Statistical Machine Learning Seminar

Hosted by Department of Mathematical Sciences

- Date: Tuesday, March 8, 2016
- Time: 12:00-1:00
- Room: WH-100E
- Speaker: Lin Yao (Mathematical Sciences)
- Title: RE: Sparse Regression Incorporating Graphical Structure among Predictors

Abstract

With the abundance of high dimensional data in various disciplines, sparse regularized techniques are very popular these days. In this paper, we make use of the structure information among predictors to improve sparse regression models. Typically, such structure information can be modeled by the connectivity of an undirected graph using all predictors as nodes of the graph. Most existing methods use this undirected graph edge-by-edge to encourage the regression coefficients of corresponding connected predictors to be similar. However, such methods do not directly utilize the neighborhood information of the graph. Furthermore, if there are more edges in the predictor graph, the corresponding regularization term will be more complicate. In this paper, we incorporate the graph information node-by-node, instead of edge-by-edge as used in most existing methods. Our proposed method is very general and it includes adaptive Lasso, group Lasso, and ridge regression as special cases. Both theoretical and numerical studies demonstrate the effectiveness of the proposed method for simultaneous estimation, prediction and model selection.

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