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Classifying EEG for Brain Computer Interfaces Using Gaussian Process

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Abstract

Classifying electroencephalography (EEG) signals is an important step for proceeding EEG-based brain computer interfaces (BCI). Currently, kernel based methods such as support vector machine (SVM) are the state-of-the-art methods for this problem. In this paper, we apply Gaussian process (GP) classification to binary classification problems of motor imaging EEG data. Comparing with SVM, GP based method naturally provides a predictive probability for identifying a trusted prediction which can be used for post-processing in a BCI. Experimental results show that the classification methods based on Gaussian process outperform SVM and K-Nearest Neighbor (KNN) in terms of 0-1 loss class prediction error.