Brain Computer Interface with Wireless EEG

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Abstract

Human computer interface devices had allowed us to have interface to computers for entry of data, control and communication. Brain computer interface (BCI) directly integrates our thoughts and emotions with the technology we use every day. It is a communication channel which enables us to control devices and applications without the use of muscles. Much of the recent work on BCIs aims to improve the quality of life of people who are paralyzed or have severe motor disabilities. But BCIs movements produced are much slower, less precise and less complex than what able-bodied people do easily every day with their limbs. One of the new approaches to this brain computer interface is wireless electroencephalography. An electroencephalogram (EEG)demonstrates direct correlations with user intentions (Dong & Lee, 2012), thereby enabling a direct Brain-Computer Interface (BCI) communication. Implementing BCI requires high computational capacity to analyze brain signals in detail and in real-time, and such equipment was very expensive. The recent availability of inexpensive, single-channel, dry-electrode EEG devices makes it feasible to take this technology outside of the laboratory into informal real-world environments such as schools and homes. The benefits of such devices are affordability and ease of use. Considering the current availability of many different commercial consumer-grade EEG devices, there is a need in exploring the feasibility of using low-cost EEG devices for monitoring Individuals' EEG signals in their natural environment. While a system with a larger number of electrode/sensors would be providing more and better-quality data than its counterpart, the users of the domestic applications of the BCI technologies such as neurofeedback games (Thomas, Vinod & Guan, 2013; Yisi, Sourina & Hou, 2014) favour lightweight easy-to-use EEG headset with a small number of sensors. Therefore, evaluating the applicability and feasibility such devices for non-medical applications is important. The different application areas of the BCI are Bioengineering applications, Human subject monitoring, Neuroscience research and Human-Machine Interaction, Neuro Feedback Games, Neuro Psychological Assessments.

References

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