The Lorry I. Lokey Interdisciplinary Center for Life Sciences and Engineering

NETWORK BIOLOGY RESEARCH LABORATORIES

Hidden Markov Models of neuronal network activity

Requirements:

044202 - Random signals

046326 - Introduction to biological signals and systems

Project require use of Matlab (or other programming languages if preferred)

Introduction:

Biological networks activity exhibits a rich dynamic which reflects the underlying biological structure and processes, which are for most part hidden from the experimenter. Hidden Markov Models (HMM) are a class of phenomenological statistical models used to describe the internal state of a system based upon external observation.

Project Description:

The project goal is to generate HMM for both spontaneous and stimulus evoked real neuronal network activity. These models might give us some un-biased insight into the behavior of biological neural networks.

Project Requirements:

- Understanding the theory behind HMMs.
- Implementation of the HMM algorithms with some programming language.
- Working with neural activity data:
- Adjusting the HMM for analysis of neural data, and applying it to different statistics, different experiment conditions.

Project Duration:

One semester, with an optional extension

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