CoCo Seminar Series Spring 2021

How to Develop an Every-Day Brain-Computer Interface

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Wednesday March 10, 2021   11:00am-12:00pm
Online (Zoom meeting link available on
http://coco.binghamton.edu/)

This talk is about the challenges of using non-invasive EEG as a brain computer interface, as well as the possibilities. I'm going to present a specific modeling framework proposed by our lead scientist, Dr. Ali Yousefi, that maps multidimensional behavioral and neural signal onto an underlying dynamic unidimensional variable. Specifically, this framework assumes there is an underlying variable that reflects a cognitive state, such as one's level of attention, and that this variable will affect behavior. We can use behavioral variables (such as reaction time and accuracy) to build a decoding model of the cognitive state. With this model we can then build an encoder model to find neural features that correlate with this cognitive state. Once we have selected the relevant neural features, we can build and encoding-decoding model that can predict cognitive state and, by extension, behavior. We are going to be discussing applications for this model, as well as the additional considerations addressed in industry to turn academic research into a usable product.

Dr. Maria Virginia (Mavi) Ruiz-Blondet is the research engineer at Neurable, a brain-computer interface company, where she is in charge of running EEG experiments and processing EEG data. Previously she did her Master's in Biomedical Engineering and her Ph.D. in Cognitive and Brain Sciences at Binghamton University. Throughout this time, she specialized in brain biometrics, developing the first experimental protocol that allowed for 100% accurate identification of people based solely on their non-invasive EEG signals, under the guidance of Dr. Sarah Laszlo and Dr. Zhanpeng Jin. She additionally did research in the realm of perception and hallucinations under the guidance of Dr. Vladimir Miskovic. She also earned the certificate in Complex Systems, which has proven an invaluable toolkit in her research.

For more information, contact Hiroki Sayama (sayama@binghamton.edu).   http://coco.binghamton.edu/