Detection and Classification of Myocardial Infarction Using New Extracted Features from Standard 12-Lead ECG Signals

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Abstract : In this paper we used four features i.e. Q-wave integral, QRS complex integral, T-wave integral and total integral as extracted feature from normal and patient ECG signals to detection and localization of myocardial infarction (MI) in left ventricle of heart. In our research we focused on detection and localization of MI in standard ECG. We use the Q-wave integral and T-wave integral because this feature is important impression in detection of MI. We used some pattern recognition method such as Artificial Neural Network (ANN) to detect and localize the MI. Because these methods have good accuracy for classification of normal and abnormal signals. We used one type of Radial Basis Function (RBF) that called Probabilistic Neural Network (PNN) because of its nonlinearity property, and used other classifier such as k-Nearest Neighbors (KNN), Multilayer Perceptron (MLP) and Naive Bayes Classification. We used PhysioNet database as our training and test data. We reached over 80% for accuracy in test data for localization and over 95% for detection of MI. Main advantages of our method are simplicity and its good accuracy. Also we can improve accuracy of classification by adding more features in this method. A simple method based on using only four features which extracted from standard ECG is presented which has good accuracy in MI localization.
Keywords : ECG signal processing, myocardial infarction, features extraction, pattern recognition