

COMPARISON OF PERFORMANCE OF DIFFERENT FEATURE EXTRACTION METHODS IN DETECTION OF P300

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Abstract

The aim of this paper is to design a pattern recognition based system to detect the P300 component in the EEG trials. This system has two main blocks, feature extraction and classification. In the feature extraction block, in addition to morphological features, some new features including intelligent segmentation, common spatial pattern (CSP) and combined features (CSP + Segmentation) have also been used. Two criteria were used for the feature evaluation. Firstly, a t-test has been applied. Secondly, each of these four groups of features was evaluated by a Linear Discriminant Analysis (LDA) classifier. Afterwards, the best set of features was selected by using Stepwise Linear Discriminant Analysis (SWLDA). In the classification phase, the LDA was used as a linear classifier. The algorithm described here was tested with dataset II from the BCI competition 2005. In this research, the best result for the P300 detection was 97.4%. This result has proven to be more accurate than the results of previous works carried out in this filed.

Keywords: P300, brain computer interface (BCI), pattern recognition, feature extraction, classification