Ruijiang Gao

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EDUCATION

- PhD in Information, Risk and Operation Management, University of Texas at Austin 2018 - 2024(Expected)
- Master of Statistics, University of Michigan 2016-2018
- B.S. Statistics (School of the Gifted Young), University of Science and Technology of China 2012-2016

SELECTED PUBLICATIONS[1] (MANUSCIPTS WILL BE SHARED UPON REQUEST)

1. Ruijiang Gao, Maytal Saar-Tsechansky, Maria De-Arteaga, Ligong Han, Min Kyung Lee, Wei Sun, and Matthew Lease. Robust human-ai collaboration with bandit feedback: Personalization, deficient support and covariate shifting. To be submitted. Preliminary version accepted at CIST, ***Best Student Paper***, 2022
2. Ruijiang Gao and Himabindu Lakkaraju. Long-term effect of algorithmic recourse on social segregation. Under Review, 2022
3. Zhendong Wang*, Ruijiang Gao*, Mingzhang Yin*, Mingyuan Zhou, and David M Blei. Probabilistic conformal prediction using conditional random samples. *arXiv preprint arXiv:2206.06584, ICML DFUQ Splotlight presentation*, 2022
4. Ruijiang Gao, Max Biggs, Wei Sun, and Ligong Han. Enhancing Counterfactual Classification via Self-Training. *arXiv preprint arXiv:2112.04461, Proceedings of the AAAI Conference on Artificial Intelligence*, 2022
5. Max Biggs*, Ruijiang Gao*, and Wei Sun*. Loss Functions for Discrete Contextual Pricing with Observational Data. *arXiv preprint arXiv:2111.09933, Under review, INFORMS RMP Splotlight presentation, ADA Special Recognition Award Finalist*, 2022
6. Ruijiang Gao, Maytal Saar-Tsechansky, Maria De-Arteaga, Ligong Han, Min Kyung Lee, and Matthew Lease. Human-AI Collaboration with Bandit Feedback. *IJCAI*, 2021
7. Ruijiang Gao and Maytal Saar-Tsechansky. Cost-Accuracy Aware Adaptive Labeling for Active Learning. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 34, pages 2569–2576, 2020
8. Ligong Han, Ruijiang Gao, Mun Kim, Xin Tao, Bo Liu, and Dimitris N Metaxas. Robust Conditional GAN from Uncertainty-Aware Pairwise Comparisons. In *AAAI*, pages 10909–10916, 2020
9. Ligong Han, Yang Zou, Ruijiang Gao, Lezi Wang, and Dimitris Metaxas. Unsupervised Domain Adaptation via Calibrating Uncertainties. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops*, pages 99–102, 2019
10. Ligong Han, Martin Renqiang Min, Anastasis Stathopoulos, Yu Tian, Ruijiang Gao, Asim Kadav, and Dimitris N Metaxas. Dual projection generative adversarial networks for conditional image generation. In *Proceedings of the IEEE/CVF International Conference on Computer Vision*, pages 14438–14447, 2021
11. Ruijiang Gao and Han Feng. Identifying Best Fair Intervention. *arXiv preprint arXiv:2111.04272*, 2021
12. Ruijiang Gao and Maytal Saar-Tsechansky. Active incentive learning. To be submitted, Preliminary version Accepted at CIST, 2022

PROFESSIONAL EXPERIENCE

- **Harvard Business School: Visiting Researcher** Boston, 2022/05-2022/08
  - Studied long-term effect of algorithmic recourse algorithms.
  - Showed theoretically and empirically existing counterfactual explanantion methods may lead to increase in social segregation.
  - Proposed balanced recourse algorithms based on implicit and explicit conditional generative models to reduce social segregation while still providing realistic recourses.
- **IBM: Research Internship** Yorktown Heights, 2021/06-2021/08
  - Developed Human-AI algorithms considering human overriding behaviors.
  - Bridged gap between causal inference, learning from supervision theoretically.
  - Proposed new minimum variance estimators for contextual / personalized pricing.
- **IBM: Research Internship** Yorktown Heights, 2020/06-2020/08
  - Developed novel algorithm based on self-training for counterfactual inference given only observational data for applications like pricing, precision medicine and ads placement.

[1] *: Equal Contribution

- Used theoretical analysis to demonstrate how self-training helps counterfactual learning.
- Showed state-of-the-art performance on synthetic and real datasets.
- Applied domain knowledge like monotonicity to further improve our algorithm.

- **Tencent: Data Scientist Internship** Shenzhen, 2018/04-2018/07
  - Worked at Tencent Social Network Group using machine learning algorithms to learn better about customers.
  - Built retention models for Tencent ESports users.
  - Used emoji and bullet screen to cluster short videos for auto-tagging.
- **Amazon: Business Intelligence Internship** Seattle, 2017/06-2017/09
  - Worked at Amazon Prime BI team using machine learning algorithms to learn better about customers.
  - Used Gaussian Mixture Model to study customers' behaviors and clustered customers into hierarchical structures.
- **University of Texas at Austin: Research Assistant (Selected Projects)** Austin, 2018/09-Present
  - **Human-AI Collaboration with Bandit Feedback**
    - Propose and develop a solution for a novel human-machine collaboration problem in a bandit feedback setting.
    - Extend our approach to settings with multiple human decision makers.
    - Demonstrate the effectiveness of our proposed methods using both synthetic and real human responses.
  - **Identifying Best Fair Intervention**
    - Define a counterfactual fairness on revenue with respect to a binary sensitive attribute.
    - Find the best (soft) intervention in a given causal graph meeting the fairness constraint required.
    - Theoretically prove the exponential decrease rate of probability of error.
    - Empirically examined the effectiveness of proposed method using synthetic and real datasets.
  - **Active Incentive Learning**
    - Select payment for active learning in crowdsourcing platform to improve auxiliary model performance under a budget constraint.
    - Use expected error reduction to estimate payment's effect on generalization error using loss correction from learning from noisy supervision literatures.
    - Propose a novel payment utility estimation method to calibrate biased estimation in existing method.

FELLOWSHIP AND AWARDS

- Best Student Paper Award Nomination at CIST 2022
- INFORMS ADA PhD Incubator Special Recognition Award Finalist 2022
- UT Austin Graduate School Continuing Fellowship 2022
- UT Austin Graduate School (OGS) Professional Development Award 2020
- UT Austin Good Systems Student Conference Grant 2020
- UT Austin Graduate School (OGS) Provost Fellowship 2018
- UT Austin Graduate School (OGS) Decentralized College Recruitment Fellowship 2018
- Outstanding Applied Masters Student. 2017

TEACHING EXPERIENCE

- Instructor for INFORMATION TECHNOLOGY MANAGEMENT. Spring 2022
- Teaching Assistant for INTRODUCTION TO DATA SCIENCE. Fall 2020, Spring 2021
- Teaching Assistant for DATABASE MANAGEMENT. Spring, 2020
- Teaching Assistant for PREDICTIVE ANALYSIS AND DATA MINING. Spring, 2019
- Teaching Assistant for STRATEGIC INFORMATION TECHNOLOGY MANAGEMENT. Fall, 2018
- Teaching Assistant for STRATEGIES FOR NETWORKED ECONOMY. Fall, 2018