THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

Statistics Colloquium

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"When is it good to be a pessimist? Off-policy optimization in reinforcement learning"

MONDAY, May 16, 2022, at 4:30 PM
Jones 303, 5747 S. Ellis Avenue

ABSTRACT

Markov decision processes provide a classical model for sequential decision-making, in which past actions influence the future states of a dynamically evolving system. MDPs are widely used in practice, including for industrial process control, medical trials, robotics, wildfire management, competitive game-playing and portfolio optimization, among others.

In this talk, we discuss recent progress on the use of pessimism for off-policy optimization. In a statistical setting, one observes some form of data from an unknown model, and seeks to determine a policy that maximizes an expected sum of rewards over time. In the "off-policy" setting, the statistician has no control over the data collection process, but must do their best with the given dataset. For finite-stage decision problems, we present a pessimistic actor-critic estimator, and establish guarantees with a natural trade-off between the quality of the policy and its associated statistical uncertainty.

Joint work with Emma Brunskill (Stanford) and Andrea Zanette (UC Berkeley).

BIOGRAPHY: Martin Wainwright is currently the Howard Friesen Professor at the University of California at Berkeley, with a joint appointment between the Department of Statistics and the Department of EECS. His research interests include high-dimensional statistics, stochastic control and reinforcement learning, information theory, and optimization theory. Among other awards, he has received the COPSS Presidents' Award (2014) from the Joint Statistical Societies; the David Blackwell Lectureship (2017) and Medallion Lectureship (2013) from the Institute of Mathematical Statistics; and Best Paper awards from the IEEE Signal Processing Society and IEEE Information Theory Society. He was a Section Lecturer at the International Congress of Mathematicians in 2014.

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