KERAN CHEN

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EDUCATION

University of Wisconsin, Madison *Madison, U.S*
Ph.D. in Statistics and Computer Science (Advisor: Kirthevasan Kandasamy) *2022 - 2026*

University of Science and Technology of China *Hefei, China*
B.Sc. in Statistics, School of the Gifted Young *2018 - 2022*

RESEARCH INTERESTS

My research interests span the intersection of machine learning, differential privacy, and mechanism design. I am particularly focused on data pricing and the development of mechanisms and marketplaces for data sharing that encourage truthful data contributions.

PUBLICATIONS AND PREPRINTS

[1] Learning to Price Homogeneous Data
Keran Chen, Joon suk Huh, Kirthevasan Kandasamy. **NeurIPS 2024**.

[2] Gene regulatory network inference using single-cell multiome ATAC-seq and RNA-seq data
Yuge Wang, **Keran Chen**, Ting Cai, Hongyu Zhao. **American Society of Human Genetics, 2022**.

RESEARCH EXPERIENCES

Learning to Price Homogeneous Data
Department of Computer Science, University of Wiscosin, Madison *Jul.2023 - May.2024*

- We studied an online data pricing problem where a seller wants to sell a set of homogeneous data points to a sequence of buyers over T rounds to achieve high revenue. In each round, the seller chooses an anonymous pricing curve, then a new buyer appears and may choose to purchase a certain amount of data that maximizes her own utility.
- Developed novel discretization schemes to approximate the revenue-optimal data pricing in the offline version of this problem.
- Proposed algorithms for online learning problem in both the stochastic and adversarial settings and achieved sublinear regret.

Gene regulatory network inference with joint analysis of single cell ATAC-seq and RNA-seq
Department of Biostatistics, visiting student, Yale University *May.2021 - Jan.2022*

- Proposed a method for constructing a gene regulatory network (GRN) based on the expression levels of human transcription factors (TF) and open chromatin accessibility.
- Developed a new method for designing the TF binding score to represent the probability that a TF binds on open chromatin, then integrated this score into our prediction model. Results showed we improved the accuracy of GRN prediction.

PROJECTS

Reinforcement Learning with low rank structure

- Showed that when the behavior policy cannot cover all the state-actions pairs, the values of uncovered state-action pairs can still be approximated if the Markov Decision Process (MDP) has a low-rank structure.

- We provided error bounds for Offline Q-learning policy evaluation in infinite-sample setting, also conducted numerical experiments to further validate the practicality of the algorithm.

Multi-Modal Temperature Prediction

- Processed time-series sensor data (temperature, humidity, pressure) with spatial features from satellite using Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs). Combined these features through concatenation to capture spatial and temporal dependence.
- Implemented multi-task deep learning framework to forecast future temperature.

Exploring the generalizability of Vision Language Frontier Maps (VLFM) in real-world robotics conditions

- Built dynamic indoor environments to replicate real-world navigation conditions.
- Simulated robot vision using Chrono Sensor, enabling high-fidelity camera emulation with optical effects like lens flare, defocus flur, and distortion.
- Evaluated VLFM's performance in challenging conditions such as poor lighting, blur, and distorted optics.

AWARDS AND HONORS

Excellent Graduate, USTC *2022*
Rose Endeavor Scholarship, USTC (top 10% in School of the Gifted Young) *2021*
Chinese Mathematics Olympiad, Bronze *2017*

SKILLS

Python, PyTorch, R, SQL, C, Matlab