国家数学与交叉科学中心

学术报告

Time：8:30-10:30am，June 23, 2017

Venue：N219

报告 Ⅰ

Time：8:30-9:30am

Title：Big EHR Data: A Directed-Graph Network of Disease Comorbidity

Speaker：Hulin Wu

Dr. D.R. Seth Family Professor & Chair, Department of Biostatistics & Data Science, School of Public health

Professor, School of Biomedical Informatics, University of Texas Health Science Center at Houston

Abstract:

Based on two EHR Big Data sets with sample sizes n=10 and 50 million respectively, we derived different types of disease-disease networks using the longitudinal information. We establish both short-term and long-term directed networks as well as the simultaneously-occurring undirected network of 1660 PheWAS disease groups. Among 2,753,940 possible disease pairs, we identified 646,969 for long-term and 10,587 for short-term significant pairs, respectively, which were observed in at least five patients and had relative risk (RR) > 1 with significance at 0.05 level after Bonferroni corrections. Among 1,376,970 possible disease pairs of simultaneous occurrence, we identified 18,137 which were observed in at least five patients and had RR > 1 with significance at 0.05 level after Bonferroni corrections. For the short-term network, the top out-degree diseases are more likely pregnancy and kidney related diseases; while for the long-term network, the top out-degree diseases are more likely chronical diseases. More clinical implications from these findings will be discussed. This project requires multidisciplinary technologies, including medical record databases, ontology, high-performance computing, computational modeling, large-scale optimization, machine learning and statistics. I will also discuss how to form a multidisciplinary team to collaborate on a Big Data project, which has potential to have a high impact in many scientific fields and people's daily life.

报告 Ⅱ

Time：9:30-10:30am

Title：Path-following Algorithms for Optimization

Speaker：Yinyu Ye

The K.T. Li Chair Professor of Engineering at Department of Management Science

and Engineering and Institute of Computational and Mathematical Engineering, Stanford University.

The Director of the MS&E Industrial Affiliates Program.

Abstract:

We propose some path-following algorithms for unconstrained or simply-constrained optimization problems. We analyze their convergence rates under various Lipshitz conditions. We also explore the predictor and corrector method and its high-order extension.