

## ABSTRACT

Heart is one of organ that which is most important part of the body. When heart pumps bloods throughout the body, heart produces a signal electrocardiograph (ECG) as a representation of electrical pattern. Each ECG signal has a special pattern to describe the condition of heart. Now, the process of reading the ECG signal pattern still done by manually. Therefore, the final project is expected to produce a program that makes someone easy to read an ECG signal so that heart conditions will be known quick and accurate.

This final project use EMD method (Empirical Mode Decomposition) to know the characteristic of signal. The function of EMD which is to describes the original signal into two parts, which is Independent Intrinsic Mode Function (IMFs) and Residue Components. The counting process is by reduce the number of signals were observed with mean (average) of the original signal. Counting step is done repeatedly until the condition of the signal is stable. For heart classification conditions using Extreme Learning Machine (ELM). ELM is a feed forward neural network with one hidden layer or more recognized as a single hidden layer feed forward neural network (SLFN) by finding nodes that provide the maximum output value, so that can determine the outcome.

The end of the result from this final project is a program that can detect heart condition based on signal generated by ECG which is processed by use EMD method. Heart condition is divided into 3 class that are Normal Sinus Rhythm (NSR), Atrial Fibrillation (AF), and Congestive Heart Failure (CHF). The accuracy rate from this project is 91.11%. Therefore, this method is sufficiently representative to recognize the ECG signal.

Keywords: Electrocardiogram (ECG), ECG signal, Empirical mode decomposition (EMD), the Independent Intrinsic Mode Functions (IMFs), ELM (Extreme Learning Machine)