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.

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

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

INVITED 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

RESEARCH

[1] End-to-End Deep Learning for Automatic Inventory Management with Fixed Ordering Cost

***Mo Liu**, Meng Qi, Zuo-jun Max Shen*.

[2] Pricing under the Generalized Markov Chain Choice Model: Learning through Large-scale Click Behaviors.

***Mo Liu**, Junyu Cao, Zuo-jun Max Shen*.

[3] Active Learning in the Predict-then-Optimize Framework

***Mo Liu**, Paul Grigas, Heyuan Liu, Zuo-jun Max Shen*.

[4] Personalized Incentive for Active Label Acquisition in the Assortment Optimization and Product Design

***Mo Liu**, Junyu Cao, Zuo-jun Max Shen*.

[5] Importance weighted active learning in the newsvendor problem.

***Mo Liu**, Paul Grigas, Zuo-jun Max Shen*.

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 (highest scholarship for juniors in Tsinghua, top 1%)	2017

SKILLS

Programming Languages & Software

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