

{tag} International Journal of Computer Applications
Foundation of Computer Science (FCS), NY, USA

[Volume 181](#)

-
[Number 46](#)

Year of Publication: 2019

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10.5120/ijca2019918604

{bibtex}2019918604.bib{/bibtex}

Abstract

The purpose of this paper is to develop a new approach for R-peak detection in ECG and compare it with the most effective and existing algorithms. The proposed approach is based on DWT and envelope for the first stage of preprocessing and decision or detecting it was achieved by adaptive thresholding. The proposed algorithm is compared with Pan & Tompkins, Savitzky-Golay smoothing filter, Hilbert and wavelet transforms as well as fast Fourier transform algorithm to investigate these techniques of R peak detection and evaluate the wavelet-based algorithm comparing with them. The algorithms are evaluated in the experimental section using ECG signals from the MIT-BIH database. The results of detection algorithms show that the proposed wavelet-based algorithm gets the highest sensitivity by 99.9% with higher reliability compared to other algorithms, also by analyzing the precision of them, it's come to light that FFT improved the highest precision with 99.7%.

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Index Terms

Computer Science

Algorithms

Keywords

ECG, Pan & Tompkins, Savitzky-Golay smoothing filter, Fast Fourier transform, wavelet transforms, Hilbert transform, R peak.