

The utility of wavelet transform in surface electromyography feature extraction - a comparative study of different mother wavelets

ABSTRACT

Electromyography (EMG) signal processing has been investigated remarkably regarding various applications such as in rehabilitation systems. Specifically, wavelet transform has served as a powerful technique to scrutinize EMG signals since wavelet transform is consistent with the nature of EMG as a non-stationary signal. In this paper, the efficiency of wavelet transform in surface EMG feature extraction is investigated from four levels of wavelet decomposition and a comparative study between different mother wavelets had been done. To recognize the best function and level of wavelet analysis, two evaluation criteria, scatter plot and RES index are recruited. Hereupon, four wavelet families, namely, Daubechies, Coiflets, Symlets and Biorthogonal are studied in wavelet decomposition stage. Consequently, the results show that only features from first and second level of wavelet decomposition yields good performance and some functions of various wavelet families can lead to an improvement in separability class of different hand movements.

Keyword: Electromyography signal; Feature extraction; Wavelettransform; Means absolute value