

工程与应用

心电信号的aTrous小波变换综合检测方法

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摘要 心电信号反映了心脏有节律的活动。R波、P波和T波是去、复极时产生的突变信号, 是典型的峰值奇异信号。信号的突变点检测是小波变换应用的一个重要方面。确定QRS波群的具体形态和起止点, 检测P波、T波特征点是心电图分析的难点。研究了信号的二进样条小波按aTrous(多孔)算法进行的变换, 构建了系列检测方法, 来检测和识别QRS波群、P波、T波的具体形态和位置。实验结果表明, 所提出的综合算法具有较好的适应性, 能很好地抑制基线漂移, 消除高频干扰, 克服了大T波、大S波、高U波波群自身病态因素对综合检测产生的影响。

关键词 [心电信号](#) [小波变换](#) [aTrous算法](#) [自适应阈值](#) [零基线](#)

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Synthesis detection algorithm of ECG based on aTrous wavelet transform

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Abstract

The R-wave, T-wave and P-wave of Electrocardiographic (ECG) signal represent the electrical activation of the ventricles, which initiates ventricle contraction, and the typical peak value singular signal, synthesis detection of the typical peak signal is very important application of wavelet transform, synthesis detection of ECG including QRS complex, P-wave, T-wave is difficult. The ECG signal is decomposed with a dyadic spline wavelet by aTrous algorithm, using a series of detection methods to detect morphology and position of ECG components. Test results show that the synthesis detection algorithm is adaptive, the fluctuation of extern noise is removed and restrained such as baseline, high frequency, and self abnormality equation such as big T-wave, big S-wave, high U-wave and wave fusion.

Key words [Electrocardiographic \(ECG\)](#) [wavelet transform](#) [aTrous](#) [adaptive threshold](#) [zero reference](#)

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