E9282 Jan 2:1

Neural Signal Processing

Instructor

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Teaching Assistant

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Department: EE

Course Time: Tue, Thu, 2-3:30 PM

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

This course introduces concepts related to processing of neural signals recorded using a variety of techniques. This is useful for anyone interested in systems and cognitive neuroscience. Topics include the following:

Biophysics and computational techniques for the analysis of action potentials, Local Field Potential (LFP), Electrocortico/encephalogram (ECoG/EEG) and functional Magnetic Resonance Imaging (fMRI). Techniques include stochastic processes, self organized criticality, time-frequency analysis, sparse signal processing, coherence, information theoretic methods, ICA/PCA, forward and inverse modeling, directed tranfer functions, Granger causality, image processing methods and reverse correlation.

Prerequisites

None

Syllabus

Biophysics and computational techniques for the analysis of action potentials, Local Field Potential (LFP), Electrocortico/encephalogram (ECoG/EEG) and functional Magnetic Resonance Imaging (fMRI). Techniques

include stochastic processes, self organized criticality, time-frequency analysis, sparse signal processing, coherence, information theoretic methods, ICA/PCA, forward and inverse modeling, directed tranfer functions, Granger causality, image processing methods and reverse correlation.

Course outcomes

Students are expected to be comfortable in using a variety of signal processing techniques on a wide variety of brain signals by the end of this course.

Grading policy

Exams, assignments, grant proposal writing, performance in journal reading sessions.

Assignments

Resources