

Abstract

Myocardial infarction is one of the most dangerous and often fatal cardiovascular diseases. To detect this disease early, non-invasive methods based on Phonocardiogram (PCG) signals have become a significant focus of research. However, to present, research on feature extraction from PCG signals is still limited. In this research, we propose a study of feature extraction algorithms using Discrete Wavelet Transform (DWT), Mel Frequency Cepstral Coefficients (MFCC), and Entropy methods to detect heart attacks. In the pre-processing stage, we applied noisereduce to remove noise in the PCG signal. Further, we perform feature extraction using DWT, MFCC, and Entropy methods on the processed PCG signal. Following that, we used a detuned KNN with hyperparameters as the classification algorithm to classify the features into two categories: heart attack and non-heart attack. The test results show that DWT, MFCC, and Entropy-based feature extraction methods can make a significant contribution in detecting Myocardial Infraction. In comparison with other feature extraction algorithms, the test results show that the Entropy-based feature extraction method provides the best accuracy of 99%, with 99% sensitivity and 99% specificity. This research makes an important contribution to the development of heart attack detection methods using PCG signals. With promising results, the Entropy-based feature extraction method can be an effective and efficient approach in detecting coronary heart disease early, which in turn can improve patient prognosis and treatment.

Keywords: Myocardial Infraction; Phonocardiogram; Feature Extraction.