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Title:

"Change points detection in high dimensional multivariate time series network"

Abstract:

Identifying change points in dynamic network structures has become increasingly popular across various domains, from neuroscience to telecommunication to finance. In this talk I will present two new change point detection methods. The first method presents each network snapshot of the data as a linear object and finds its respective univariate characterization via local and global network topological summaries. We adopt a change point detection method for (weakly) dependent time series based on efficient scores, and enhance the finite sample properties of the change point method by approximating the asymptotic distribution of the test statistic using the sieve bootstrap. The second method uses non-negative matrix factorization, an unsupervised dimension reduction technique, and a new binary search algorithm to identify multiple change points. We apply our methods to simulated and to resting-state and task-based functional magnetic resonance imaging (fMRI) data sets. For the resting-state data set, we examine the test-retest reliability of dynamic functional connectivity, while for the task-based data set, we explore network dynamics during the reading of /Harry Potter and the Sorcerer's Stone/ and whether change points across subjects coincide with key plot twists.