ABSTRACT

Epilepsy is one of the most often found disease in the world. According to World Health Organization (WHO), 1% of the world's population suffer from Epilepsy. This disease is caused by the morbid activity of electricity inside the brain until the patient cannot move normally. A person with epilepsy is characterized by the occurrence of seizures repeatedly in the last 24 hours. There are several ways to detect seizures, one of them is by looking for the differences between signal patterns from electroencephalogram (EEG) recordings. Neurologists will diagnose, detect, and examine manually. This process is difficult to do since EEG signals are nonlinear and non-stationary. Therefore, the system in Computer Aided Diagnosis could be used to help the developments in automatic seizure detection.

EEG signals are analyzed in digital signal processing through several stages, namely pre-processing, channel selection, decomposition, feature extraction, and classification. In pre-processing, the signals are filtered by applying bandpass filter (BPF) Butterworth. Channels are selected based on the energy value in all channels. Then, EEG signals are decomposed by Wavelet Packet Decomposition (WPD). The features are extracted using entropy analysis which are Shannon Entropy (ShEN) and Renyi's Entropy (REN). Afterwards, the classification stage is performed using Support Vector Machine (SVM).

In this research, dataset consists of 23 patients (660 sessions, 964.15 hours) published by Children's Hospotal Boston-Massachussets Institute Technology (CHB-MIT) is used. Channel selection stage resulted two to five channels to be processed in the next stages. Performance evaluation measured by the result of system accuracy in detecting seizure conditions of each patient. The average results of all patients are 85.64% and 72.48% obtained by REN and ShEN methods respectively.

Kata Kunci: *Epilepsy, seizure, EEG signals, WPD, ShEN, REN, SVM.*