February 12, 2025

2:00 PM TO 2:50 PM

Babbio Center 219

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All Stevens students, faculty, staff, alumni and invited guests

ADD TO CALENDAR

Boosting Power System Operation Economics via Closed-Loop Predict-and-Optimize

Department of Electrical and Computer Engineering

Location: Babbio 219

Speaker: Xianbang Chen, Postdoctoral Fellow, Electric Power and Energy Systems Laboratory at the Stevens Institute of Technology

ABSTRACT

Most power system operation tasks follow an open-loop predict-then-optimize (OPO) approach: uncertain parameters (e.g., variable energy resources) are first predicted as accurately as possible, and these predictions are then input into an optimization model to establish the operation plan. The ultimate goal is to improve overall economics: minimizing operation costs or maximizing operation revenue. However, the prediction phase in the OPO approach focuses solely on immediate predictive accuracy without considering how predictions impact downstream operation tasks, which can potentially worsen final operational economics. To address this, we propose a closed-loop predict-and-optimize (CPO) framework that feeds operation economics back into the learning process, resulting in a cost-oriented prediction model rather than one focused on accuracy. Our experiments indicate that using this cost-oriented prediction model can enhance the economics of power system operations.

BIOGRAPHY

Xianbang Chen is a postdoctoral fellow at the Electric Power and Energy Systems Laboratory at the Stevens Institute of Technology. He received his B.S. and M.S. in Electrical Engineering from Sichuan University in 2017 and 2020, respectively, and completed his Ph.D. in Electrical Engineering at the Stevens Institute of Technology in 2024. His research focuses on improving the operational efficiency of modern power systems through the integration of hybrid optimization and learning methodologies.

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