

Shuhan Zhang

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Education

The Chinese University of Hong Kong, Shenzhen, BS in Data Science Sept 2022 – May 2026

- GPA: 3.89/4.00 (Top 5%)
- Dean's List: 2022 - 2024 & AY 2022-2023 Academic Performance Scholarship
- Coursework: Mathematical Analysis, Stochastic Processes, Advanced Probability Theory

University of Pennsylvania, Visiting Student Jan 2025 – May 2025

- GPA: 3.90/4.00
- Coursework: Bayesian Data Analysis, Numerical Optimization, Game Theory

Research Interests

Human Preference Learning and Alignment, Cognitive Modeling, Reinforcement Learning, Interpretable and Trustworthy AI, Human AI Interaction

Publications

Logic-Logit: A Logic-Based Approach to Choice Modeling Jan 2025

Shuhan Zhang, Wendi Ren, Shuang Li

The Thirteenth International Conference on Learning Representations (ICLR 2025 Poster)

Deep Context-Dependent Choice Model June 2025

Shuhan Zhang, Zhi Wang, Rui Gao, Shuang Li

ICML 2025 Workshop on Models of Human Feedback for AI Alignment (MoFA Oral)

Research Experience

Topic: Distributional Reinforcement Learning *June 2025 – Present*

Advisor: Prof. Rui Gao, UT Austin & Prof. Shuang Li, CUHKSZ

- Investigating distributional reinforcement learning algorithms under Wasserstein geometry and entropy regularization, with applications continuous control tasks with high-dimensional action space.

Topic: Bridging Preference Learning and Recommendation System *Jan 2025 – May 2025*

Advisor: Prof. Damek Davis, University of Pennsylvania

- Explored the connection between discrete choice models and traditional recommendation algorithms (e.g., matrix completion), aiming to transform user choice data into formats amenable to recommendation techniques.

Topic: Edge-Enhanced Graph Neural Networks for Logistics Forecasting *Oct 2024 – July 2025*

Advisor: Shan Dai, Shenzhen Research Institute of Big Data

- Developed an **edge-enhanced GNN** for spatio-temporal demand forecasting with complex logistics shift schedule data, achieving superior accuracy and efficiency on real-world logistics and traffic datasets through structure-aware representation learning.

Topic: Context-Dependent Choice Modeling *Oct 2024 – May 2025*

Advisor: Prof. Rui Gao, UT Austin & Prof. Shuang Li, CUHKSZ

- Developed a **deep context-dependent choice model** using permutation-invariant neural architectures to capture dynamic interaction effects among alternatives.
- Bridged **context-dependent utility theory** and deep learning, supporting interpretable context-aware preference modeling.
- Demonstrated superior performance on synthetic and real-world datasets (e.g., Expedia, LPMC), capturing

phenomena such as compromise and substitution effects.

Topic: Interpretable Rule-Based Preference Learning

Mar 2024 – Feb 2025

Advisor: Prof. Shuang Li, CUHKSZ

- Proposed **Logic-Logit**, a rule-based discrete choice model that captures heterogeneous human preferences via interpretable OR-of-ANDs logic rules.
- Designed a **two-level optimization framework** combining Frank-Wolfe and column generation to efficiently search over exponentially large rule spaces.
- Achieved **state-of-the-art interpretability and accuracy** on synthetic, commercial (Expedia), and clinical (MIMIC-IV) datasets, revealing meaningful decision patterns in practice.

Work Experience

Topic: Machine Learning Models for Financial Fraud Detection

Mar 2024 – Feb 2025

Research Assistant Internship, Advisor: Shan Dai, Shenzhen Research Institute of Big Data

- Constructed financial factors from noisy, imbalanced datasets and performed predictive modeling with XGBoost; adopted PCMCI for causal interpretation of key indicators and detection of potential anomalies or manipulations.

Awards

Second National Prize in the China Undergraduate Mathematical Contest in Modeling

Oct 2024

- Utilized the Runge-Kutta method to perform numerical simulations, effectively solving path planning and collision detection challenges

AY 2022-2023 Academic Performance Scholarship

Dec 2023

- Received an academic excellence award for achieving a top GPA ranking among peers in the school of data science, recognizing outstanding performance in coursework and dedication to academic achievement