

Analysis of Matching Pursuit Features of EEG Signal for Mental Tasks Classification

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Abstract : Brain Computer Interface (BCI) Systems have developed for people who suffer from severe motor disabilities and challenging to communicate with their environment. BCI allows them for communication by a non-muscular way. For communication between human and computer, BCI uses a type of signal called Electroencephalogram (EEG) signal which is recorded from the human's brain by means of an electrode. The electroencephalogram (EEG) signal is an important information source for knowing brain processes for the non-invasive BCI. Translating human's thought, it needs to classify acquired EEG signal accurately. This paper proposed a typical EEG signal classification system which experiments the Dataset from "Purdue University." Independent Component Analysis (ICA) method via EEGLab Tools for removing artifacts which are caused by eye blinks. For features extraction, the Time and Frequency features of non-stationary EEG signals are extracted by Matching Pursuit (MP) algorithm. The classification of one of five mental tasks is performed by Multi_Class Support Vector Machine (SVM). For SVMs, the comparisons have been carried out for both 1-against-1 and 1-against-all methods.

Keywords : BCI, EEG, ICA, SVM

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