SCMS & SDS Joint Seminar

JOIN STATISTICS SEMINAR OF SCMS AND SDS

WEIGHTED INVERSE REGRESSION ENSEMBLE FOR DIMENSION REDUCTION AND VARIABLE SELECTION

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Lecture

Time: 10:30-11:30, Thursday, Apr. 12, 2018

Venue: Zibin N201, Fudan University

Abstract: Based on the conditional characteristic function of the response given the predictors, we introduce weighted inverse regression ensemble (WIRE) as a novel sufficient dimension reduction and variable selection method in this paper. Unlike classical sufficient dimension reduction estimators and existing model-free variable selection procedures, WIRE is slicing free and is readily applicable in the case of multivariate response. Under the setting with fixed predictor dimensionality, the root-n consistency of the sample level WIRE estimator is established for dimension reduction. Furthermore, stepwise WIRE is proposed for model-free variable selection in a parallel fashion to the classical stepwise regression for the linear model. In the case of ultrahigh dimensionality, we propose the forward WIRE algorithm, which enjoys the model-free variable screening consistency when the predictor dimensionality p diverges at an exponential rate of the sample size n. The superior finite-sample performances of our proposals over existing methods are demonstrated through extensive simulation studies and the analysis of the Cancel Cell Encyclopedia data set.