Xueran Tao

(312)-973-2799 | xuerantao@uchicago.edu | https://github.com/rosie-xue

EDUCATION

University of Chicago Chicago, USA
Master in Statistics *Sep. 2024 - Jun. 2026*
Courses: Linear Models, Modern Bayesian Methods, Deep Learing, Causal Inference, Representation Learning, Speech Technologies.

Beijing Normal University Beijing, China
B.Sc in Statistics (**Top 4** in China) | *Minor in Data Science and Big Data Technology* *Sep. 2019 - Jun. 2024*
GPA: 3.84/4.00 First-Class Scholarship **(Top 10%)** **Qualified for exam-free graduate school admission**
Courses: Statistical Learning, Experimental Design, Stochastic Processes, Time Sequence Analysis, Data Structure and Algorithms, Computer Vision, Natural Language Processing

The High School Affiliated to Renmin University of China (RDFZ) Beijing, China
Math Experimental Class *Sep. 2013 - Jun. 2019*

RESEARCH EXPERIENCE

Non-invasive Blood Glucose Detection Method based on Graph Neural Network Model Beijing, China
Research Assistant | Jiusan Research Institute *Jul. 2023 - Oct. 2023*

- Proposed a signal processing method for non-invasive blood glucose monitoring, addressing challenges associated with array-type impedance data modeling.
- Translated array-type impedance data into graph data and proposed a Graph Neural Network method, Diff-PNA, for graph data analysis, integrating concepts of Differentiation, Position Normalization, and Principal Neighborhood Aggregation. (Using Pytorch)
- Attained a accuracy of 95.3% in classification of 11 blood glucose concentration levels, surpassing traditional methods by 20%. Showing robustness facing internal environmental noise and displacement as a method employed in wearable devices.
- Led the writing and development of a research paper published at "*IEEE Transactions on Industrial Electronics*".

Spectral Clustering Algorithm for Network Data Community Detection and Its Applications Beijing, China
Supervisor: Prof. Gaorong Li *Jun. 2023 - Jun. 2024*

- Adopted the generative model Degree Corrected Stochastic Block Model (DCSBM) to characterize large-scale, sparse, and heterogeneous networks featuring inherent community structures. Investigated the robust asymptotic properties of Spectral Clustering On Ratios-of-Eigenvectors (SCORE) algorithm in fitting the DCSBM model.
- Proposed a paradigm for selecting spectral clustering algorithms based on their performance in clustering simulated network data with diverse characteristics.
- Addressed community detection in a collaboration network of statisticians using a hierarchical spectral clustering method selected by the proposed paradigm. (with R and Matlab) The optimal number of communities is determined based on the dendrogram and modularity.
- Evaluated community detection results by considering both clustering effectiveness and interpretability.

Key Achievements: Outstanding Project of Beijing Undergraduate Innovation Training Program

The Impact of Digitization and Digital Divide on Elderly Consumers' Consumption Beijing, China
Supervisor: Prof. Xun Zhang *Jun. 2022 - May. 2023*

- Employed a two-way fixed-effects model (using Stata) for causal inference to investigate the influence of digital finance (consumption-side digitization) on the consumption and health of seniors.
- Construct panel data by aligning the China Digital Inclusive Finance Development Index with variables sourced from the China Health and Retirement Longitudinal Study (CHARLS).

- Developed an Instrument Variable - spherical distance from Beijing to Hangzhou and applied 2SLS to address endogeneity issues in the regressions. Employed a mediation model to scrutinize the transmission mechanism.
- Uncovered a substantial impact of digital development on elderly consumption, particularly in healthcare spending. Identified a noteworthy digital divide and observed heterogeneity concerning age and geographical location.

INTERNSHIP EXPERIENCE

Meta-neuron, China *Jun. 2024 - Sep. 2024*

Machine Learning Engineer

- Proposed a deep neural network model for EEG-based depression detection. (Using Pytorch)
- Preprocessed 6-channel EEG time series data. Utilized 1D-CNN, Transformer structures to capture spatial signal features, frequency features and time-domain features.
- Attained a accuracy of 80.3% in classification of depressed and non-depressed people among mental patients.
- Conduct a literature review on studies involving brain networks, EEG data, and methods for clustering depression subtypes.

PUBLICATIONS

[1] Yicun Liu, Wan Zhang, Wei Liu, Yi Lu, **Xueran Tao**, Shiyue Jia, Dawei Shi. (2023). Towards Event-Based Non-Invasive Continuous Glucose Monitoring Based on Bio-Impedance Grid Sampling Topology. (*IEEE Transactions on Industrial Electronics*)

EXTRACURRICULAR ACTIVITIES

Beijing Normal University Radio Station *Sep. 2019 - Sep. 2020*

Outstanding Station Member

- Independently planned, wrote scripts, and broadcasted 6 episodes of radio programs, winning the "Golden Microphone" award for outstanding programs. Conducted interviews with famous voice actors and past contestants, and published over 20 news articles.

The Youth's Choir of China National Radio (CNR) *May. 2010 - Aug. 2022*

Core Member

- Took part in dozens of song recordings, concerts, performances, and international and domestic cultural exchange events. Led weekly sectionals and rehearsals.

SELECTED AWARDS

First-Class Academic Scholarship (Top 10%), Beijing Normal University *2022,2023*

Meritorious Winner (Top 7%) in American College Students Mathematical Contest in Modeling *2022*

Second prize of National College Students Statistical Modeling Competition, Beijing *2022*

SKILLS

Programming: Python (Pytorch), R, C++, MATLAB, SQL

Software: Stata, Eviews, LaTeX

Languages: English (Fluent), Chinese Mandarin (Native)

Hobbies: Chorus singing, hiking, Chinese poetry