Zuoyan Zhang

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Education

Hunan University *Sep 2024 – present*
PhD in Computer Science and Technology

- Supervisor: Jie Zhao
- Laboratory: CYCLE Lab
- Research Interests: Deep Learning Systems, AI Compilers

Information Engineering University *Sep 2021 – Jun 2024*
Master in Computer Technology

- GPA: 88.7/100
- Laboratory: State Key Laboratory of Mathematical Engineering and Advanced Computing
- Research Interests: Numerical Program Analysis

Henan University of Technology *Sep 2017 – Jun 2021*
Bachelor in Computer Science and Technology

Experience

Intern Research *Beijing, China*
AI for Science Institute *June 2023 – Sep 2023*

- Implemented and optimized accuracy testing framework for ABACUS core numerical functions
- Developed customized precision testing schemes targeting diverse function categories
- Designed and implemented comprehensive test suites for Simpon's integral and spherical harmonic functions

Publications

Arfa: An agile Regime-based Floating-point Optimization Approach for Rounding Errors Sep 2024

Jinchen Xu, Mengqi Cui, Fei Li, ***Zuoyan Zhang***, Hongru Yang, Bei Zhou, Jie Zhao

In Proceedings of the 33rd ACM International Symposium on Software Testing and Analysis (**ISSTA 2024**)

10.1145/3650212.3680378

Eiffel: Inferring Input Ranges of Significant Floating-point Errors via Polynomial Extrapolation Sep 2023

Zuoyan Zhang, Bei Zhou, Jiangwei Hao, Hongru Yang, Mengqi Cui, Yuchang Zhou, Guanghui Song, Fei Li, Jinchen Xu, Jie Zhao

In Proceedings of the 38th IEEE/ACM International Conference on Automated Software Engineering (**ASE 2023**)

10.1109/ASE56229.2023.00139

Hierarchical search algorithm for error detection in floating-point arithmetic expressions Jun 2023

Zuoyan Zhang, Jinchen Xu, Jiangwei Hao, Yang Qu, Haotian He, Bei Zhou

The Journal of Supercomputing

10.1007/s11227-023-05523-6

Projects

Intelligent Compilation and Optimization Techniques for Supernode Parallelism Strategies
Jan 2025 - Dec 2026

- Huawei Technologies (Agreement No. TC20241115006)
- My research will focus on two key aspects of LLM distributed training optimization:
  - Design automated search algorithms for distributed parallelization strategies in large-scale model training
  - Investigate compute-communication co-optimization approaches to enhance training efficiency
- Main participant
- ¥ 2,286,000

Research on Floating-point Error Detection and Precision Optimization *Maxfpeed*
Oct 2022 - Sep 2024

- Open Project of the State Key Laboratory of Mathematical Engineering and Advanced Computing (Grant No. 2023B02)
- Developed Maxfpeed, an innovative floating-point error detection tool, with optimized detection algorithms achieving significant efficiency improvement over existing methods for complex arithmetic expressions analysis
- Main participant
- ¥ 600,000

Basic Mathematics Library System Jun 2018 - Jun 2022

- National major special project
- Architected and implemented a comprehensive test framework for high-performance mathematical libraries, including correctness, anomaly detection, precision and performance testing modules, with automated test suites and scripts for continuous validation
- Participant

Honors and Awards

Excellent MEng Dissertation Award, Information Engineering University	Oct 2024
National Scholarship, Ministry of Education of China	Dec 2023
First Class Academic Scholarship, Information Engineering University	Nov 2023
Second Class Academic Scholarship, Information Engineering University	Nov 2022
First Class Academic Scholarship, Information Engineering University	Nov 2021

Technologies

Skills: C++, C, Python, Linux, Latex, Matlab, Git, Shell, Docker, Pytorch, MindSpore, and etc