# Yifei Liu

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#### **Carnegie Mellon University** Master of Science in Robotics. GPA: 4.25/4.0 University of California, Irvine Bachelor of Science in Computer Science. Specialization in Intelligent Systems. GPA: 3.93/4.0 **EXPERIENCES** CMU Robotics Institute AirLab | Graduate Researcher Develop depth estimation module for online mapping and 3D reconstruction for situational awareness with UAV and UGV in visually-degraded environments; leverage HPC for training and accelerate models on Jetson Orin using TensorRT Build a full ML pipeline for outdoor metric depth dataset, including calibration, LiDAR-SLAM, sensor fusion, filtering • Lead a team and design cross-calibration methods for RGB, thermal, LiDAR to enhance fusion and mapping NASA Jet Propulsion Laboratory | Robotics Perception Intern Developed a multi-modal long range perception module for autonomous navigation in off-road terrains using depth • foundation model, LiDAR fusion, and dynamic satellite maps; integrated into ROS workspace Trained and fine-tuned deep neural networks (DNNs) for real-time depth and semantic segmentation UCI Intelligent Dynamics Lab | Undergraduate Researcher Achieved zero-shot visual sim-to-real transfer for autonomous navigation, using cGAN and U-Net for semantic segmentation and Reinforcement Learning for control; deployed on edge device (Jetson Nano based vehicle)

#### Created a customizable Unreal Engine 5 simulation for effective domain randomization; evaluated sim-to-real techniques USC Energy Efficient Secure Sustainable Computing Group | Amazon Research Fellow May. 2022 - Oct.2022

- Rendered realistic simulation in Unreal Engine 4 and developed an automatic synthetic dataset generation pipeline for ٠ UAV-based ember detection in wildfires; enabled zero-shot detection of embers in real wildfire scenarios
- Implemented and trained object detection models (Faster R-CNN, RetinaNet, DETR, Yolov7) to track tiny embers
- Built Readytosky S500 drone and calibrated system of Vicon motion capture cameras

Published and administered HITS on Amazon Mechanical Turk to label real-world data for model evaluation

#### UCI Center for Artificial Intelligence in Diagnostic Medicine | Research Personnel

- Preprocessed and augmented cancer histopathology images, implemented deep learning models (ResNet, VGG, DenseNet, etc.) for multi-class classification of tumor patches with 95% accuracy
- Designed variations of UNet for precise segmentation of blood vessels in brain CT slides

#### PROJECTS

**EDUCATION** 

#### **Image Translation for Off-road Driving Data Augmentation**

- Implemented unpaired translation between off-road environments (e.g. desert, forest) using a text-to-image one-step • diffusion model and cycle-consistency loss (CycleGAN-Turbo)
- Developed segmentation constraints to preserve terrain structure for accurate data augmentation

#### **Advanced Image Processing and Object Detection**

- Jan. 2022 Mar. 2022 • Built a camera view extension tool by blending and forming homography mosaic from multiple images
- Developed an object detector using gradient orientation histograms and template learning

## **PUBLICATIONS**

D. Dhrafani\*, Y. Liu\*, A. Jong, U. Shin, Y. He, T. Harp, Y. Hu, J. Oh, S. Scherer. "FIReStereo: Forest InfraRed Stereo Dataset for UAS Depth Perception in Visual-Degraded Environments," under review for Robotics and Automation Letters (RAL), 2024.

Y. Hu, X. Ye, Y. Liu, S. Kundu, G. Datta, S. Mutnuri, N. Asavisanu, N. Ayanian, K. Psounis, P. Beerel. "FireFly: A Synthetic Dataset for Ember Detection in Wildfire," in International Conference on Computer Vision (ICCV), 2023.

#### LEADERSHIP

#### Artificial Intelligence at UCI | President

- Led workshops on AI/ML techniques, guiding 60+ participants in applying deep learning to real-world tasks •
- Organize external AI events to foster connections between students, professors, and industry professionals
- Managed long-term student project teams, guiding them in building AI-based solutions; maintained communication with 1500+ club members through newsletter

## **SKILLS & INFORMATION**

- Programming Languages: Python, C++, HTML/CSS, JavaScript .
- Frameworks/Tools: PyTorch, TensorFlow, TensorRT, OpenCV, Sklearn, ROS, Docker, HPC (SLURM), Unreal Engine •
- Languages: English (Proficient), Mandarin (Proficient), Thai (Conversational), Korean (Conversational)

Aug. 2023 - June. 2025 Pittsburgh, PA Sep. 2019 - Mar. 2023 Irvine, CA

Aug. 2023 - Present

May 2024 - Aug. 2024

Oct. 2021 - May 2023

Mar. 2022 - Jun. 2022

March 2024 - May 2024

Jun. 2022 - Mar. 2023