

An Auxiliary Technique for Coronary Heart Disease Prediction by Analyzing Electrocardiogram Based on ResNet and Bi-Long Short-Term Memory

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Abstract : Heart disease is one of the leading causes of death in the world, and coronary heart disease (CHD) is one of the major heart diseases. Electrocardiogram (ECG) is widely used in the detection of heart diseases, but the traditional manual method for CHD prediction by analyzing ECG requires lots of professional knowledge for doctors. This paper introduces sliding window and continuous wavelet transform (CWT) to transform ECG signals into images, and then ResNet and Bi-LSTM are introduced to build the ECG feature extraction network (namely ECGNet). At last, an auxiliary system for coronary heart disease prediction was developed based on modified ResNet18 and Bi-LSTM, and the public ECG dataset of CHD from MIMIC-3 was used to train and test the system. The experimental results show that the accuracy of the method is 83%, and the F1-score is 83%. Compared with the available methods for CHD prediction based on ECG, such as kNN, decision tree, VGGNet, etc., this method not only improves the prediction accuracy but also could avoid the degradation phenomenon of the deep learning network.

Keywords : Bi-LSTM, CHD, ECG, ResNet, sliding window

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