Estimation of wavelet threshold value for surface EMG baseline removal

ABSTRACT

High quality of surface electromyography is vital during investigation on muscle activity. Low quality of surface EMG signals causes extracted signals to be inaccurate and lead to misinterpretation and misclassification of the signals. A surface EMG signal quality is determined by the ratio of muscle contraction to its baseline during muscle relaxation period. Baseline noises are originated from powerline, cable motion artefact, electronics of the amplification systems and skin-electrode interface. The noises are quite difficult to be removed by digital or active filter since they do not have specific frequency range like powerline interference and corner frequency noise. However, wavelet de-noising enables users to remove noise by accessing both frequency and time information. Baseline surface EMG noise is possible to be removed by estimating de-noise threshold based on mean absolute value and root mean square of its baseline. The result of this study shows that the proposed estimation of threshold method is better than the conventional threshold setting.

Keyword: Baseline noise; Stationary wavelet transform; Surface electromyography; Wavelet thresholding