Mo LIU

PhD Candidate | Department of Industrial Engineering and Operations Research

1117 Etcheverry Hall, University of California, Berkeley, CA

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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

My research interest includes *data-driven decision making* and *machine learning*. Specifically, I am interested in *decision-focused 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.

- In methodologies, I am interested in statistical learning, active learning, and predict-then-optimize approach.
- 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", under review at **Operations Research**, 2023

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

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

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

ACTIVITIES AND SERVICES

- ➢ Reviewer for *Production and Operations Management*
- ➢ Session chair of INFORMS annual meeting 2023

SKILLS

Programming Languages & Software

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

REFERENCES

- Prof. Zuo-Jun Max Shen

  Professor Emeritus at Industrial Engineering and Operations Research

  University of California, Berkeley

  Vice-President and Pro-Vice-Chancellor at Hong Kong University

  Email: maxshen@berkeley.edu

- Prof. Paul Grigas

  Assistant Professor

  Industrial Engineering and Operations Research

  University of California, Berkeley

  Email: pgrigas@berkeley.edu

- Prof. Junyu Cao

  Assistant Professor

  Department of Information, Risk, and Operations Management (Decision Science)

  McCombs School of Business, University of Texas at Austin

  Email: junyu.cao@mccombs.utexas.edu