The Chinese University of Hong Kong
Department of Statistics

Seminar

Testing Mediation Effects Using Logic of Boolean Matrices with Applications in Neuroimaging Mediation Analysis

By

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Abstract

A central question in high-dimensional mediation analysis is to infer the significance of individual mediators. The main challenge is that the total number of potential paths that go through any mediator is super-exponential in the number of mediators. Most existing mediation inference solutions either explicitly impose that the mediators are conditionally independent given the exposure, or ignore any potential directed paths among the mediators. In this talk, we present a new hypothesis testing procedure to evaluate individual mediation effects, while taking into account potential interactions among the mediators. Our key idea is to construct the test statistic using the logic of Boolean matrices, which enables us to establish the proper limiting distribution under the null hypothesis. We further employ screening, data splitting, and decorrelated estimation to reduce the bias and increase the power of the test. We show that our test can control both the size and false discovery rate asymptotically, and the power of the test approaches one, while allowing the number of mediators to diverge to infinity with the sample size. We illustrate our method with two applications in neuroimaging-based mediation analysis for Alzheimer's disease.

Date:	May 25, 2021 (Tuesday)
Time:	11:00 a.m. - 12:00 p.m.
Venue:	via Zoom
Meeting ID:	966 9370 0564
Passcode:	404096
Join Zoom Meeting:	

https://cuhk.zoom.us/j/96693700564?pwd=d1FBZnFtVk1rYTdmNExnZ21NZWQwdz09

ALL INTERESTED ARE WELCOME !!