High-dimensional Statistics and Large-Scale Inference with Graphical Nonlinear Knockoffs

报 告 人: 李高荣
所属单位: 北京师范大学统计学院
报告时间: 2021 年 06 月 18 日（星期五） 14:00-15:00
报告地点: 应用优化研究所会议室（合肥学院南艳湖校区 53 栋 920）

摘要: This talk first introduces some high-dimensional statistics, then introduces the recent work about graphical nonlinear knockoffs. Power and reproducibility are key to enabling refined scientific discoveries in contemporary big data applications with general high-dimensional nonlinear models. In this article, we provide theoretical foundations on the power and robustness for the model-X knockoffs procedure introduced recently in Candès, Fan, Janson and Lv in high-dimensional setting when the covariate distribution is characterized by Gaussian with known covariate distribution in high-dimensional linear models is asymptotically one as sample size goes to infinity. When moving away from the ideal case, we suggest the modified model-X knockoffs method called graphical nonlinear knockoffs (RANK) to accommodate the unknown covariate distribution. We provide theoretical justifications on the robustness of our modified procedure by showing that the false discovery rate (FDR) is asymptotically controlled at the target level and the power is asymptotically one with the estimated covariate distribution. To the best of our knowledge, this is the first formal theoretical result on the power for the knockoffs procedure. Simulation results demonstrate that compared to existing approaches, our method performs competitively in both FDR control and power. A real dataset is analyzed to further assess the performance of the suggested knockoffs procedure.

简介: 李高荣，北京师范大学统计学院教授，博士生导师。全国工业统计学教学研究会常务理事、中国概率统计学会第十一届理事和中国工业互联网研究院技术专家委员会专家等。主要研究方向是非参数统计、高维统计、统计学习、纵向数据、测量误差数据和因果推断等。迄今为止，在 Annals of Statistics, Journal of the American Statistical Association, Statistics and Computing, Statistica Sinica，中国科学：数学，和统计研究等学术期刊上发表学术论文 90 余篇。在科学出版社出版专著《纵向数据半参数模型》和《现代测量误差模型》。主持国家自然科学基金、北京市自然科学基金和北京市教委科技计划面上项目等国家和省部级科研项目 10 余项。

主办单位：人工智能与大数据学院、应用优化研究所

联系人：吴自军 **联系电话：**13661166270