

Surface electromyography of eyes potential behaviour using wavelet transform analysis

ABSTRACT

The previous study of eyes potential behavior was carried out using Fourier Transform which is found to be working on a single scale. Then, Wavelet Transform was proposed to overcome the limitation. Hence, the objective of this paper is to identify the surface electromyography of eye movement potentials behavior by using Wavelet Transform scalogram analysis. The eye movement signals are detected by using electrodes that are placed on a person's forehead around the eye. It then recorded the signal using the data acquisition Electroencephalograph Neurofax-9200. The eye moved towards various directions involving 15 humans were identified. The Wavelet scalogram analyzed the eye movement signals by comparing the energy distribution with the change of time and frequency of each signal. The results proved that different surface electromyography of eye movement signals created different signals energy with their corresponding scales. Analysis of variance statistically proved that there was a 99% significance difference between each scale indicating that each eye movement has different frequency bands and energy distribution. These findings could be integrated to design a support machine for paralyzed people to move their robot or wheelchair by using eye movements. Future works should explore the energy and frequency bands distribution within four eye movement signals for better interpretation of surface Electromyography signals analysis by using Wavelet scalogram.

Keyword: Surface electromyography; Eyes potential; Wavelet transform; Energy distribution scalogram