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Abstract

Brain Computer Interface is a technology make a communication with the outside world via brain thoughts. The performance of the BCI system depends on the choice of approaches to process the signals of the human brain at each step. The recording signals of a human brain having bad or small signal to noise ratio (SNR) made brain patterns hard to be distinguished. So, the signal quality need to be enhanced, i.e. enhancing the SNR. The electroencephalogram (EEG) signals are composed of true signal and noise signals so that in order to have high SNR, the EEG signals should be transformed so that the undesired components (noise signal) will be isolated and the true signal will remain.

Methods proposed in this paper are for preprocessing, feature extraction and classification of EEG signals (brain signals) recorded from Emotiv EPOC. The raw EEG data is preprocessed to remove noise and then is handled in order to eliminate the artifacts using Principal Component Analysis (PCA), Common Spatial Pattern (CSP), and Common Average Reference(CAR). Power Spectral Density (PSD) is computed from filtered data as a feature. Finally, Support

Vector Machine method used to interpret the EEG patterns. The PCA algorithm showed good performance with a value 94.28% compared to other algorithms.

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Index Terms

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Keywords

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