

CROSS VALIDATION AS AN EFFECTIVE DISCRIMINATORY TOOL FOR EEG PATTERN ANALYSIS

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Abstract

The method of cross-validation offers a means for checking the accuracy or reliability of results that were obtained by an exploratory analysis of the data. Cross validation is a model evaluation method. This method give an indication of how well the learner will do when it is asked to make new predictions for data it has not already seen. Here data is spilt in two parts Training and Testing. Model is first trained with training part and tested with another part. This is the basic idea for a whole class of model evaluation methods called *Cross Validation*. In this paper Cross Validation method for EEG signal analysis is described. EEG signals recorded while performing following five independent thinking tasks viz. Baseline, Counting, Letter Composition, Multiplication and Rotation are used. The patterns observable in the recorded EEG Signals are correlated with the tasks. The usefulness of Cross Validation as a discriminatory tool for this EEG pattern analysis is checked. Here the cross validation works by segmenting the EEG signals, finding its auto regression coefficients and their consistency for training and testing segments. The EEG data for five subjects and 5 trials are used to confirm validity of the method. The effective discrimination capabilities suggest that the Cross validation method can give good accuracy for applications such as Brain Computer Interfacing.

Keyword : Electroencephalogram (EEG), Cross Validation, Auto Regression (AR), Brain Computer Interface (BCI).