Special Issue on

Brain Computer Interface Systems for Neurorobotics: Methods and Applications

CALL FOR PAPERS

Brain computer interface (BCI) systems establish a direct communication between the brain and an external device. These systems can be used for entertainment, to improve the quality of life of patients and to control Virtual Reality applications, industrial machines, and robots. In the neuroscience field such as in neurorehabilitation, BCIs are integrated into controlled virtual environments used for the treatment of disability, for example, cerebral palsy, Down syndrome, and depression. Its aim is to promote a recovery of brain function lost due to a lesion through noninvasive brain stimulation (brain modulation) in a more accurate and faster manner than the traditional techniques. Neurorobotics combines BCIs with robotics aiming to develop artificial limbs, which can act as real members of human body being controlled from a brain-machine interface. With the advancement of a better understanding of how our brain works, new realistic computational algorithms are being considered, making it possible to simulate and model specific brain functions for the development of new Computational Intelligence algorithms and, finally, BCI for mobile devices/apps.

As an augmentative communication channel, BCI has already attracted considerable research interest thanks to recent advances in neurosciences, wearable biosensors, and data mining. However, to overcome numerous challenges BCI technology still requires research in high-performance and robust signal processing and machine learning algorithms to produce a reliable and stable control signal from nonstationary brain signals to allow development of real-life BCI systems usable across many individuals. Further improvements to BCI systems are necessary to ensure that they can meet the needs of specific user groups such as disabled or impaired people as well as common users.

This special issue focuses on recent advances and future trends in methods and applications of BCI systems evaluated in different fields of knowledge, such as neuroengineering, rehabilitation, psychology, pattern recognition, computational intelligence, machine learning, industrial engineering, control and automation engineering, and robotics. We are seeking theoretical, methodological, and particularly empirical papers dealing with different topics.

Potential topics include but are not limited to the following:

- ▶ Acquisition of brain signals
- ▶ Brain signal processing algorithms
- ▶ Virtual, augmented, and mixed realities
- ▶ Automatic real time detection and diagnosis of disease
- ▶ Neurorobotics
- ▶ Mobile robot navigation
- ▶ Smart home
- ▶ Serious games and gamification
- ▶ Hardware, software, and firmware
- ▶ Communication protocols
- ▶ Applications of BCI for education
- ▶ BCI for entertainment
- ▶ Privacy and security in BCI systems
- ▶ BCI systems for independent and assisted living
- ▶ Usability evaluation of BCI systems

Authors can submit their manuscripts through the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/bmri/neuroscience/nsnbcis/.

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