Xiao Liang

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Education

University of California San Diego **Sep. 2023 – present**
PhD in Electrical and Computer Engineering *La Jolla, California*

University of California San Diego **Sep. 2021 – Jun. 2023**
MS in Computer Science and Engineering *La Jolla, California*

University of Washington Seattle **Sep. 2017 – Jun. 2021**
BS in Computer Science and Engineering *Seattle, Washington*

Publications

Xiao Liang†, Fei Liu†, Yutong Zhang, Yuelei Li, Shan Lin, Michael C. Yip. Real-to-Sim Deformable Object Manipulation: Optimizing Physics Models with Residual Mappings for Robotic Surgery. *IEEE International Conference on Robotics and Automation (ICRA)*, 2024. [Accepted]

Yutong Zhang†, Fei Liu†, Xiao Liang, Michael C. Yip. Achieving Autonomous Cloth Manipulation with Optimal Control via Differentiable Physics-Aware Regularization and Safety Constraints *IEEE International Conference on Robotics and Automation (ICRA)*, 2024. [Accepted]

Xiao Liang, Shan Lin, Fei Liu, Dimitri Schreiber, Michael C. Yip. ORRN: An ODE-based Recursive Registration Network for Deformable Respiratory Motion Estimation with Lung 4DCT Images. *IEEE Transactions on Biomedical Engineering (TBME)*, 2023

Research Experience

PhD Student **Sep 2023 – present**
Physics simulation and machine learning, UCSD Advanced Robotics and Controls Lab *La Jolla, California*

- Briging the reality to simulation gap for deformable object manipulation through online simulation optimization.
- Safety-awared deformable object manipulation using differentiable cloth simulation.
- Active sening for deformable object manipulation and boundary parameter estimation.

Graduate Student Research **Sep 2021 – June 2023**
Medical Image analysis, UCSD Advanced Robotics and Controls Lab *La Jolla, California*

- Developed a novel learning-based deformable registration algorithm for lungs under respiratory deformation.
- Improved registration accuracy and inference speed upon SOTA learning-based methods.
- This work is published as a journal paper (paper link) by IEEE Transactions on Biomedical Engineering.

Undergraduate Research Assistant **Jan 2021 – Jun 2021**
Computer Vision, UW Graphics and Imaging Laboratory *Seattle, Washington*

- Extending a previous research Background Matting V2, developed a novel video matting neural network that generates high-resolution matte and estimates a static background in real time.
- Improved the matte prediction by utilizing motions and developed criteria for selecting key frames for background reconstruction in a video.

Undergraduate Research Assistant **March 2020 – Jun 2021**
Human Computer Interaction (Mixed Reality), UW Reality Lab *Seattle, Washington*

- Developed a deep learning-enabled Mixed Reality application for augmenting the cooking experience.
- Trained and deployed SOTA object recognition and detection neural networks on a cloud server.
- Developed near real-time communication scheme between an Magic Leap One headset and the cloud machine, providing semantic awareness to the mixed reality device.

Teaching Experience

Teaching Assistant **Mar. 2021 – Jun. 2021**
CSE 481V Virtual Reality Capstone, University of Washington *Seattle, Washington*

Teaching Assistant **Jun. 2020 – Dec. 2020**
CSE 457 Computer Graphics, University of Washington *Seattle, Washington*

Other Projects

Neural Process for Safe Exploration | *Neural Process*

- Developed a neural process guided safe exploration algorithm for a movie recommendation problem.

Volume Rendering in Virtual Reality System | *Unity, High Level Shading Language*

- Developed a real-time, interactive, volume rendering algorithm for visualizing 3D medical image in Virtual Reality.

Graph Neural Network Particle Simulator | *Graph Neural Network*

- Implemented a previous work on using Graph neural network for simulating fluid particle dynamics.

Human Pose-controlled Game | *Kinect, Unity, Neural Network*

- Made a Super Mario-like game that is controlled by player's poses classified by a neural network using Kinect's data.

Professional Activities

Journal/Conference reviewer

- IEEE Journal of Biomedical and Health Informatics (JBIH)

Workshop Poster

- Workshop on Integrated Perception, Planning, and Control for Physically and Contextually-Aware Robot Autonomy (IPPC), *IROS 2023*, Detroit, USA

Technical Skills

Languages: Python, Java, C++, Matlab, JavaScript
Tools & libraries: Pytorch, Jax, Numpy, OMPL, Unity, Blender, Slicer, PolyFem...