Fall 2015
Colloquium Series
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Candidate for Statistician at Statistical Consulting Laboratory (SCL)

Priyangi Bulathsinhala

Department of Statistics
Southern Methodist University

Spatial Integration of Functional Connectivity Methods in the Default Mode Network of the Brain

Functional Magnetic Resonance Imaging (fMRI) is a very popular and a powerful research component of brain studies in the field of neuroscience. The fMRI measures brain activity by detecting changes in bold flow. The ability to record brain signals non-invasively with minimal risk and cost is the reason for its popularity.

In the analysis of neuroimaging studies, functional connectivity is defined as the statistical dependencies among neurophysiological events. Initially, connectivity studies were more focused on highlighting the brain regions that are differentially involved in executing a specific task (task-related fMRI). However, there is also a great interest in resting state fMRI.

There are two common ways of assessing functional connectivity in resting state fMRI data: seed-based correlation (SCA) analysis and independent component analysis (ICA). A major component of the existing techniques is the need for voxel-based statistical testing of several thousands of voxels. We propose to use spatial statistical methods to group individual voxels into neighboring "blocks" in order to investigate whether the block averages, rather than individual voxel time courses, can enhance current functional connectivity analyses.