JINGWEN TANG

Ph.D. Candidate
Department of Industrial and Operations Engineering, University of Michigan
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EDUCATION

University of Michigan, Ann Arbor, MI, USA *August 2019 - Present*
Ph.D. in Industrial and Operations Engineering (GPA: 4.0/4.0) *(Expected April 2024)*
Advisor: Professor Cong Shi
Joint Ph.D. in Scientific Computing *May 2021 - Present*

Tsinghua University, Beijing, China *July 2015 - June 2019*
B.S. in Industrial Engineering

University of California, Davis, CA, USA *Sep 2017 - Dec 2017*
Study in Statistics
UC Education Abroad Program (UCEAP) Reciprocity Student

RESEARCH INTEREST

Methodologies: Online Learning Algorithms, Machine Learning, Approximation Algorithms
Applications: Supply Chain Management, Revenue Management, Service Operations

JOURNAL PUBLICATIONS

1. "Online Learning for Dual Index Policies in Dual Sourcing Systems",
Jingwen Tang, Boxiao (Beryl) Chen, Cong Shi, ***Manufacturing and Service Operations Management***, accepted for publication.
Winner of University of Michigan IOE Richard C. Wilson Prize for Best Student Paper.

   Outline: We propose a two-layer nonparametric learning algorithm to approximate the optimal dual-index policy for the dual-sourcing inventory system with backlogged demand. The algorithm admits an optimal regret bound and integrates stochastic bandits, sample average approximation techniques, and simulation-based methods in a seamless and non-trivial fashion.

PAPERS UNDER REVIEW/WORKING PAPERS

1. "Offline Feature-Based Pricing under Censored Demand: A Causal Inference Approach",
Jingwen Tang, Zhengling Qi, Ethan (Xingyuan) Fang, Cong Shi, under review at ***Operations Research***.

   Outline: We study a feature-based pricing problem with demand censoring in an offline data-driven setting. Through the lens of causal inference, we propose a novel data-driven algorithm that is motivated by survival analysis and doubly robust estimation. We quantify the theoretical regret and also demonstrate the efficacy of this proposed approach in large-scale numerical experiments.

2. "Remunerating Newsvendor Problem in a Two-Sided Market",
Jingwen Tang, Cong Shi, Izak Duenyas, under review at ***Operations Research***.

   Outline: We introduce a new model, the "remunerating newsvendor" problem, which extends the classical price-setting newsvendor problem to incorporate remuneration decisions in two-sided markets. We propose a new algorithm called Bandit Bisection Search (BBS) to solve the incomplete information problem for which matching upper and lower regret bounds are established.

3. "Online Learning and Matching for Multiproduct Inventory Systems with General Upgrading", **Jingwen Tang**, Cong Shi, Izak Duenyas, under review at ***Production and Operations Management***.

   Outline: We first characterize the structure of the clairvoyant optimal joint ordering and allocation policy in a multiproduct system with general upgrading with full information. We then solve the problem with demand learning via a novel online learning algorithm termed stochastic gradient descent with a perturbed gradient (SGD-PG) approach that achieves an optimal regret bound.

4. "Multi-product Pricing under the Multinomial Logit model with Vanishing Choices", **Jingwen Tang**, Cong Shi, Yuqian Xu, to be submitted with draft available.

   Outline: We study a multiproduct dynamic pricing problem in continuous time under capacity constraints with a vanishing choice set, using the MNL model with heterogeneous parameters to model the customer choice. We propose an asymptotic optimal heuristic with a $\sqrt{\theta}$ upper bound for the expected revenue discrepancy when the size of the problem scales proportionally to θ.

5. "Fairness in Inventory Control", **Jingwen Tang**, Boxiao (Beryl) Chen, Cong Shi, to be submitted with draft available.

   Outline: We tackle the multi-location inventory control problem from a centralized perspective without prior knowledge of demand distributions accounting for service rate fairness. We propose an online learning algorithm that effectively maintains fairness levels with high probability and achieves a tight regret bound with censored demand.

CONFERENCE PRESENTATIONS

1. Online Learning for Dual Index Policies in Dual Sourcing Systems, Jingwen Tang, Boxiao (Beryl) Chen, Cong Shi, presented at INFORMS 2022 (Indianapolis, IN).
2. Online Learning for Dual Index Policies in Dual Sourcing Systems, Jingwen Tang, Boxiao (Beryl) Chen, Cong Shi, presented at Amazon Modeling and Optimization (MOP) Lunch and Learn Seminar.
3. Offline Feature-Based Pricing under Censored Demand: A Causal Inference Approach, Jingwen Tang, Zhengling Qi, Ethan (Xingyuan) Fang, Cong Shi, presented at 2023 Purdue Operations Conference.

INDUSTRY EXPERIENCE

Amazon May 2023 - Aug 2023
Research Scientist Intern, MOP (Modeling and Optimization), Bellevue, WA, USA

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Research Scientist Intern, MOP (Modeling and Optimization), Bellevue, WA, USA

HONORS AND AWARDS

University of Michigan IOE Richard C. Wilson Prize for Best Student Paper *2023*
Rackham Travel Grant by University of Michigan *2022, 2023*
Graduate Fellowship by Industrial and Operations Engineering at University of Michigan *2019*
Technology Innovation Award by Tsinghua University *2018*
Meritorious Winner of 2018 MCM/ICM as team leader *2018*
CSC Scholarships by China Scholarship Council *2017*
Star Student of Winter Time Social Practice Program *2016*
Guanghua Scholarships by Tsinghua University *2016*
Academic Excellence Reward by Tsinghua University *2016*
Social Practice Excellence Reward by Tsinghua University *2016*

First Prize in the 30^{th} National Mathematical Olympiad in Jiangsu Province *2015*
First Prize in the 32^{nd} Chinese Physics Olympiad in Jiangsu Province *2015*

TEACHING/MENTORING

Graduate Student Instructor, University of Michigan

- IOE516: Stochastic Processes II *Winter 2022, 2023*
  - Instructor: Prof. Cong Shi
  - Responsibilities: weekly office hours, homework grading
- IOE541: Optimization Methods in Supply Chain *Fall 2022*
  - Instructor: Prof. Cong Shi
  - Responsibilities: weekly office hours, homework grading
- IOE611/MATH633: Nonlinear Programming *Fall 2021*
  - Instructor: Prof. Salar Fattahi
  - Responsibilities: weekly office hours, homework grading
- IOE 511/Math 562: Continuous Optimization Methods *Winter 2021*
  - Instructor: Prof. Albert S. Berahas
  - Responsibilities: weekly office hours, homework grading

IOE Ph.D. Mentor Program, University of Michigan

- Geyu Liang, IOE PhD Student *2021 - 2022*
  - Responsibilities: answering questions, assistance in going through the program

SERVICES AND PROFESSIONAL ACTIVITIES

- Reviewer for *Operations Research*, *Production and Operations Management*, *Operations Research Letters*
- Graduate Student Coordinator, Department of Industrial and Operations Engineering, University of Michigan July 2021 - July 2023
  - Responsibilities: Graduate Student Orientation, Recruitment Weekend, Graduate Student Mentoring Guide, Graduate Banquet, Office Assignments, Grad Picnic
- Member of the Student Leadership Board, Department of Industrial and Operations Engineering, University of Michigan July 2021 - July 2023
  - Responsibilities: Student Leadership Board Meetings

TECHNICAL STRENGTHS

Programming Languages: C, C++, Java, Python, Matlab, R, SAS, SQL
Packages: CPLEX, Gurobi, OpenMP, MPI, CUDA