ABSTRACT

Dementia is a nervous system disorder in brain that causes various reactions in the human body. One of them is the reducing of ability to understand other people's words and memory loss. This disease will get worse with time. In general, dementia can be detected using an electroenchephalograph.

Electroenchephalograph is a tool that used to measure electrical activity in brain. Dementia is characterized by a slowed response in the brain which can affects the memory part in brain. The electroenchephalograph uses a special sensor in the form of an electrode that is mounted on the head. In previous studies, EEG signal processing was carried out using the fast forward transform (FFT) method. The analysis of the EEG signal filter, especially in dementia, has not been widely carried out. In this study, the analysis of filters that using for dementia signal processing was carried out by several filtering methods, there are using butterworth, empirical mode decomposition (EMD) which is the part of Hilbert Huang transform (HHT) and selecting the frequency band. To determine the effectiveness of the application of these filters, accuracy measurements are used to measure the performance of the BCI system design. In designing this system, the BCI system uses entropy as its feature extraction form and support vector machine (SVM) as its classification method.

Based on the test results, it was found that EMD was proven to be able to increase the accuracy until more than 3% compared to butterworth with the frequency wave type (alpha) and the highest accuracy achieved was 80.70%. As a conclusion from this research, the BCI system shows that the result is more accurate using EMD as a filter. Thus, EMD can function as an EEG signal filter in dementia detection systems.

Key-word: *Brain-Computer Interface (BCI), Electroenchephaloghrapy (EEG), Hilbert Huang Transform (HHT), Support Vector Machine (SVM), Dementia.*