Self-organizing Maps for Event-Related Potential Data Analysis

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Event-related potentials (ERPs) and especially the P300 component have been gaining attention in braincomputer interface design and neurobiological research. The detection of the P300 component in electroencephalographic signal is challenging since its signal-to-noise ratio is very low. Instead of using traditional supervised pattern recognition, this paper discusses using unsupervised neural networks for the P300 classification purposes. To validate the proposed approach, a method for the P300 detection based on matching pursuit and self-organizing maps is proposed and evaluated. The results may be applied to the design of brain-computer interfaces.

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