Abstract

Myocardial Infarction or MI is a medical condition that occurs when the oxygen-rich blood supply to the heart muscle is interrupted or stops suddenly. As a result, the part of the heart muscle that does not get enough blood supply begins to suffer damage or death. Research related to MI using ECG signals has started since the 1900s. Along with advances in technology and computing, analysis of ECG signals with more sophisticated methods, such as digital image processing and signal processing techniques, has been developed to improve accuracy and reliability in detecting myocardial infarction. However, these methods do not provide detailed information regarding the interaction between embedded features. This research provides a solution to the above problem by developing a CNN-based MI model that will be optimized by Hyperparameter-tuning. This technique is proven to produce a solid and accurate MI model. However, it is necessary to conduct a comprehensive evaluation and validation of the model, including testing on existing data sets and comparison data. The method used in developing the MI model with CNN is as follows. First, this study tests the performance of ECG data using the CNN algorithm, then the results will be compared with the performance of ECG data using CNN Hyperparameter-tuning. Furthermore, the CNN model without tuning will be compared with other algorithms such as RNN and DNN. The results of this study on the MI model with the CNN Non-Tuning method have an accuracy of 77% and for the CNN Fine-Tuning method has an accuracy of 80%. Then the accuracy result of the RNN Non-Tuning model is 71%, RNN Fine-Tuning is 71%. And the accuracy result of the DNN Non-Tuning model is 84% and DNN Fine-Tuning is 84%.

Keywords: Myocardial Infarction, ECG Signal, Convolutional Neural Network.