Zixiao Wang

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Education

The Chinese University of Hong Kong, Shenzhen **Sep. 2020 – May 2024**
*BBA in Financial Engineering, with **First Class Honor*** *Shenzhen, Guangdong, China*

- **GPA**: 3.70/4.00; **Major GPA**: 3.82/4.00
- **Related Coursework**: Calculus, Mathematical Analysis, Optimization, Advanced Linear Algebra, Numerical Methods, Machine Learning, Design and Analysis of Algorithms (**A** range for all the courses listed)

University of California, Berkeley **Jan. 2023 – May 2023**
Visiting *Berkeley, CA, United States*

- **GPA**: 4.00/4.00
- **Coursework**: Discrete Mathematics ($\mathbf{A}^+$), Computer Architecture (**A**), Computer Security (**A**)

Research Interests

- Operation Management
- Machine Learning
- Data-Driven Decision Making

Publication & Preprints

- **Zixiao Wang** and Jicong Fan. *Graph classification via reference distribution learning: Theory and practice.* In Neural Information Processing Systems (**NeurIPS**), 2024. [PDF]
- **Zixiao Wang**, Dong Qiao, Jicong Fan. *Spectral Clustering for Discrete Distributions.* (under review) [PDF]

Working Paper

- Zixiao Wang, Zizhuo Wang. *Dynamic Pricing Competition under Product Differentiation with Posterior Price Matching.* [Writing Sample]

Research Experience

Omnichannel Assortment Optimization under Markovian Channel Switch **Oct. 2024 – Present**
Independent

- Many firms operate multiple selling channels. If customers are not satisfied with one channel, they may switch to another. We explore how firms can utilize customers' channel-switching behavior to optimize their assortment decision in each channel. Current progress includes:
  - Built a model where consumers choose products in each channel according to a multinomial logit (MNL) choice model and switch between channels following a Markov Chain.
  - Analyzed the case where customers' switching behavior follows a directed acyclic graph (DAG). Showed that there exists a revenue-ordered optimal assortment in each channel.
  - Proposed a fully polynomial time greedy algorithm to solve the assortment optimization problem in DAG case.

Dynamic Pricing Competition with Posterior Price Matching **May 2024 – Present**
Advisor: Prof. Zizhuo Wang

- Posterior price matching (PM) policies are widely adopted by retailers to mitigate consumers' waiting behavior. We explore the posterior PM policies under a duopoly competition model and analyze how these policies affect firms' revenue. Current progress includes:
  - Built a duopoly dynamic pricing competition model in which firms offering products with different quality dynamically adjust their prices in each period to maximize their discounted revenue, and heterogeneous consumers strategically choose their purchasing time to maximize utility.
  - Proved the existence and uniqueness of the subgame-perfect Nash Equilibrium of the dynamic pricing game under all price matching decisions.

- Showed that an asymmetric equilibrium in the PM decision game can emerge, in which only the firm offering the high-quality product chooses to implement PM if firms are more forward-looking than customers but not excessively so.
- Conducted numerical experiments to further validate our theoretical findings.

Graph Classification via Reference Distribution Learning **Sep. 2023 – Feb. 2024**

Advisor: Prof. Jicong Fan

- Proposed an efficient and effective graph classification method which preserved graphs' structural information in a novel way.
- Conducted extensive experiments on moderate-scale and large-scale graph datasets, which showed that our methods significantly increase classification performance comparing to existing methods.
- Provided theoretical analysis of the generalization error bound of our proposed model based on statistical learning theory, which offered valuable insights into how the generalization ability scales with the properties of the graph data and neural network structure.

Spectral Clustering for Discrete Distribution **Feb. 2023 – Jun. 2023**

Advisor: Prof. Jicong Fan

- Proposed a simple yet effective framework based on spectral clustering and optimal transport metrics for discrete distribution clustering.
- Evaluated the effect of sample complexity and provided theoretical guarantees for the consistency and correctness of clustering for the proposed methods.
- Conducted extensive experiments on synthetic and real data, which showed that our methods significantly increase clustering performance comparing to existing methods.

Honors and Awards

Graduate with First Class Honor Jul. 2024

Dean's List (honor for academic excellence) 2020 – 2024

Bowen Scholarship (award for academic excellence) 2020 – 2024

Skills

Programming Languages: Python (Proficient), C/C++, MATLAB, Shell, Go, MySQL, R, Git, LaTeX, STATA
Language: Mandarin (Native), English