

## ABSTRACT

Arrhythmia (Arrhythmias) is a form of heart conduction system disease that causes an inefficient heart beat. Typically, Arrhythmias can be diagnosed through electrocardiogram (ECG) recorder. Besides, a lot of mobile health care system adapting EKG recorder is increased and need an automatic arrhythmia classification algorithm. Recently, pattern recognition algorithm neural networks have been done for arrhythmia classification by many scientists and engineers. However, this algorithms still have some problems concerning practical applications, such as slow learning speed and unstable performance.

In this Final Project is proposed an arrhythmia classification algorithm that has learning speed and high accuracy using Extreme Learning Machine (ELM). The process of classification is using ELM where the data has been extracting of feature using Short time Fourier Transform (STFT) before. The proposed algorithm can eventually classify five types of arrhythmia, namely: Atrial Fibrilasi (AF), Congestive Heart Failure (CHF), Normal Sinus Rhythm (NSR) , Left Bundle Branch Block (LBBB), and Paced Beat (PB).

The testing results use 3 parameters, such as accuracy, sensitivity, and testing computation time of 125 testing data. By using *window* 20, *n-overlap* 19, and *nfft* 599 in STFT and by using  $L$  hidden nodes 800 and activation function *sigmoid* in ELM, the testing results give accuracy 100%, sensitivity 100%, training time average 0.35 seconds and testing time average 0.107 seconds. And finally, this shows that the proposed algorithm has high accuracy and fast computation time.

**Key words:** Arrhythmia, electrocardiogram (ECG) signal, Short time Fourier Transform (STFT), Extreme Learning Machine (ELM).