

ABSTRACT

Epilepsy is a disease caused by abnormal electrical activity in the brain. Epilepsy is characterized by an excess amount of electricity coming out of the brain cells that causes seizures or abnormal movements. A common test for the diagnosis of epilepsy is the electroencephalogram (EEG). The initial condition in which a patient will be diagnosed with epilepsy is called a focal condition. Recognition of patterns and characteristics of EEG signals to detect focal conditions with the naked eye takes a long time and the chance of error in distinguishing epileptic seizures from normal (non-focal) conditions is quite large. Therefore, a system can be used to help neurologists detect focal and normal conditions in patients who will be diagnosed with epilepsy.

The EEG signal is processed by digital signal processing through several stages, namely pre-processing, decomposition, feature extraction, and classification. In the pre-processing stage, the two channels are merged into one channel. The EEG signal is decomposed using Wavelet Packet Decomposition (WPD). The feature extraction is carried out using fractal analysis, namely Higuchi and Katz. Then, these features are classified by Support Vector Machine (SVM) using linear kernel and K-Nearest Neighbor (KNN).

In this research uses the Bern Barcelona dataset. The dataset is a recording of EEG signals from 5 patients with epilepsy. The pre-processing process produces one channel which will be processed in the next step. Based on the value of accuracy, specificity and sensitivity, the highest value was obtained at WPD levels 3 and 4 with the Higuchi method of SVM classification with each value of 100% and the KNN classification of accuracy, specificity and sensitivity values obtained the highest value at level 2 of the Higuchi-Katz method with each value is 100%.

Keyword: Epilepsy, EEG Signals, Focal & Non-Focal, WPD, SVM, KNN.