Yu Wu

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Education

Carngie Mellon University Sep 2021 – May 2025
B.S. in Computer Science, Minor in Physics

- GPA: 4.0/4.0

Research Experience

Research Assistant, Physical Perception Lab, CMU May 2023 - Present
Advisor: Prof. Shubham Tulsiani

- Researching text-to-3D object generation. Developing novel sampling method from 2D diffusion for better view consistency in 3D generation and editing.
- Developed noise-matching renderer to connect 3D and 2D noise space using GAN. Applied noise-matching to diffusion distillation for 3D generation.
- Presented poster at CMU Undergraduate Research Symposium.

Research Assistant, Search-Based Planning Lab, CMU May 2022 - Aug 2024
Advisor: Prof. Maxim Likhachev and Prof. Jiaoyang Li

- Developed SpaceOrder-CBS, a novel algorithm that improves robustness in multi-agent path-finding problem. Reduced communication cost by 80
- Presented poster and spotlight talk at SoCS 2024
- Extended and implemented multi-agent path-finding algorithm for 3D automated warehouses. Contributed to the first public 3D MAPF benchmark.

Research Assistant, Language Technology Institute, CMU Feb 2023 - May 2023
Advisor: Prof. Yiming Yang

- Researched novel deep reinforcement learning method for solving Mixed Integer Programming (MIP). Created MIP partial solution datasets with SCIP solver for GNN training.

Publications

From Space-Time to Space-Order: Directly Planning a Temporal Planning Graph by Redefining CBS

Yu Wu, Rishi Veerapaneni, Jiaoyang Li, Maxim Likhachev
Proceedings of the International Symposium on Combinatorial Search (SoCS) 2024

MAPF in 3D Warehouses: Dataset and Analysis.

Qian Wang*, Rishi Veerapaneni*, Yu Wu, Jiaoyang Li, Maxim Likhachev
Proceedings of the International Conference on Automated Planning and Scheduling (ICAPS) 2024

Teaching Experience

10-701 Intro to Machine Learning (PhD), CMU Spring 2024
Teaching Assistant

- Led recitations with 100+ students. Explained problems and hosted tutorial on PyTorch.
- Co-lead the creation of a new assignment that introduced training transformer and RNN for machine translation.

21-241 Matrices and Linear Transformations, CMU Spring 2023
Teaching Assistant

- Led weekly recitation with 30+ students.
- Created problems for assignments and recitations.

Projects

SpaceVQA: Video Question Answering Enhanced by 3D Reconstruction Jan 2024 - May 2024

- Developed a novel model for Video Question Answering (VQA). Incorporated monocular 3D point cloud reconstruction into slot-centric multimodal models to resolve depth ambiguity.
- Improved robustness of VQA models to 3D transformation on CLEVRER dataset by learning 3D spatial interations.
- Evaluated and compared multiple baselines, including SlotFormer, Aloe, etc.

Parallel A* Search Nov 2023 - Dec 2023

- Parallelized A* algorithms. Implemented HDA* using MPI and GA* using CUDA.
- Achieved massive parallelization with a 25x speedup on path-finding benchmark.

Coursework

Computer Vision: 16-825 Learning in 3D Vision, 16-385 Computer Vision, 15-462 Computer Graphics

Machine Learning: 11-777 Multimodal Machine Learning, 16-831 Intro to Robot Learning, 11-485 Intro to Deep Learning, 10-701 Intro to Machine Learning

Computer Science: 15-418 Parallel Computer Architecture and Programming, 15-451 Algorithms Design and Analysis, 15-316 Software Foundations of Security & Privacy, 15-213 Intro to Computer Systems, 15-251 Great Theoretical Ideas in Computer Science

Physics: 33-650 General Relativity, 33-658 Quantum Computation and Quantum Information

Awards

CMU Summer Undergraduate Research Fellowships 2023

CMU Dean's List, High Honors 2021-2023

Skills

Languages: Python, C, C++, Java, Standard ML

Frameworks: PyTorch, PyTorch3d, CUDA, Blender, MPI, Mathematica