Yiyang Lu

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Education

IIIS, Tsinghua University
Undergraduate Study Sep 2024 - Now

IIIS, Tsinghua University
Pre-College Program Sep 2023 - Jun 2024

Research interests

Computer Vision, Robotics, Reinforcement Learning

Experiences

Undergraduate Research in Computer Vision
Supervised by Professor Kaiming He, Massachusetts Institute of Technology Feb 2025 - Now

- Conduct research on generative models, including Diffusion models, Flow matching, and Normalizing Flows.
- Develop and deploy models on Google Cloud Platform using TPU and JAX.

Undergraduate Research in Robotics
Supervised by Professor Huazhe Xu, Tsinghua University Sep 2024 - Now

- Gain experiences on robotics and computer vision, especially designing diffusion models and vision encoder for imitation learning.
- Implementing ideas and training models on real robots and simulators, such as Metaworld, Maniskill, Robotwin.

Internship in Computer Vision
Supervised by Dong Wei, Tencent Jul 2024

- Worked on multi-modal AI, especially extracting features from images and texts.
- Selected as "Challenging Star" in the internship program.

Awards

Tsinghua Academy Talent Development Program Scholarship
Tsinghua University 2024

Freshman Scholarship (Second Prize)
Tsinghua University 2024

Gold Medal (Top 10)
39th Chinese Physics Olympiad 2022

Projects

Realistic Multi-Material Interaction Simulation Pipeline
2024.12 https://github.com/Lyy-iiis/ACG-Project

Project for the course *Advanced Computer Graphics* at IIIS, Tsinghua University, completed in a team of 2. This project is selected for class **oral presentation (top 3)** and **most popular project (top 3)**.

- Implement a comprehensive simulation pipeline that supports multiple materials and their interactions, including rigid body, fluid, cloth and smoke simulation.
- Leverages GPU acceleration and spatial hashing to achieve high simulation performance and scalability, produce real-time visual effects.

Do LLMs Outperform Multi-task Learning Expert in Medical Report Generation?
2024.12 https://github.com/Lyy-iiis/Crayon-new

Project for the course *Natural Language Processing* at IIIS, Tsinghua University, completed in a team of 3. This project is selected for class **oral presentation**.

- Compare the performance of Large Language Models and Multi-task Learning Expert in medical report generation, revealing the weaknesses of LLMs in domain-specific tasks even with fine-tuning.
- Implement a multi-task learning expert for medical report generation, which achieves competitive performance on IU-X-Ray dataset.

Randomized Techniques in Graph Algorithms
2024.10 https://github.com/PeppaKing8/algdesign-project

Project for the course *Algorithm Design* at IIIS, Tsinghua University, completed in a team of 2. This project receives **6 bonus points** for creativity.

- Investigate the application of randomized techniques in graph algorithms, as well as implementation in C++.
- Propose a new NPC problem, Optimal Point Traversing Path, and present a sublinear randomized algorithm to solve the special case, completed with a correctness proof and complexity analysis.

Music Image Transfer
2024.6 https://github.com/Lyy-iiis/LLM_project

Project for the course *Introduction to Large Language Model Application* at IIIS, Tsinghua University, completed in a team of 3. The project is further developed by **ZhiPu AI**.

- Build a pipeline of Large Language Models to generate an image according to the content of a piece of music.
- Achieve high correlation between the contents and rather high speed of generation.
- Use Docker to build an API on Kubernetes server and use gradio to build up a website for the application.

Skills

Programming Languages: Python, C/C++, Bash, Assembly
Tools: PyTorch, JAX, MATLAB, Git, LaTeX, Docker, GDB
Languages: English (Fluent), Chinese (Native)

Additional information

Transript at IIIS, Tsinghua University
All of my **professional courses** taken at IIIS, Tsinghua University is shown below.

Year-Semester	Course Title	Credit	Grade
2023-Autumn	Introduction to Computer Science	3	A+
	Introduction to Programming in C/C++	2	A+
	Calculus A (1)	5	A
	Linear Algebra	4	A+
	General Physics (2)	4	A+
2024-Spring	Introduction to Computer Systems	4	A+
	Introduction to Large Language Model Application	2	A
	Mathematics for Computer Science and Artificial Intelligence	4	A+
	Calculus A (2)	5	A+
	General Physics (1)	4	A
	Quantum Computer Science	4	A+
2024-Autumn	Advanced Computer Graphics	3	A+
	Natural Language Processing	3	A+
	Machine Learning	4	A+
	Algorithm Design	4	A+
	Artificial Intelligence: Principles and Techniques	3	A+

Self-Studied/Audited courses

- Deep Learning, IIIS, Tsinghua University
- Abstract Algebra, IIIS, Tsinghua University
- The Missing Semester of Your CS Education, MIT, `https://missing.csail.mit.edu/`
- Introduction to Algorithms, MIT, `https://ocw.mit.edu/courses/6-006-introduction-to-algorithms-spring-2020/`
- Design and Analysis of Algorithms, MIT, `https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-2015/`
- CS224n: Natural Language Processing with Deep Learning, Stanford, `http://web.stanford.edu/class/cs224n/`
- CS231n: Deep Learning for Computer Vision, Stanford, `http://cs231n.stanford.edu/`
- Intro to Computer Systems, CMU, `https://www.cs.cmu.edu/afs/cs/academic/class/15213-f15/www/schedule.html`
- CS285: Deep Reinforcement Learning, UC Berkeley, `https://rail.eecs.berkeley.edu/deeprlcourse`