Feb 9th, 11:30 AM - 12:30 PM

Innovative Computing in Engineering and Medicine II

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11:30 AM – 12:30 PM (Room 1311)
Innovative Computing in Engineering and Medicine II
Chairs: Drs. Khan Iftekharuddin & Jiang Li,
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PTSD Patients Monitoring and Diagnosis Using Voice Features
By Andrew Le

Measuring stress levels as reflected in the voice signal has the potential for automatic diagnosis of mental related diseases such as posttraumatic stress disorder (PTSD). Past research has shown that several prominent features of speaking behavior and voice sound characteristics are closely related to the severity of patients' mental illness as well as the depression recovery time course. In this project, we propose to apply advanced feature extraction techniques and a recently developed machine learning algorithm, Random forest, to extract reliable and effective voice features for PTSD diagnosis and for emotion recognition.

Expansion of Mind-Controlled Robotic Arm Applications and Lab Demonstrations
By Benjamin McDermott

Brain-computer interfacing (BCI) is a technology that allows a human to control a computer by manipulating the electrical activity of his/her mind. Although this communication system has proven to be effective in numerous biomedical applications, many avenues have not been explored that could potentially increase its capabilities. This project focuses on elucidating practical applications for the physically disabled and novel lab demonstrations of core concepts through an attempt to merge BCI with Computer Vision, another research area that has also demonstrated enormous potential in various applications. By merging the two, a system with unique advantages can be realized that could possibly increase the versatility or efficiency of implementing BCI.

Statistical Characterization of EEG Event-Related Potentials after Single-Bit Amplitude Quantization
By George Micros

A brain-computer interface (BCI) is a device that allows severely disabled individuals to communicate and interact with their environments using brain activity. Event-related potentials (ERP) are a class of the most researched EEG signals for BCI communication. It has recently been shown that an ERP-based BCI is still highly effective following significantly reduced amplitude quantization of EEG signals, even to single-bit resolution. This research examines the statistical properties and relationships of the drastically simplified binary spatio-temporal EEG ERPs.