Brain-computer interface using P300 and virtual reality: A gaming approach for treating ADHD - DTU Orbit (16/12/2018)

This paper presents a novel brain-computer interface (BCI) system aiming at the rehabilitation of attention-deficit/hyperactive disorder in children. It uses the P300 potential in a series of feedback games to improve the subjects' attention. We applied a support vector machine (SVM) using temporal and template-based features to detect these P300 responses. In an experimental setup using five subjects, an average error below 30% was achieved. To make it more challenging the BCI system has been embedded inside an immersive 3D virtual reality (VR) classroom with simulated distractions, which was created by combining a low-cost infrared camera and an “off-axis perspective projection” algorithm. This system is intended for kids by operating with four electrodes, as well as a non-intrusive VR setting. With the promising results, and considering the simplicity of the scheme, we hope to encourage future studies to adapt the techniques presented in this study.

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