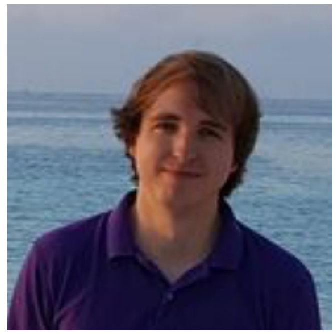
University of Houston - Biomedical Engineering Seminar
Friday, September 2, 2022, 12 noon
SEC 206

Transfer Learning Application and Selective Control of Somatosensory Brain Activity Using a Novel Peripheral Neural Interface



Bret See

Abstract

In the USA, approximately 185,000 people suffer from limb amputations every year, severely impacting patients' quality of life. Current prostheses available to amputees are limited to either passive devices or those controlled by EMG signals from remaining intact muscles. Use of these prostheses is limited by the lack of direct somatosensory feedback people depend on to perform even basic tasks. Visual feedback is often necessary, which imposes and heavy cognitive load on the user. Peripheral neural interfaces are an option for addressing this limitation, stimulating the residual nerve to provide naturalistic mechanoceptive and proprioceptive percepts that can be used by the patient to intuitively guide a prosthesis in a way more similar to that of an intact limb. To quantitatively validate the degree to which the electrically evoked percepts resemble naturally generated ones in an animal model, it is necessary to establish a ground truth by simultaneously recording from somatosensory regions in the brain, such as the Primary Somatosensory Cortex (S1) and the Ventral Posterolateral nuclei of the Thalamus. Use of transfer learning methodology can enable high accuracy classification of Local Field Potential (LFP) data associated with touch locations on the paw as part of a somatosensory neuroprosthesis pipeline.

Biosketch

Bret See is a Ph.D. candidate and research assistant at the University of Houston as a member of Dr. Joseph Francis's Lab. He received his Bachelor's degrees in Biochemistry, Economics, and Electrical Engineering from the University of Texas at Austin. Prior to pursuing graduate studies, he spent several years as a process engineer in the semiconductor industry working on leading edge chip fabrication technologies. His research interests are in cortical, thalamic, and peripheral neural interfaces for use in somatosensory neuroprosthesis.