University of California, Irvine
Statistics Seminar

Non-stationary High Dimensional Time Series Networks

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(Bldg. #314 on campus map)

We develop original statistical methodology on the evolving interdependencies between high-dimensional multivariate time series. Specifically, we introduce a data-driven method which detects change points in the network of a (very high dimensional) multivariate time series, with each component of the time series represented by a node in the network. The novel method allows for estimation of both the time of change in the network summary statistics without prior knowledge of the number or location of the change points. We also propose a new multiple change point algorithm that begins by segmenting the data into partitions and then looks for changes locally. We show the improvement of our method over classical binary segmentation methods. We apply these methods to various simulated high dimensional data sets as well as to a resting state functional magnetic resonance imaging (fMRI) data set from the from the Alzheimer's Disease Neuroimaging Initiative (ADNI) database. The method allows us to characterize the large scale resting state dynamic brain networks that are related to Alzheimer's disease.