



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

Latent Subgroup Analysis with Observational Data

By

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Abstract

When working with candidate subgroups defined by latent memberships, we must analyze the latent subgroups in a valid and computationally feasible way. The classical one-stage framework, which models the joint likelihood of all variables, may not be feasible with observational data when there are many potential confounders. The two-stage framework, which estimates the latent class model and performs subgroup analysis with estimated subgroup memberships, can accommodate potential confounders but may suffer from bias issues due to misclassification of latent subgroup memberships. In this paper, we investigate the maximum misclassification rate that a valid two-stage framework can tolerate in the presence of potential confounders and built on spectral clustering, propose a two-stage approach to achieve the desired misclassification rate and estimate and infer latent subgroup effects consistently with observational data in broad practical scenarios. The proposed method can accommodate high-dimensional potential confounders and leverage the potential blessing of large-scale item responses, which is computationally efficient and robust to the presence of noninformative item responses. We demonstrate the merit of the proposed method through simulation and real data analysis on the TIMSS dataset. Possible extensions of debiased methods and some related work are also discussed.

Date : 8 May 2025, Thursday

Time : 2:00pm

Venue : Room 2408 (Lifts 17-18)

All are Welcome!