Kuangshi Ai

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Education

University of Notre Dame — Indiana, USA
Ph.D. Student in ***Computer Science and Engineering*** — *2024.08-Present*
Research Interests: Scientific Visualization, Multi-modal LLMs, Human-Computer Interaction

Fudan University — Shanghai, China
B.E. in ***Artificial Intelligence****, School of Data Science* — *2020.09-2024.06*
- **Overall GPA:** 3.71/4.0 **Junior GPA:** 4.0/4.0 **Rank:** 2/16

The University of Sydney — Sydney, Australia
Exchange Student in the Faculty of Engineering — *2023.02-2023.06*
- **Overall Grade:** HD (High Distinction) **U.S. scale GPA:** 4.0/4.0

Publications

- **Kuangshi Ai**, Kaiyuan Tang, Chaoli Wang. NLI4VolVis: Natural Language Interaction for Volume Visualization via Multi-LLM Agents and Editable 3D Gaussian Splatting. *Submitted to 2025 IEEE VIS: Visualization and Visual Analytics*
- Kaiyuan Tang, **Kuangshi Ai**, Jun Han, Chaoli Wang. TexGS-VolVis: Expressive Scene Editing for Volume Visualization via Textured Gaussian Splatting. *Submitted to 2025 IEEE VIS: Visualization and Visual Analytics*
- Simret Araya Gebreegziabher, **Kuangshi Ai**, Zheng Zhang, Elena Glassman, Toby Jia-Jun Li. Leveraging Variation Theory in Counterfactual Data Augmentation for Optimized Active Learning. *In Proceedings of the 63rd Annual Meeting of the Association for Computational Linguistics, 2025*

Research Experience

Natural Language Interaction for Volume Visualization — University of Notre Dame, USA
Instructor: Prof. Chaoli Wang — *2024.08-Present*
- Developed the first-ever framework enabling natural language interaction with complex 3D scenes using LLM agents and editable 3D Gaussian splatting
- Integrated vision-language foundation models to achieve open-vocabulary querying of objects in 3D volumetric scenes, supporting intuitive scene manipulation with natural language
- Work to be submitted to IEEE VIS2025 (TVCG)

Counterfactual Data Augmentation for Active Learning — University of Notre Dame, USA
Instructor: Prof. Toby Li — *2023.07-2024.05*
- Link: https://github.com/KuangshiAi/VariationTheory
- Inspired by Variation Theory, proposed an Active Learning (AL) approach which synthesizes artificial datapoints that highlight key similarities and differences among labels
- Developed a neuro-symbolic pipeline combining large language models and rule-based models, which generates high-quality counterfactual examples
- Achieved a comparable accuracy to prevalent AL strategies while necessitating fewer annotations

Data-Efficient Preprocessing of Vision Transformers — The University of Sydney, Australia
Instructor: Prof. Chang Xu — *2023.03-2023.06*
- Link: https://github.com/KuangshiAi/vision_transformer
- Proposed and implemented a method to preprocess and regenerate visual data input sequences, achieving minimal throughput loss and performance improvements on four small-scaled datasets
- Pointed out potentials of ViTs and the limitation of our method on large-scaled datasets, and proposed a practical guideline for ViT training

Bilevel Optimization with Special Forms of Lower-level Functions — Fudan University, China
Instructor: Prof. Rujun Jiang — *2022.12-2023.07*
- Conducted experiments on IJCNN1 and corrupted MNIST datasets to evaluate stochastic and variance reduction algorithms for strongly convex lower-level functions
- Proposed case-specific algorithms for typical machine learning problems based on the structure of lower-level functions

Internship Experience

Quantitative Research Beijing, China
Ningbo Lingjun Investment Management Partnership *2024.01-2024.05*

- Participated in the development and optimization process of the combo model, maintaining and proficiently mastering the company's live trading model framework
- Based on the company's factor library and financial data, designed a graph transformer-based daily-frequency investment portfolio model, which demonstrated superior effectiveness and robustness compared to the existing live trading model through backtesting.

Embodied AI Algorithm Research Shanghai, China
Shanghai Ziyan Intelligent Technology Co., Ltd. *2023.10-2023.12*

- As an early member of the startup, developing autonomous control systems for humanoid robots to enhance their capabilities for everyday tasks
- Combined the structure of Swin ViT and Resformer to achieve robot vision focusing ability, and developed a Fast-ACVNet based stereo depth estimation pipeline for affordable environmental information capture
- Deployed and fine-tuned RT2 and Qwen locally as the high-level control unit of robot dogs, and leveraged GPT-4-vision to build navigation system in Meta's Habitat simulation environment

Business Operations and Data Management Yunnan, China
YCIH Logistic Co., Ltd *2022.07-2022.08*

- Utilized PostgreSQL database management system and Python web crawler technology to collect, analyze and manage data for the company's "INJA" Intelligent Supply Chain Platform
- Developed a backend system for data monitoring and control, real-time data visualization, and data analysis modeling

Honors & Awards

- **Outstanding Graduate**, Fudan University, 2024
- **Second Prize** (Top 2 in major), the Scholarship for Outstanding Students, Fudan University, 2024 & 2021
- **Third Prize**, the Scholarship for Outstanding Students, Fudan University, 2022
- **Outstanding Student Leaders**, Fudan University, 2020-2022
- **Second Prize in Shanghai**, Contemporary Undergraduate Mathematical Contest in Modeling, 2022
- Scholarship for **Outstanding Freshmen**, Fudan University, 2020

Professional Skills

Programming: Python, MATLAB, C/C++, SQL, R
Tools: Pytorch, TensorFlow, paddlepaddle, LaTeX, Numpy, Pandas, Linux
Language: English (TOEFL: 106/120), Chinese (native speaker)