國立中山大學應用數學系
學術演講

講　者：戴齊賢 教授 (國立成功大學統計與資料科學學系)

講　題：Fusing External Machine-Learning Information into Statistical Inference under Heterogeneity

時　間：2026/11/05（Thursday）14:10 ~ 15:00

地　點：理 SC4009-1 教室

茶　會：13:30

Abstract

Modern statistical practice increasingly requires combining a primary study with external information available as summary statistics from black-box machine-learning algorithms. We propose a fused generalized method of moments framework that incorporates such external information into primary study inference through auxiliary moment conditions, addressing the main challenge to data integration: heterogeneity in terms of concept and covariate shifts. The proposed integration framework yields valid inference for the target parameter in the primary study, without requiring estimation of the density ratio between the primary and external sources. To accommodate concept shift, we allow the outcome-generating mechanisms to differ across sources through an unknown subset of source-specific parameters, which we identify via a data-driven selection procedure. We establish consistency, asymptotic normality, a necessary and sufficient condition for an efficiency gain over the primary only estimator, variable selection consistency for concept shift, and valid asymptotic inference, all of which are obtained even when the primary working model is misspecified.

Simulation studies document good performance of proposed estimators and substantial efficiency improvements, even when working model is wrong. An application integrating the National Health and Nutrition Examination Survey with external information from the Behavioral Risk Factor Surveillance System illustrates the method in diabetes related associations.

敬 請 公 告！ 歡 迎 參 加！

應用數學系：http://math.nsysu.edu.tw

校園地圖：http://math.nsysu.edu.tw/var/file/183/1183/img/779/nsysu_math_map.jpg

交通資訊：https://www.nsysu.edu.tw/p/412-1000-4132.php?Lang=zh-tw

用數學系

校園地圖

交通資訊