

## ABSTRACT

The most important organ in the human body is the heart. Therefore, knowing the condition of the heart becomes important. And to know how the condition of the heart is, we do a recording of the electrical activity of the heart that is called electrocardiography (ECG). The output of this process is known as electrocardiogram (ECG). ECG produces certain patterns that only a trained person can interpret the meaning behind those patterns. However, modern-day ECG machine has equipped itself with software that can interpret ECG pattern automatically although the results can be inaccurate sometimes.

On this final task, I created a system which its way of work is similar to the modern-day ECG machine's software. The system is able to recognize an ECG and then based on the produced ECG pattern this system is also able to analyze and classify the kind of heart dysrhythmia (if there is) that a patient is suffered from. The system uses Hilbert-Huang Transform (THH) to extract the ECG pattern image features. As for the classification the system uses k-Nearest Neighbors (k-NN) algorithm.

There are six kinds of heart dysrhythmia the system can interpret; they are Atrial Fibrillation (AF), Normal Sinus Rhythm (NSR), Bundle Branch Block (BBB), Premature Ventricular Contraction (PVC), Ventricular Fibrillation (VF) and Ventricular Tachycardia (VT). Unfortunately, the best accuracy value the system could provide is only about 68.33% using Cityblock Distance and  $k=7$ .

**Keywords:** electrocardiography, electrocardiogram, Hilbert-Huang Transform, k-Nearest Neighbors algorithm