Mo LIU

PhD Candidate | Department of Industrial Engineering and Operations Research
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EDUCATION

Department of Industrial Engineering and Operations Research, UC Berkeley, CA Aug 2019 - Present
PhD Candidate, Major in Industrial Engineering and Operations Research, GPA: 3.976
Master of Science in Industrial Engineering and Operations Research July 2020
Advisor: Prof. Zuo-Jun (Max) Shen

Department of Industrial Engineering, Tsinghua University, Beijing, China Aug 2015 - Jul 2019
Bachelor of Engineering with Honor, Major in Industrial Engineering, GPA: Top 2%

RESEARCH INTERESTS

I am interested in decision-based learning: settings where a machine learning model is built to make decisions in the downstream optimization problem. In this setting, the prediction models are evaluated by the cost of the downstream problem, instead of the prediction errors. Particularly, I am interested in the setting where the labels of the samples are expensive to acquire, requiring us to smartly select samples by exploiting the structure of the downstream problem.

- In methodologies, I am interested in statistical learning, active learning, and predict-then-optimize.
- In applications, I am interested in revenue management, pricing, and supply chain management.

RESEARCH

[1] **Mo Liu**, Junyu Cao, Zuo-Jun Max Shen, "Pricing under the Generalized Markov Chain Choice Model: Learning through Large-scale Click Behaviors", ***Operations Research***, Under Review, 2023

[2] **Mo Liu**, Paul Grigas, Heyuan Liu, Zuo-Jun Shen, "Active Learning in the Predict-then-Optimize Framework: A Margin-Based Approach", ***Management Science***, Under Review, 2023

[3] **Mo Liu**, Junyu Cao, Zuo-Jun Max Shen, "Active Label Acquisition with Personalized Incentives in Assortment Optimization", ***Management Science***, Under Review, 2023

[4] **Mo Liu**, Meng Qi, Zuo-Jun Shen, "End-to-End Deep Learning for Automatic Inventory Management with Fixed Ordering Cost", ***Production and Operations Management***, Under Review, 2022

[5] **Mo Liu**, Paul Grigas, Zuo-Jun Max Shen, "Importance Weighted Active Learning in the Predict-then-Optimize Framework", *working paper*

INDUSTRY EXPERIENCES

IBM, AI for transportation, Yorktown Heights, NY
Research Intern, Manager: Markus Ettl May 2022 - Aug 2022

- Design the pricing strategy for the tickets of different seats in the logistic network.
- Develop the demand function of customers in a time-series framework.
- Optimizing the prices based on the demand model in a time-series framework.
- Verify the proposed methods using airline booking data.

Amazon, Department of Supply Chain Optimization Technology, Seattle, WA, (Virtual)
Research Scientist Intern June 2020 - Aug 2020

- Developed the pricing strategy for used items sold at Amazon Warehouse
- Adopted multinomial choice models and fit the demand function for different conditions of each item, assuming the common price elasticity across items within each group
- Predicted the new arrival rate of used items with different conditions
- Formulated the problem as a Markov Decision Process, and solve it by dynamic programming
- Compared the new strategy with the benchmarks and estimate the improvement

TEACHING EXPERIENCES

Graduate Student Instructor (Latest Teaching Score 6.56 / 7)

IEOR 250 Introduction to Production Planning and Logistics Models, Instructor: Prof. Robert Leachman Fall, 2020

IEOR 142 Introduction to Machine Learning and Data Analytics, Instructor: Prof. Paul Grigas Spring, 2021

IEOR 240 Optimization Analytics. 2022 Fall, Instructor: Prof. Ilan Adler Fall, 2022

IEOR 242 Introduction to Machine Learning and Data Analytics, Instructor: Prof. Paul Grigas Spring, 2023

SELECTED TALKS

INFORMS Annual Meeting, End-to-End Deep Learning for the Inventory Management with Fixed Ordering Cost 2020

INFORMS Annual Meeting, Pricing under the Generalized Markov Chain Choice Model: Learning through Large-scale Click Behaviors 2022

MSOM Conference, Personalized Incentive for Active Label Acquisition in the Assortment Optimization 2023

ICSP, Active Learning in the Predict-then-Optimize Framework: A Margin-Based Approach 2023

PATENT IN APPLICATION

MACHINE LEARNING AND OPTIMIZATION WITH PARTIALLY OBSERVABLE TIME SERIES DATA

Zachary Xue, **Mo Liu**, Markus Ettl, Shivaram Subramanian

HONORS AND AWARDS

Duryea Fellows, IEOR department, UC Berkeley 2021

First Year Fellowship, IEOR department, UC Berkeley 2019

Outstanding Graduate in Beijing (top 1%) 2019

Excellent Graduate in Tsinghua University (top 5%) 2019

Outstanding Undergraduate Thesis Award in Tsinghua University 2019

National Scholarship in China (top 1%) 2018

Principal Jiang Nanxiang Scholarship (top 1%) 2017

SKILLS

Programming Languages & Software

- Python, R, JAVA, HTML, Cplex, Gurobi, MySQL, Latex