Kaiyuan Wang

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Summary

I'm a computer science Master's student at UC San Diego with a specialized focus in **computer vision** and **robotics**, applying for PhD positions starting Fall 2024. My ongoing and past projects span topics including deformable tissue tracking, 6 DoF pose estimation, semantic segmentation, GANs, and advanced rendering techniques.

My current research focuses on **deformable tissue tracking** under endoscopic surgery settings. Additionally, I'm broadly interested in modeling, control, planning, and optimization towards robot autonomy.

Education

M.S in Computer Science, UC San Diego. GPA: 3.96/4.0 *2022-2024*

Coursework: Convex optimization, Deep learning (3D data, generative model, vision), Unsupervised learning.

B.S. in Computer Engineering, UC San Diego. GPA: 3.75/4.0 *2018-2022*

Coursework (advanced): Deep learning, OS, Computer Networks, Signal processing.
Coursework (fundamental): Algorithms and data structures, Linear algebra, Probability, Calculus.

Research

A Large Scale Residential Robot Demonstration Dataset *Fall 2023*

Co-author | UC San Diego, ARC Lab | Collaboration with Stanford IRIS lab

- Implemented back-propagation-enabled Perspective-n-Point (BPnP) solver.
- Implement end-to-end trainable segmentation and keypoint detection networks.

*On-going project.

A Robust Long-term Deformation Tracking Framework for Endoscopic Videos *Summer 2023*

Lead Author | UC San Diego, ARC Lab | Advised by Professor Michael Yip

- Proposed and implemented two novel improvements to an existing surgical perception framework:
  - Deformable point set registration using Gaussian Mixture Model.
  - Keyframe-based loop closure.

*To be submitted to IEEE Robotics and Automation Letters (RA-L) as co-first-author.

A Point Matching Enabled Deformation Robust Surgical Perception Framework *Summer 2023*

Co-author | UC San Diego, ARC Lab | Advised by Professor Michael Yip

- Implemented image rectification and stereo vision pipeline for 3D data collection.
- Conducted literature review on learning based partial-to-partial point set registration methods.

*Submitted to 2024 IEEE International Conference on Robotics and Automation (ICRA2024) as co-author.

Differentiable Neural Architecture Search for Blood Cell Image Classification *Summer 2021*

Independent Study | UC San Diego, Professor Pengtao Xie's Group

- Conducted survey on differentiable neural architecture search (DARTS) methods.
- Increased GPU utilization from 20% to 80% by migrating data pipeline to ephemeral SSD on kubectl cluster.

Teaching Assistanship

Teaching Assistant: CSE120 Operating Systems *Fall 2022, Spring 2023, Fall 2023*

- Automated grading and GitHub course repo management for 300+ students.
- Led discussion sections and prepared original instruction materials.
- Designed and graded exam questions.

Tutor: CSE120 Operating Systems *Winter 2021, Spring 2022*

- Helped students with debugging and conceptual questions

Skills and Extra

Programming Languages: ***Experienced:*** Python, Java | ***Familiar:*** C++, Bash, Go

Frameworks & Libraries: PyTorch, Open3D, OpenCV, Matplotplib, NumPy, Scikit-learn, TensorFlow, Kubernetes

Languages: English (fluent), Mandarin (native)

Extra: I enjoy taking and sharing my notes. They are posted here.

I'm also a basketball player, here is a GIF of me playing :)