Optimal accuracy and runtime trade-off in wavelet based single-trial P300 detection

ABSTRACT

Single-trail detection of P300 from EEG signals is the main challenge of diagnostic purposes and research applications. In this article, Wavelet Transform is used for feature extraction from EEG signals. The goal is to prove the capability of wavelet transform in P300 feature extraction. A number of established wavelet feature extraction methods were evaluated from accuracy and computation speed perspectives. To conduct uniform evaluation, Support Vector Machine (SVM) was used for classification of all methods. The results show that DWT can be fast in computing signal features with lower accuracy, while a combination of DWT and T-CWT is proven to be more accurate when real-time computation is concerned.