Taoyi(Jasper) Chen

7346047469 | Email | LinkedIn | Personal Website

EDUCATION

University of Michigan - Ann Arbor   **Aug 2024 - Jun 2026**
Master of Science in Quantitative Finance and Risk Management   *Ann Arbor, US*

University of Michigan - Ann Arbor   **Aug 2025 - Jun 2026**
Master of Science in Applied Statistics   *Ann Arbor, US*

Wuhan University   **Sep 2020 - Jun 2024**
Bachelor of Science in Mathematics& Bachelor of Arts in Finance   *Wuhan, China*

SKILLS & COURSEWORK

Mathematics: Linear Algebra, Calculus, Real Analysis, Dynamic Optimization, Numerical Analysis
Statistics: Statistics, Probability, Stochastic Process, Time Series Analysis, Statistical Learning
Programming: Data Structure, Algorithm, Machine Learning, Python (pandas, numpy, scikit-learn), R, MatLab
Finance: Microeconomics, Econometrics, Behavioral Economics, Investments, Corporate Finance

COURSE PROJECTS

High-dimensional factor analysis with network-linked data   University of Michigan-Ann Arbor
STATS 601: Advanced Statistical Learning   *March 2025 - May 2025*

- Implemented the proposed generalized factor analysis model that jointly captures latent structures in high-dimensional covariates and network connections, using both shared and individual latent factors.
- Developed and executed a two-step estimation procedure, including adjacency spectral embedding (ASE) for network-based factor extraction and EM-based factor analysis for residual structures.
- Reproduced theoretical results including asymptotic distributions of estimators and identifiability analysis under relaxed conditions enabled by network information.
- Implemented sequential hypothesis testing procedures (based on Tracy-Widom law) to consistently estimate the number of shared vs. individual latent factors.
- Conducted extensive Monte Carlo simulations to assess finite-sample performance under varying network densities, signal strengths, and latent dimensions.

RESEARCH EXPERIENCES & COMPETITION

Core Member, Research Group of Prof. Gongjun Xu   University of Michigan - Ann Arbor
Item Response Theory   *May 2025 - present*

- Developed a Variational Autoencoder (VAE) objective incorporating normalizing flows for binary IRT data, relaxing conventional distributional assumptions in IRT models.
- Implemented the VAE framework in PyTorch, designing stochastic neural networks (StoNet) with residual blocks and Gaussian noise injection for flexible latent modeling.
- Conducted large-scale training on the Great Lakes HPC cluster, leveraging multi-GPU parallelization to accelerate convergence for high-dimensional simulation studies.
- Performed extensive simulation experiments under varying distributions and latent dimensions, evaluating recovery quality using Trace Projection Score and Maximum Mean Discrepancy (MMD)

Research with Prof Bernadro Modenesi   University of Michigan - Ann Arbor, MIDAS
Inference-Based and Model-Agnostic Bias Detection Pipeline   *Oct 2024 - present*

- Developed a model-agnostic, threshold-free pipeline for testing individual fairness in machine learning models, integrating causal inference and ensemble clustering.
- Constructed a random forest proximity matrix and applied Bayesian hierarchical clustering to group similar observations based on outcome-relevant features.
- Performed within-cluster statistical inference to test whether models treat similar individuals similarly; aggregated results using multiple hypothesis test correction.
- Do simulation study to showcase our method can ignore irrelevant features and don't need to standardize/normalize data