ABSTRACT

Epilepsy is a disorder when the activity of nerve cells in the brain is disturbed which causes seizures. Seizures in ordinary epilepsy vary from seizures that occur for only a short time and are almost undetectable to seizures that occur very strongly and for a long time. This happens as a result of nerve cells in the cortex of the brain that are overactive. According to the World Health Organization (WHO), epilepsy has affected about 50 million people worldwide, so serious treatment 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 identifying epileps.

In this reseach, we designed an automatic system that can classify brain signal waves, especially during ictal and non-ictal conditions on brain signal recording data. The data used dataset belonging to the Department of Epileptology, University of Bonn, Germany. There are three main stages in this process, namely signal preprocessing, feature extraction, and classification. The feature extraction method used is Permutation Entropy (PE), and K-Nearest Neighbors (K-NN) will be used as a classification method..

From the test results, the highest accuracy value of 99% is obtained by using the embedded dimension value of the PE method of 3. The specificity and sensitivity were obtained at 99%, in the Z-S scenario. These results prove that the proposed method is successful in classifying well.

Keywords: Epilepsy, Ictal & Non-Ictal, Brain Signals, Permutation Entropy, K-Nearest Neighbor.