RAPID BCI PROTOTYPING: RESULTS WITH ADAPTIVE AUTOREGRESSIVE PARAMETERS AND COMMON SPATIAL PATTERNS

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A BCI system that uses Rapid Prototyping to enable a fast transition of various types of parameter estimation and classification algorithms to real-time implementation and testing is described. The system is able to process multiple EEG channels on-line and operates under Windows 95 in real-time on a standard PC. The BCI can be controlled over the Internet, LAN or modem. For assistive applications an embedded computer can be used. Matlab controls the data acquisition and the presentation of the experimental paradigm, while Simulink is used to describe the current state of the EEG in real-time. Results are presented for two different parameter estimation methods: calculation of adaptive autoregressive (AAR) parameters and common spatial patterns (CSP). In the first case the recursive least square algorithm is utilized to control a prosthesis. In the second case a horizontal bar is controlled on a computer screen by utilizing subject-specific spatial patterns that weight each electrode according to their importance to the discrimination task and allow to achieve a high classification accuracy. Experiments with three subjects resulted in 86,95 and 98% accuracy during on-line discrimination of left and right motor imagery.

List of BCI-relevant publications from Graz

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