HAOLAN ZUO

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EDUCATION

Yale University, New Haven, CT — Expected May 2024
M.S. in Computer Science
Selected coursework: Deep Learning on Graph-Structured Data, Distributed System, Software Engineering

Sichuan University, Chengdu, China — Jun 2023
B.S. in Computer Science & *B.Econ.* in Financial Engineering
Awards: National Scholarship, Outstanding Graduate of Sichuan Province, First Prize in China Undergraduate Mathematical Contest in Modelling (CUMCM), Second Prize in Chinese Mathematics Competitions (CMC)

PUBLICATIONS

- Weikang Qiu, **Haolan Zuo**, Huangrui Chu, Selena Wang, Xiaoxiao Li, Yize Zhao, Zhitao (Rex) Ying*. *Learning High-Order Relationships of Brain Regions*. **Under Review, ICLR 2024**.

RESEARCH & MACHINE LEARNING EXPERIENCE

Research Assistant, **Yale University**, New Haven, CT — Aug 2023 – Present
- Advised by Rex Ying, co-authored paper on deep learning on cognitive science has been submitted to ICLR 2024
- Conducted research on Graph Transformers, focusing on pre-training methods for positional and structural encodings
- Been updated with latest research in telecom, hieratical graph, hyperbolic representation and XAI in weekly meeting

Machine Learning Engineer, **Meituan**, Beijing, China — May 2023 – Aug 2023
- Collaborated with a team of 9 machine learning engineers, partnering closely with two colleagues to implement GNNs to improve current ALNS order generation model; business revenue increased by 7% in big cities
- Researched large-scale graph dataset construction and GNN frameworks, delivering tailored methods aligned with project and business needs, substantiated by experimental documentation and code implementations
- Explored GNN deployment in online ALNS Java project; Engaged in daily discussions with mentor, delivered weekly team presentations, and produced concise daily/weekly reports summarizing progress and insights

Research Engineer, **Johns Hopkins University CBID**, Baltimore, MD — Jun 2022 – Sep 2022
- Collaborated with an Abell Fellow Evan Haas to develop wearable device applications (IOS and watchOS) for hypothesis testing on deformity spine patients; conducted weekly meetings with the mentor
- Accessed optical sensors and inertial measurement units; synchronized and recorded time-series data in timestamps
- Employed LSTM for human activity recognition, achieving 84% accuracy for specified body movements
- Produced activity metrics and inertial sensor data for gait metrics analysis (sway, gait irregularity and gait symmetry)

RESEARCH PROJECTS

Graph Transformer Positional and Structural Encodings Pre-training — Sep 2023 – Present
Advisor: Rex Ying. **Yale University**, New Haven, CT
- Lead project on transfer learning or pre-training methods for positional/structural encodings in Graph Transformers
- I am currently working on developing models to capture non-low-dimensional features like shortest path distance and graph isomorphism in node-level positional/structural encodings during pre-training periods.

Learning High-Order Relationships of Brain Regions — Aug 2023 – Sep 2023
Advisor: Rex Ying. **Yale University**, New Haven, CT
- Reproduced baseline models including BrainNetGNN, BrainGB, and FBNetGen; trained and benchmarked these models for comparison against our proposed approach; contributed to the writing of the methodology and experimental sections

Graph-based Modeling for Profitability Optimization in E-bike Sharing Systems May 2023 – Aug 2023
Machine Learning Engineer, **Meituan**, Beijing, China
Large-scale Heterogenous Graph Datasets Curation (200K nodes, 9M edges)
- Utilized PySpark for retrieving raw data from Hive tables; curated heterogenous graph datasets for business
- Partitioned datasets using stratified sampling; concatenated standardized disjoint graphs for effective training

GNN to improve current ALNS order generation model
- Implemented GCN, GraphSAGE and GAT for node classification task, yielding an impressive 72% F1-score
- Devised a node filtering algorithm within the ALNS framework, increasing business revenue by 7% in back testing

Deployment of GNN in online ALNS Java project
- For off-line prediction, scheduled automated Dockers; For real-time, replicated GNNs in Java with learned parameters

Multi-Agent Deep Reinforcement Learning for Quantitative Trading Oct 2022 – Mar 2023
Advisor: Prof. Dezhong Peng. Interdisciplinary Thesis, **Sichuan University**, Chengdu, China
- Proposed a stock selection model based on P/B-ROE using residual momentum to capture pricing regression signals
- Employed an ensemble deep reinforcement learning agent (A2C, PPO, and DDPG) for quantitative trading

CDAE-C: Medical Image Denoising and Lung Nodule Classification Feb 2022 – May 2022
Advisor: Prof. Yi Zhang. Research Project, **Sichuan University**, Chengdu, China
- Proposed a versatile deep learning model, CDAE-C, designed for both low-dose CT denoising and lung nodule classification; notably, a customized 2.5D CNN was adopted tailored for lung nodule predictions
- Conducted ablation experiments to demonstrate the superiority of the 2.5D convolutional classifier

Medium-Frequency Quantitative Trading Research Oct 2021 – Feb 2022
Advisor: Prof. Xuwei Li. Research Project, **Sichuan University**, Chengdu, China
- Developed analytical tools for minute-level data processing and visualization using Python
- Identified pricing deviations of China A-share stocks and their corresponding Hong Kong counterparts using ARIMA (Auto-Regressive Integrated Moving Average) model; constructed a strategy-based life-circle model for automatic generation and trading of stock portfolios

Graph Learning for Point Clouds Jul 2021 – Sep 2021
Advisor: Li Lu. Research Intern, **Sichuan University**, Chengdu, China
- Constructed small-scale partial point cloud datasets from CAD model samples for point cloud completion tasks
- Conducted paper review on point cloud classification and completion

CERTIFICATIONS

Academic Skills Development Programme, issued by Nanyang Technological University Singapore, 2022
- Academic skills including academic writing, data visualization etc.

Graduate Record Examination (GRE), 2022
- Verbal: 161, Quantitative: 169, Writing: 3.0

PERSONAL PHILOSOPHY

Rather than settling for just any job, I am committed to pursuing a role that genuinely aligns with my interests and passions. While there was a time when I considered joining the many Java roles in the market, my deeper exploration into software development revealed my genuine passion for AI and data science. This isn't to say I don't value development, but I regard it as a secondary focus.

I take great pleasure in the systematic process of problem-solving, using and creating machine learning and AI tools to discern patterns in data. My experiences have strengthened my belief in the immense potential of AI, and I aspire for it to be central in the next phase of my life.