Yuci Han

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Education

The Ohio State University — *Columbus, OH*
Ph.D. in Electrical and Computer Engineering. Advised by Prof. Alper Yilmaz — *Jan.2021 – Present*

The Ohio State University — *Columbus, OH*
M.S. in Electrical and Computer Engineering. Advised by Prof. Alper Yilmaz — *Aug 2018 – Dec 2020*

Civil Aviation University of China — *Tianjin, CHINA*
B.S. in Civil Engineering — *Sept 2011 – May 2015*

Research Interests

My research interests span the areas of in **computer vision** and **embodied AI**, particularly **reinforcement learning** and **generative models** for both 3D vision and RL policy learning. I am passionate about empowering agents with the capability to learn, understand, and interact with their surroundings in a way that is both **reliable and adaptable**. I use **learning-based methods** that scale with data and computation to pushing them toward achieving human-level performance.

Experience

The Ohio State University — *Columbus, OH*
Graduate Research Assistant at Photogrammetry Computer Vision Lab, Advised by Prof. Alper Yilmaz — *Jan 2021 – Present*

Projects

Visual navigation in Large and Unseen Environments (U.S. Army Research Office) *ISAR*

- Developed an Unmanned Aerial Agent capable of efficiently learning to navigate large-scale urban environments and transferring its acquired expertise to novel environments.
- Enabled the agent navigated using only a single camera, without any additional sensors.
- Proposed **Incremental Self-Adaptive Reinforcement learning (ISAR)**, an algorithm that combines the ideas of incremental learning and **meta reinforcement learning (MRL)** which improve the learning speed and generalization ability.
- Deployed on both a real ground robot (iRobot) and within an **Unreal Engine** simulation environment.

Autonomous Driving using Reinforcement Learning with Prior Policy *SIRL*

- Developed an autonomous driving agent capable of imitating expert drivers and continuously improving beyond the expert using reinforcement learning and policy fusion.
- Ensured an accelerated training process while preventing catastrophic outcomes during RL exploration, thereby ensuring **safe exploration**.
- Deployed and tested the agent in CARLA simulation environment.

Enhancing 3D Gaussian Splatting from Sparse Views with Diffusion Priors

- Proposed an efficient feedforward 3D reconstruction pipeline using **pose-free sparse-view** inputs.
- Improved reconstruction results by fine-tuning a **2D diffusion enhancer** to complement missing details and reduce artifacts.
- Enabled real-time rendering upon completion of the optimization process.

UAS Control with Natural Language Instructions.

- Implemented a neuro-symbolic approach to control UAS with natural language instructions.
- Utilizing the in-context learning ability of large language models (LLM) to generate python-like modular programs, which are then executed to control the drone. Each line of the generated program may invoke one of several off-the-shelf predefined modules.
- Deployed within Unreal Engine simulation environment with AirSim plugin.

Visual Localization with Multi-skylines (U.S. Army Research Office)

- Proposed a visual localization approach leveraging multi-skyline features by converting skylines into multi-level signals and 'visual words' to enable fast and accurate matching.
- Enabled deployment on edge devices for real-time processing and localization.

Publications

[1] BetterSplat: 3D Gaussian Splatting from Sparse Views with Diffusion Enhancer. ***Yuci Han***, Alper Yilmaz
In submission

[2] UAS Visual Navigation in Large and Unseen Environments via a Meta Agent.
Yuci Han, Charles Toth, Alper Yilmaz
ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS 2024)

[3] UAS Navigation in the Real World using Visual Observation.
Yuci Han, Jianli Wei, Alper Yilmaz
IEEE Sensors Conference (2022)

[4] Learning to Drive Using Sparse Imitation Reinforcement Learning.
Yuci Han, Alper Yilmaz
International Conference on Pattern Recognition (ICPR 2022)

[5] Dynamic Routing for Navigation in Changing Maps using Deep Reinforcement Learning.
Yuci Han, Alper Yilmaz
ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS 2021)

Academic Services

Reviewer: Remote Sensing Letters, Journal. 2025
ISPRS Journal of Photogrammetry and Remote Sensing. 2025

Skills

Programming: Python, Linux
Frameworks: PyTorch, Tensorflow
Platforms: Unreal Engine, AirSim