Abstract

Myocardial infarction (MI), also known as a heart attack, refers to a condition where the blood flow to the heart is interrupted, leading to a deficiency of blood supply. This insufficient blood flow results in damage to the heart muscle, potentially causing cell death and a loss of proper functionality. Damage or death of heart muscle tissue causes changes to the normal heart conduction system resulting in arrhythmias that can be life threatening and cause the heart to stop suddenly. So the most effective technology used to diagnose MI is by reading the patient's Electrocardiogram (ECG) signal or performing Magnetic Resonance Imaging (MRI) tests. Currently, many studies have proposed MRI-based MI detection methods. In general, the method used for MI detection is localization heart, motion field estimation, preprocessing, and classification. From the many studies of MI detection with MRI, the accuracy value is still low compared to MI detection with ECG. This is because the classification algorithm used can still make the detection accuracy low. So in this study, MI detection with MRI will use a hybrid CNN-LSTM algorithm. And the autoencoder algorithm is also performed as a comparison to the hybrid CNN-LSTM algorithm. To solve the existing problems, this final project proposes the development of Deep Learning which is a CNN algorithm, that supports the improvement of MI detection accuracy. Last but not least, this final project also analyzes the accuracy of the proposed algorithm. The MRI data contains only 100 images so do Data Augmented for getting more data. The total data after Data Augmented is 800 images, that will be use for training, validation and testing. The highest testing classification accuracy, specificity, and sensitivity are 96.25%, 97.08%, and 94.73%, respectively. using CNN algorithm. While the Hybrid CNN-LSTM algorithm is 98.12%, 99.01%, and 96.55%, respectively. And Autoencoder algorithm is 97.5%, 98.05%, and 96.49%, respectively.

Keywords: Myocardial Infraction, Hybrid CNN-LSTM, MRI.