"Wavelet Threshold-Based ECG Data Compression Technique Using Immune Optimization Algorithm"

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Abstract:

In this paper, a new ECG compression method called Wavelet Threshold Based Immune Algorithm (WTBIA) is proposed. This method is based on finding the best threshold level for each wavelet subband using Immune Algorithm (IA). The WTBIA algorithm consists of three main steps: 1) Applying 1-D Discrete Wavelet Transform (DWT) on ECG signal; 2) Thresholding of wavelet coefficients in each subband; and 3) Minimization of the Percent Root mean square Difference (PRD) and maximization of the Compression Ratio (CR) using IA. The main advantage of this method is finding the best threshold level for each subband based on the required CR and PRD. The compression algorithm was implemented and tested upon records selected from the MIT-BIH arrhythmia database [6] using different wavelets such as Haar, Daubechies, Coiflet, Symlet and Biorthogonal. Simulation results show that the proposed algorithm leads to high CR associated with low distortion level relative to previously reported compression algorithms.

Keywords:

Electrocardiogram, Data Compression, Wavelet Transform, Immune Algorithm

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