عنوان مقاله:

Detection and Classification of Myocardial Infarction with Support Vector Machine Classifier Using Grasshopper Optimization Algorithm

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خلاصه مقاله:

Background: Providing a noninvasive, rapid, and cost-effective approach to diagnose of myocardial infarction (MI) is essential in the early stages of electrocardiogram (ECG) signaling. In this article, we proposed the new optimization method for support vector machine (SVM) classifier to MI classification. Methods: After preprocessing ECG signal and noise removal, three features such as Q-wave integral, T-wave integral, and QRS-complex integral have been extracted in this study. After that, different statistical tests have evaluated the matrix of these features. To more accurately detect and classify the MI disease, optimizing the SVM classification parameters using the grasshopper optimization algorithm (GOA) was first used in this study (that called SVM-GOA). Results: After applying the GOA on the SVM classifier for all three kernels, the final results of MI detection for sensitivity, specificity, and accuracy were ۱۰۰% ± ۰%, ۱۰۰% ± ۰%, and ۱۰۰% ± ۰%, respectively. The final results of different MI types' classification after applying the GOA on SVM for polynomial kernel were obtained ۱۰۰% ± ۰%, ۹۷.۳۷% ± ۰%, and ۹۴.۲% ± ۰.۲% for sensitivity and specificity and accuracy, respectively. However, the results of both linear and RBF kernels that were used for the SVM classifier method have also shown a significant increase after using GOA. Conclusion: This article's results show the highly desirable effect of applying a GOA to optimize different kernel parameters used in the SVM classifier for accurate detection and classification of MI. The proposed algorithm's final results show that the proposed system has a relatively higher performance than other previous studies.

کلمات کلیدی:

Biomedical signal processing, electrocardiogram, grasshopper optimization algorithm, myocardial infarction, support vector machine classifier