ABSTRACT

Epilepsy is a chronic brain disease whose main characteristic is characterized by repeated uncontrolled seizures that can interfere daily activities and threaten people's health. This occurs as a result of overactive activities of nerve cells in the cortex of the brain. Based on the World Health Organization (WHO), epilepsy has attacked about 65 million people worldwide, so that serious attention is needed. Currently, the process of diagnosing or detecting seizures is done by recording brain signals using an Electroencephalogram (EEG) which will be read manually by a neurologist. This process has several drawbacks in terms of time, cost, and diagnostic accuracy. Therefore, it is necessary to develop an automatic seizure detection process, so that it can assist neurologists in establishing the diagnosis of epilepsy.

This research will design an automatic system that can classify brain signal waves, especially during ictal and non-ictal conditions on brain signal recording data. The data in question is a dataset belonging to the Department of Epileptology, University of Bonn, Germany. There are three main stages in this process, namely signal pre-processing, feature extraction, and classification. The feature extraction method and classification method used are Dispersion Entropy and K-Nearest Neighbors respectively.

The proposed automated program system was then evaluated for system performance. In this study, the highest values for accuracy (ACC), sensitivity (SEN), and specificity (SPE) were 98.5%, 98.99%, 98.02% respectively in the Z - S scenario of gamma frequency with configuration values C = 4, M = 4, MA = Logsig on the Dispersion Entropy method, and the value of K = 10 on the K-Nearest Neighbors classification method.

Keywords: *Epilepsy, Ictal & Non-Ictal, Brain Signals, Dispersion Entropy, K-Nearest Neighbor*