiding monitoring, ictal EEG footage is typically connected through the medical appearance of removal. Maryann D'Alessandro et al (2014) reported that the one of the greatest defining features in seizure recognition before primary recognition is Maryann D'Alessandro et al (2014) reported that the the assignment of electrodes. Unknown footage location is where the capture attention is placed; the variations in EEG can happen earlier the medical appearances. Sudarshan Nandy et al (2012) reported that if the electrodes are located in remote place after the seizure beginning spot, the medical appearances could transpire earlier any graphic variations in EEG. Professionals observing abiding EEG footages typically look on behalf of initial visually specious variations in EEG to classify ictal arrival. This data benefits doctor or caregiver toward treat patients initial in period with the accessible medicines. But, the graphic review of lasting EEG through clinicians is stimulating for it is achieved over numerous times to weeks due to the indefinite landscape of the period of manifestation of seizures. So, a capture recognition apparatus with great recognition amount and significantly little incorrect recognition amount would be an enormous development in the medical surroundings of epilepsy behavior thus overcoming the time consuming and monotonous nature of the graphic assessment of the huge volume of information to classify seizure.

RELATED WORK

Epilepsy is one of the neurological disorders under extensive research and over the years there has been several methods of seizure detection. One of method was based on detecting strong rhythmic movements of the patient. The drawback in these methods is that, seizures do not always present strong movements. This setback led the detection problem to apply methods based on EEG signal analysis, for example, J.R. Ives & Woods (1974) described detection of large seizures discharges in several EEG channels by

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