University of California, Irvine
Statistics Seminar

Tensor Response Regression and Neuroimaging Analysis

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(Bldg. #314 on campus map)

Classical regression models treat variables (predictor or response) as a vector and estimate a corresponding vector of regression coefficients. Modern applications in medical imaging generate variables of more complex form such as multidimensional arrays (tensors). Traditional statistical and computational methods are proving insufficient for analysis of those data due to their ultrahigh dimensionality as well as complex structure. In this talk, we propose a family of tensor response regression models that efficiently exploit the special structure of tensors. Under this framework, ultrahigh dimensionality is reduced to a manageable level, resulting in efficient estimation and prediction. Fast and highly scalable estimation algorithms are proposed, numerous forms of regularizations are studied, and asymptotic properties are obtained. Effectiveness of the new methods is demonstrated on real neuroimaging data analysis