Jiahao Xie

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Education

- University of Delaware,　　Computer Science　　　　　　　PhD student,　　USA ,　2024.2 — present
  Course: Artificial Intelligence, Algorithm Design and Analysis, Machine Learning, Operating System.
  GPA: **3.945/4**

- Central South University,　　Traffic and Transportation Engineering,　PhD student,　　China,　2022.9 — 2023.11

- Central South University,　　Rail Transit Signal and Control　　　　B.Eng.,　　　China,　2018.9 — 2022.6
  GPA: **92.45/100**；　Rankings: **1/41.**

Technique Skills

1) Machine Learning & AI
- Supervised, unsupervised, and reinforcement learning techniques. (e.g., CNNs, RNNs, Transformers, VAE, Q-learning)
- Experienced with generative models (e.g., GANs, VAEs, LLMs), and graph neural networks (GNNs).
- Skilled in designing and implementing ML pipelines, hyperparameter tuning, and model fine-tuning and optimization.

2) Data Science & Statistical Analysis
- Skilled in statistical modeling, feature engineering, and working with complex datasets.
- Proficient in tools for data analysis and visualization (Python, R).

3) Algorithm: Strong foundation in algorithm design, combinatorial optimization, and multi-objective optimization.

4) Programming: Python (PyTorch, Scikit-learn, NumPy, Pandas, and so on), MATLAB (Simulink), R, C++.

Publications and Patents

1) Paper:
- **Jiahao Xie**, Guangmo Tong. (2025). Advances in Set Function Learning: A Survey of Techniques and Applications. ACM Computing Surveys (CSUR).
- Siqi Wang, **Jiahao Xie**, Yifan Wang, Guangmo Tong. Query-Decision Regression for Misinformation Prevention in Social Networks. The 13th International Conference on Computational Data and Social Networks (CSoNet).
- Mengmei Zhong[#], **Jiahao Xie**[#], Yao Feng, Shao-Hui Zhang, Jiangnan Xia, Li Tan, Ningxin Chen, Xiaolin Su, Qian Zhang, Yunzhi Feng* and Yue Guo*, Causal effects of the gut microbiome on COVID-19 susceptibility and severity: A two-sample Mendelian randomization study. Frontiers in Immunology.
- Shaohui Zhang, Yao Feng, Mengmei Zhong, **Jiahao Xie**, Wei Xu. Association between oxidative stress and chronic orofacial pain and potential druggable targets: Evidence from a Mendelian randomization study. Journal of Oral Rehabilitation.
- Xirui Chen, Hui Liu, Yamin Fang, Mengshuai Su, **Jiahao Xie**. Rotor Fault Feature Extraction Based on Low-frequency Sampling Vibration Signal. The 7th CAA International Conference on Vehicular Control and Intelligence (CVCI). IEEE.

2) Patent:
- Hui Liu, Yanfei Li, **Jiahao Xie**, Jie Zhang, Xirui Chen. Train compartment air adjustment and control method and apparatus, storage medium, and program product. US20230366004A1.
- Bing Yi, Yongfeng Song, Haowen Zheng, Wencheng Yin, Mingjie Guo, **Jiahao Xie**, Honglei Xu, Renkai Sun, Ying Zhang, Yanjun Zhong. Topological optimization method and system for mortise-tenon interlocking connection multi-component structure. CN112883619B.
- **Jiahao Xie**, Neng Wang. Be used for electric pile test quick connecting device. CN214535698U.
- **Jiahao Xie**, Neng Wang. Automatic calibration device and system for fuel cell engine. CN214426975U.

Research Experiences

1) Vision based method for graph property detection (Advisor: Prof. Guangmo Tong)   2024.9—present
- Develop novel vision based methods to detect graph properties

2) Set function learning (Advisor: Prof. Guangmo Tong)   2024.2—2024.9
- Conduct the first comprehensive survey on set function learning, including foundational theories, methodologies, applications, relevant datasets and future directions.
- Categorize key deep learning approaches, such as DeepSets and Set Transformers, and non-deep learning methods.
- Explored various applications like point cloud processing, recommend systems, time series prediction, amortized inference and multi-label classification, highlighting progress in permutation-invariant modeling.
- Paper accepted by ACM Computing Surveys.

3) Multi-objective optimization (Advisor: Prof. Hui Liu)   2022.9—2023.6
- Study aerodynamic drag reduction of train head shapes using surrogate modeling and optimization algorithms.
- Develop a hybrid differential evolution algorithm and a novel double-layer structure differential evolution algorithm for multi-objective optimization.
- Employ OLHS sampling, FFD, and CFD for aerodynamic parameter computation and model training.

4) Bioinformatics analysis (Advisor: Prof. Yunzhi Feng)   2023.1—2023.3
- Focus on bioinformatics algorithms, data analysis, and programming for disease-targeted drug research.
- Published two papers based on statistical analysis methods (Mendelian randomization).

5) Robot-driven intelligent manufacturing of train (Advisor: Prof. Hui Liu)   2022.1—2022.6
- Design multi-robot task allocation (clustering combinatorial auction algorithm) and path planning (bidirectional A* algorithm) for high-speed train body manufacturing.
- Build a simulation system for robots using ROS and Gazebo.
- Awarded Excellent Capstone Project at Central South University.

6) College Students' Innovative Entrepreneurial Training Plan Program   2021.3—2022.3
- Lead the development of intelligent time management software featuring task recognition, data visualization, personalized recommendations, and platform sharing.
- Successfully applied for software copyright.

7) College Students' Innovative Entrepreneurial Training Plan Program   2020.3—2021.3
- Contribute to the development of Zhongnan Library, a learning resource-sharing platform for college students.
- Responsible for resource collection and database management.

8) Topology optimization method of high-speed train body structure (Advisor: Prof. Bing Yi)   2020.1—2021.4
- Research structural topology optimization and lightweight design for high-speed train bodies.
- Focus on structural splitting algorithms and filed a patent for the invention.

Awards and Honors

- The **Best Paper Award** of the 13th International Conference on Computational Data and Social Networks (CSoNet 2024).
- Academic Year Special Scholarship in Central South University (2019). (**Top 1%**)
- Academic Year First Class Scholarship (2020, 2021). (**Top 5%**)
- Outstanding student of Central South University (2019, 2020).