Yifei Zuo

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Education

University of Science and Technology of China (USTC) — Sep. 2020 – May 2024
Bachelor of Science in Artificial Intelligence. Rank: **top3%**. GPA: **3.90/4.30 (90.26/100)** — Hefei, Anhui

Selected Coursework

- ▸ Mathematical Analysis II (90)
- ▸ Discrete Mathematics (95)
- ▸ Information Theory (94)
- ▸ Introduction to Pattern Recognition-A (95)
- ▸ Data Structures and Algorithms (95)
- ▸ Introduction to Data Science (96)
- ▸ Functions of Complex Variables (93)
- ▸ Thermodynamics-A (97)
- ▸ Electromagnetics-A (92)
- ▸ Knowledge Engineering (97)
- ▸ Mathematics-Physics Methods (91)
- ▸ Introduction to Artificial Intelligence (93)
- ▸ Introduction to Brain and Cognitive Science (90)
- ▸ Compiler Principles (91)
- ▸ Operating Systems (90)
- ▸ Introduction to Computing System (92)
- ▸ Principles of Computing Systems and Embedding Systems (91)

Research Interest

I am interested in **statistical and computational principles** that underlie the success of modern machine learning and artificial intelligence, with a focus on the conceptualization and development of efficient and scalable machine learning algorithms and architectures empirically and theoretically.

Research Experience

University of Washington — Jul. 2023 – Jan. 2024
Research Assistant at SAMPL, supervised by **Prof. Luis Ceze** — Seattle, WA

Quantum Transformer With Linear Attention — Yifei Zuo*, Xiaochuang Han, Luis Ceze, 2023 in preparation
- ★ Reduced the computational complexity and memory requirements of current language models.
- ★ Leveraged quantum probability theory to develop a novel Transformer framework with linear attention.
- ★ Accelerated the optimization process of attention map via quantum Natural Gradient Descent.

LoraBoost: Boosting Low-Rank Adaptation — Yifei Zuo*, Zihao Ye, Tianqi Chen, Luis Ceze, 2023 in preparation
- ★ Efficient low-rank adaptation for language model fine-tuning with quantization integration.
- ★ Supported on-device training with limited memory and computational resources.
- ★ Achieved better expressiveness and generalization performance via boosting mechanism.

Positional Expressive Power of Transformers — Xiyu Zhai*, Jian Qian, Yifei Zuo, Ma Xiao, Simon Du, Alexander Rakhlin, 2023 in preparation
- ★ Theoretically investigated the expressive power of Transformer with positional encoding.
- ★ Demonstrated the representation ability for expressing several vision tasks from low level to high level.

Massachusetts Institute of Technology | Remote Work — Jul. 2022 – Jan. 2023
Research Assistant at CSAIL, supervised by **Prof. Samuel Madden** and Postdoc. Lei Cao — Cambridge, Mass

Robust Entity Resolution with Contrasitive Learning — Yifei Zuo*, Lei Cao, Samuel Madden, 2022 (Not submitted)
- ★ Improve the efficiency of Entity Resolution (ER) inference model with contrastive learning on Siamese encoder.
- ★ Identify a trick that improved the robustness of classification leveraging geometric properties of the representation space in contrastive learning.

Generic Entity Resolution Models — Jiawei Tang*, Yifei Zuo, Lei Cao, Samuel Madden, *NeurIPS 2022 workshop*
- ★ General fine-tuned entity resolution model for cross-domain adaptation with linear probing.

Other Experience

Teaching Assistant in Discrete Mathematics Course — Mar. 2023 – Jun. 2023
New Experiment Framework For Compiler Principle Course — Nov. 2022 – Jan. 2023
An educational compiler framework implemented in C++ for future Compiler Principle course experiments.
USTC Robogame — Sep. 2021 – Oct. 2021
Annual robotics competition with the goal of designing and implementing a robot that can complete a series of tasks.

Main Honors

- Nominee of **Guo Moruo Scholarship (highest honor in the university)** — Nov. 2023
- Artificial Intelligence **Honors Program** Outstanding Student Scholarship — Oct. 2023
- **Gold Award** of Outstanding Student Scholarship **(annual top 1 student)** — Sep. 2022
- **Silver Medal Winner** of Robogame (university robotics competition) — Oct. 2021
- **First Price Winner** in school Traditional Calligraphy Competition — Dec. 2021
- **Silver Award** of Outstanding Student Scholarship — Sep. 2021
- Cultural Ambassador of USTC — Nov. 2020
- Outstanding campers in **Shing-tung Yau Mathcamp**. (top 20/70) — Sep. 2019

Technical Skills

System Development: Rust, C/C++, CUDA, also a vim user
Theorem Proving: Lean
Machine Learning: Python
Language: Chinese (native), English (TOEFL iBT 101 in 2022)

Leadership

- Head of Class Academic Committee — Sep. 2022 – Present
- President of Shuangxin Chinese Calligraphy Club — Sep. 2022 – Sep. 2023
- Vice President of Shuangxin Chinese Calligraphy Club — Sep. 2021 – Sep. 2022
- Class Psychological Commissioner — Sep. 2021 – Sep. 2022
- Class Monitor — Sep. 2020 – Sep. 2021