



BCS for Adaptive Intelligence

Lecture

Noninvasive Brain-Computer Interfaces for Communication and Control

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2020.09.09 (Wed)
5:00 p.m.



<https://bit.ly/3hXIWJ6>

Meeting ID: 956 6616 0982
Passcode: 145528

Brain-computer interface (BCI) is an emerging technology capable of translating human intentions into control signals, thereby enabling people to communicate with their external environment without any kinesthetic movement. BCI technology has primarily targeted patients with severe or complete motor dysfunction due to various neurological disorders and cardiovascular diseases. Among these target groups, patients with amyotrophic lateral sclerosis (ALS) have the potential to benefit most from BCI technology because they generally maintain unimpaired cognition even after complete loss of voluntary motor function. For the communication of ALS patients, EEG has been most widely used because of its portability, non-invasiveness, high temporal resolution, and a reasonable cost compared to other neuroimaging tools. Over the last couple of decades, EEG-based BCI systems have been developed with elaborately designed paradigms, with greatly promising practical applications. For example, steady-state visual evoked potential (SSVEP), event-related potential (ERP), and motor imagery (MI) are three major EEG-based BCI paradigms. In this talk, I will introduce our recent efforts to realize novel noninvasive BCIs that can be used in practical scenarios.