뇌-기계 인터페이스 시스템 UI 설계를 위한 벤치마킹 및 사용자 요구사항 분석

최신아, 정하영, 정성욱, 홍영기, 유희천

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Benchmarking and User Needs Analysis for the UI Design of Optical Brain-Machine Interface System

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ABSTRACT

Objective: The present study was to suggest user interface design guidelines for an optical brain-machine interface (O-BMI) system by benchmarking existing systems and analyzing user's needs. **Background:** Compared with traditional electrophysiology-based BMI systems, an OBMI system based on the calcium imaging technology has the advantage of providing dense recordings of neuronal population and spatial organization. An O-BMI system needs to be developed for better usability as well as functionality. **Method:** A benchmark study on four existing BMI systems and their UIs was conducted. The major functions of the BMIs were evaluated in terms of use frequency and importance using 5-point scale by XX BMI researchers having at least 2 years of experience. A focus group interview with a structured usability questionnaire was performed to identify optical BMI tasks and usability problems. **Result:** The BMI support various tasks such as on-line (real-time) and off-line data processing. Next, novel functions such as lever pressure gauge need to be provided to the O-BMI system for user's convenience. Lastly, selection of functions with high importance and frequency are required in system user interface design. **Conclusion:** The concepts and guidelines proposed in the present study can be used to develop an ergonomic O-BMI UI design. **Application:** The proposed features of the O-BMI system UI can be applied to other BMI UI designs.

Keywords: Optical Brain-Machine Interface (BMI), User Interface (UI) Design, User Needs, Benchmarking

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