Characteristics of Noise Cancellation for MCG Signals Using Wavelet Package

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Noise from electronic instrumentation is invariably present in biomedical signals, although the art of instrumentation design is such that this noise source may be negligible. And sometimes signals of interest are contaminated or degraded by signals of similar type from another source. Biomedical signals are omni-presently contaminated by these background noises which span nearly all frequency bandwidths.

In the magnetocardiogram (MCG), several digital filters have been designed for the elimination of the power-line interference, broadband white noise, surrounding magnetic noise, and baseline wondering. In addition to the introduced FIR filter, notch, adaptive filter using the least mean square (LMS) algorithm, and recurrent neural network (RNN) filter, a new filtering method for effective noise canceling in MCG signals is proposed in this paper, which is realized by a wavelet package.

The experimental results show that the proposed filter using wavelet package performs best with respect to noise rejection. To verify this, several characteristics is analyzed and compared with one another, SNR of filtered signal, computation time, memory for data storage, and attractor pattern using the nonlinear dynamics.

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