ABSTRACT

Electroencephalogram (EEG) has an important role for the detection, diagnosis, and treatment of brain disorders. One of the indications of disease that can be done through an EEG examination is dementia. This disease causes a progressive decline in cognitive functions such as memory, thinking, orientation, comprehension, learning abilities, language and decision making. Dementia occurs due to excessive deposition of peptides in the extracellular space that causes plaques and changes in intracellular neurofibrils in the brain. If you don't get the right treatment, it can cause rapid death of brain cells and worsen the condition of this disease. Research in dementia is focused on detecting the disease at an early stage in order to provide effective therapy for the treatment of this disease. In this final project, early detection of dementia in patients suffering from mild cognitive impairment (MCI) will be carried out by conducting energy analysis on EEG waves. It is suspected that there is a change in signal energy in patients with MCI so that this analysis can be used for evaluation or diagnosis. MCI is very important to detect because MCI is an early symptom of dementia.

This final project is designed to produce a classification process and detect normal and MCI patients. One of the neurological disorders associated with cognitive decline is Mild Cognitive Impairment (MCI). MCI is a syndrome in which a person loses mild cognitive abilities that can be measured through neuropsychological tests. This final project uses the Spectral Entropy (SpecEn) method for measuring signal complexity so that the complexity increases, the resulting entropy value is higher, and Fractal Dimension (FD) techniques are useful for dealing with the complexity of self-similar patterns. Generally, FD measures the complexity of the waveform in time series analysis. SpecEn and FD are used as methods for signal complexity-based approximation.

The EEG signal generated from noise rejection by BPF is then calculated for its entropy and fractal. Classification of the data obtained with an accuracy rate of 70.6% and the system can recognize the data well on normal and MCI subjects.

Keywords: EEG, Dementia, MCI, Energy