

Indiana University-Purdue University Indianapolis

Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, December 05, 2023

Zoom Meeting: Meeting ID: 845 0989 4694

Speaker: Ran Mo

Department of Mathematical Sciences, IUPUI

Title: Nonparametric Outlier Resistant Conditional Average Treatment Effect Estimation with Sufficient Dimension Reduction

Abstract:

The project focuses on constructing an outlier-resistant estimator for the conditional average treatment effect (CATE) under the counterfactual framework by incorporating the idea of the M-estimator with the inverse propensity score weighting (IPW) method. Since estimating the propensity score with a parametric method subject to model misspecification, the Nadaraya Watson (NW) estimator with higher-order kernels is proposed as an alternative. We establish the asymptotic properties of the proposed estimator, while also recognizing its limitations in the presence of high-dimensional covariates. To address the curse of high dimensionality, the project further explores the integration of Sufficient Dimension Reduction (SDR) and NW-estimator in the estimating of CATE, particularly with the existence of outliers. We explored the necessary modification to the Minimum Average Variance Estimation (MAVE) method to estimate the SDR subspaces under the counterfactual framework and with the existence of outliers. Finally, we derive the asymptotic properties of our proposed estimator incorporating SDR and conduct an efficiency comparison across estimators with different SDR subspaces.