

## **ABSTRACT**

Stroke is one of the cerebrovascular disease caused by obstruction of blood flow to the brain. Stroke is one of the biggest causes of death in Indonesia, according to South East Asian Medical Information Center (SEAMIC) data, it is known that the biggest stroke mortality rate occurred in Indonesia which was followed by the Philippines, Singapore, Brunei, Malaysia, and Thailand respectively. There are several tools to diagnose stroke, one of which is Electroencephalogram (EEG).

EEG is a tool that can be used to record the activity of neurons in the human brain that are placed on the human scalp. Among other BCI systems EEG is one of the more widely used tools, because the price is cheaper, easy to use and high temporal resolution compared to other tools such as fMRI and fNIRS. However, the signal performance in EEG will decrease if using a channel with a large amount. In addition, a large number of channels can spend a considerable preparation time that will affect the convenience of using EEG. Based on the issue, this research will process the stroke EEG signals using the spatial selection method using the Power Spectral Density (PSD) extraction feature and the Extreme Learning Machine (ELM) Classification to filter the dataset to a more optimal size and obtain the relevant active channel composition results.

Results showed that the spatial selection method both manual and automatic selection can increase the accuracy of up to 15% of normal data with the highest accuracy of 0.84 achieved when using L2-norm calculation method. The L2-norm energy calculation method gets better results than other calculation methods. The program method can select the relevant active channel with the stroke EEG signal.

**Keywords:** Stroke, electroencephalogram (EEG), channel selection, Spatial Selection