Sub Band CSP Using Spatial Entropy-Based Relevance in MI Tasks

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Abstract

In motor imagery-based Brain-Computer Interfaces (BCI), discriminative patterns are extracted from the electroencephalogram (EEG) using the Common Spatial Pattern (CSP) algorithm. However, successful application of CSP heavily depends on the filter band and channel selection for each subject. To solve this issue, this work introduces a new supervised spatio-spectral relevance analysis (named HFB) from EEG. The proposal parameters allow controlling the number of selected spatio-spectral components and CSP features. The experimental results evidence an improved accuracy in comparison with CSP, FB and SFB assessed in the BCI competition IV dataset IIa. As a conclusion, focusing on the discriminative channels and sub-bands enhances the MI classification with a neurophysiological interpretation of the components.

Keywords: *Spatio-spectral relevance, Renyi entropy, Brain-computer interface*

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