

Payat Jirasuwanpong 2011: Hand Motor Imagery EEG Classification Using Adaptive Band Selection for Brain-Computer Interface. Master of Engineering (Information and Communication Technology for Embedded Systems), Major Field: Information and Communication Technology for Embedded Systems, Department of Electrical Engineering. Thesis Advisor: Mr. Miti Ruchanurucks, Ph.D. 78 pages.

Brain-Computer Interface (BCI) is a system designed for a specific application. In hand motor imagery, the Electroencephalograph (EEG) signal related to motor activity can be recorded from the sensorimotor area, which releases informative signals during motor execution. Patterns used to classify left and right hand motor imagery are called Event Related Desynchronization (ERD). However, an individual produces the informative patterns in different frequency components. Therefore, the BCI system needs to be appropriately designed for both applications and subjects. This thesis attempts to design an adaptive filter for selecting proper frequency bands of each person. The filter based on wavelet transform is called Wavelet Filter. Nevertheless, the wavelet filter will not be adaptive if there is no band selection. The band selection is to choose the most discriminative bands by using a cost function. When a value from a cost function is high, it means there is high discrimination between the patterns of the two classes. After the process selects the bands, the adaptive wavelet filter will be implemented to eliminate undesirable components. In summary, the results indicate that the proposed method achieves higher classification accuracy than that of static filters.

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