A Reliable QRS Detection Method Based on Dual-Tree Wavelet Transform

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Abstract

Electrocardiography is considered as a powerful technique for assessing heart condition. To study cardiac disorders, it is essential to localize and extract the QRS complex: the prominent region within the electrocardiogram signal. Since the QRS complex has various morphologies and is usually contaminated by severe overlapping spectral noise, accurate detection is a complicated task. This paper proposes a reliable method based on the Dual-Tree Wavelet Transform, which uses a threshold process to select the QRS frequency components and reduce the overlapping noise. The QRS deflections are then emphasized using squaring and moving average operators. The chosen decision rule is simple and based on the variance of the signal. The proposed method was tested on the MIT-BIH Arrhythmia database, and the algorithm showed high accuracy detection results compared to those of other recently published works.

Keywords: ECG signal, QRS complex, dual tree wavelet transform

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