THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

Statistics Colloquium

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"Inference and Decision-Making amid Social Interactions"

Monday February 12, 2024, at 11:30 AM
Jones 303, 5747 S. Ellis Avenue
Pre-Seminar refreshments will be served at 11:00 AM in Jones 303

Abstract

From social media trends to family dynamics, social interactions shape our daily lives. In this talk, I will present tools I have developed for statistical inference and decision-making in light of these social interactions.

(1) Inference: I will talk about estimation of causal effects in the presence of interference. In causal inference, the term "interference" refers to a situation where, due to interactions between units, the treatment assigned to one unit affects the observed outcomes of others. I will discuss large-sample asymptotics for treatment effect estimation under network interference where the interference graph is a random draw from a graphon. When targeting the direct effect, we show that popular estimators in our setting are considerably more accurate than existing results suggest. Meanwhile, when targeting the indirect effect, we propose a consistent estimator in a setting where no other consistent estimators are currently available.

(2) Decision-Making: Turning to reinforcement learning amid social interactions, I will focus on a problem inspired by a specific class of mobile health trials involving both target individuals and their care partners. These trials feature two types of interventions: those targeting individuals directly and those aimed at improving the relationship between the individual and their care partner. I will present an online reinforcement learning algorithm designed to personalize the delivery of these interventions. The algorithm's effectiveness is demonstrated through simulation studies conducted on a realistic test bed, which was constructed using data from a prior mobile health study. The proposed algorithm will be implemented in the ADAPTS HCT clinical trial, which seeks to improve medication adherence among adolescents undergoing allogeneic hematopoietic stem cell transplantation.

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