THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

Statistics Colloquium

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"From HeartSteps to HeartBeats: Personalized Decision-making"

FRIDAY, JANUARY 20, 2023, at 2:00 PM
Jones 303, 5747 S. Ellis Avenue

ABSTRACT

Ever-increasing access to data and computational power allows us to make decisions that are personalized to users by taking their behaviors and contexts into account. These developments are especially useful in domains like mobile health and medicine. For effective personalized decision-making, we need to revisit two fundamental tasks: (1) estimation and inference from data when there is no model for a decision's effect on a user and (2) simulations when there is a known model for a decision's effect on a user. Here we must overcome the difficulties facing classical approaches, namely statistical challenges due to adaptively collected data and computational bottlenecks caused by high-dimensional models.

This talk addresses both tasks in two parts. First, I provide a nearest-neighbor approach for unit-level statistical inference in sequential experiments. I also introduce a doubly robust variant of nearest neighbors that provides sharp error guarantees and helps measure a mobile app's effectiveness in promoting healthier lifestyle with limited data. For the second task, I introduce kernel thinning, a practical strategy that provides near-optimal distribution compression in near-linear time. This method yields significant computational savings when simulating models of cardiac functioning.

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