

Local Adaptive Noise Cancellation for MCG Signals Based on Wavelet Transform

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Magneto-cardiogram(MCG) signals may be highly distorted by the environmental noise interfering with powerline interference, broadband white noise, surrounding magnetic noise, and baseline wondering. Several kinds of digital filters and noise cancellation methods have designed and realized by many researchers, but these methods gave some problems that the original signal may be distorted by digital filter because of the wideband characteristics of background noise.

To eliminate noise effectively without distortion of MCG signals, we performed multi-level frequency decomposition using wavelet packets and then local adaptive noise cancellation was progressed in each local frequency range.

In addition to proposed wavelet filter to eliminate these various non-stationary noise elements, the local adaptive filter using least mean square(LMS) algorithm and soft-threshold de-noising method were introduced in this paper. The signal-to-noise ratio(SNR) and reconstruction square error(RSE) were calculated to evaluate the performance of proposed method, which is compared with conventional wavelet filter and adaptive filter. The experimental results show that the proposed local adaptive filtering method is better than the other conventional methods.

keywords : MCG, adaptive noise cancellation, wavelet packets