University of California, Irvine
Statistics Seminar

Causal Inference via Artificial Neural Networks: From Prediction to Causation

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Recent technological advances have created numerous large-scale datasets in observational studies, which provide unprecedented opportunities for evaluating the effectiveness of various treatments. Meanwhile, the complex nature of large-scale observational data poses great challenges to the existing conventional methods for causality analysis. In this talk, I will introduce a new unified approach that we have proposed for efficiently estimating and inferring causal effects using artificial neural networks. We develop a generalized optimization estimation through moment constraints with the nuisance functions approximated by artificial neural networks. This general optimization framework includes the average, quantile and asymmetric least squares treatment effects as special cases. The proposed methods take full advantage of the large sample size of large-scale data and provide effective protection against mis-specification bias while achieving dimensionality reduction. We also show that the resulting treatment effect estimators are supported by reliable statistical properties that are important for conducting causal inference.