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Abstract:

Brain-computer interface (BCI) technology facilitates communication between users and external environments without involving any physical body movements. Various non-invasive modalities have been employed to measure brain activity, including MEG, fNIRS, and EEG. Among these, EEG has been most widely used owing to its affordability, portability, and ease of use. Over the past decades, various EEG-based BCIs have been developed and used in a range of applications, such as games, communication applications, wheelchair control, and smart home automation. In this tutorial lecture, I aim to introduce the basic theory of EEG-based BCI along with the latest trends. It is expected that a wide range of participants, from those new to EEG-based BCI to researchers looking to grasp current trends, will gain valuable insights from this tutorial.

Brief Biosketch

Chang-Hwan Im received his B.S., M.S., and Ph.D. degrees from the School of Electrical Engineering, Seoul National University in 1999, 2001, and 2005, respectively. He was a post-doctoral Associate in the Dept. Biomedical Engineering, University of Minnesota, Minneapolis, USA, from 2005 to 2006. From 2006 to 2011, he was with the Department of Biomedical Engineering, Yonsei University, South Korea, as an assistant/associate professor. Since 2011, he has been with the Dept. of Biomedical Engineering, Hanyang University, South Korea, as a tenured full professor. He has authored over 210 articles in peer-reviewed international journals. He is currently serving as an Associate Editor in a number of SCI-indexed journals including IEEE TNSRE, Scientific Reports, Frontiers in Human Neuroscience, and Experimental Neurobiology. His research interests cover various areas of neuroelectromagnetics and computational neuroengineering, especially brain-computer interfaces, diagnosis of neuropsychiatric diseases, noninvasive brain stimulation, and biosignal-based human-computer interfaces.