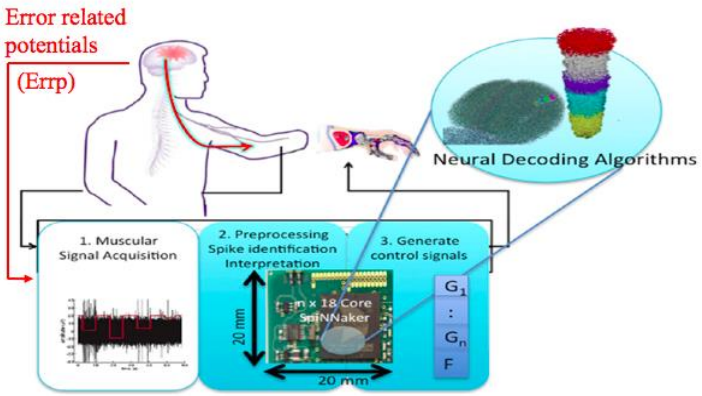
Hybrid Brain-Computer Interfaces for Intelligent Neuroprostheses

Abstract

A neuroprosthesis is a device that has an interface with the nervous system and supplements or substitutes functionality in the patient's body. Regarding the increasing consumer base of amputees, neuroprosthetic research has gained a momentum over the last decades. However, current neuroprostheses still present several limitations especially on the complexity of tasks that can be performed during movement recognition. Hybrid brain-computer interface based on the combination of electroencephalography (EEG) and the electromyography (EMG) signals could be a promising solution to improve existing prostheses. Our research project investigates the design of decoding algorithms to interpret EEG and EMG neuro-recorded signals. In a parallel investigation, we explore the implementation of those decoding algorithms on dedicated neuromorphic hardware which allows low-energy real-time processing to create portable closed-loop neuroprosthetic devices. This talk will introduce the concept of hybrid brain-computer interfaces (BCI) and neuromorphic computing. Moreover, an overview of our BCI research projects will be presented.



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Research Interests:

- Brain-computer interfaces
- Neuroprosthetics
- Neuromorphic computing
- Rehabilitation robotics