

SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

Completing Cooperative Task by Utilizing Brain Computer Interface

MS Dissertation Defense

By

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Abstract: We sought to design a cooperative brain computer interface (BCI), wherein multiple users contribute brain activities that are decoded towards a common goal. We used a base design involving collections of electroencephalographic (EEG) brain activities from a low-cost consumer system (the Muse Headband), then classified the ensuing signals into different mental states as either relaxed or focused. The goal of the cooperative BCI was to have two subjects drive a cursor on the screen to some acceptance range given a prescribed path. Each subject is responsible for controlling either the direction or the displacement of the ball. EEG patterns for the respective mental states were recognized and investigated through power spectral density estimation techniques. For the classification of patterns, we deployed linear discriminant analysis and support vector machine techniques on the gamma and alpha band limited EEG power. Our design yielded an error rate of 10 percent and an information transfer rate of 1.5 bit/s, despite the noisy data and limited array of EEG electrodes. With sufficient training for each subject, the cursor was successfully driven to the acceptance range. Our results establish the feasibility of cooperative BCI using relatively modest hardware.

DATE: Friday, April 27, 2018
TIME: 11:00 am
PLACE: Green Hall. Room 0120

Research Advisor:
Dr. ShiNung Ching

This seminar is in partial fulfillment
of the Masters Degree