HAOYANG HE

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EDUCATION

Carnegie Mellon University Pittsburgh, PA
M.S. in Robotic Systems Development | GPA: 4.08/4. *Expected Dec 2025*
M.S. in Electrical and Computer Engineering | GPA: 3.92/4. *May 2023*
B.S. in Electrical and Computer Engineering | Dean's List, 3-Year Graduation. *May 2022*

RESEARCH PROJECTS

RayFronts: Open-Set Semantic Ray Frontiers for Online Scene Understanding and Exploration *Mar 2025*
- Worked on a novel unified representation that enables both dense and beyond-range efficient semantic mapping, with a novel language-aligned image encoder NARADIO, achieving state-of-the-art in 3D offline semantic segmentation.
- Integrated ConceptFusion and NACLIP and evaluated offline mapping baselines and throughput on AGX Orin.
- Submitted to IROS 2025.

SceneGaussian: Unconstrained Generation of 3D Gaussian Splatting Scenes *May 2024*
- Proposed a novel method for unconstrained text-to-3D scene generation by enhancing 3D Gaussian Splatting with Stable Diffusion RGB inpainting and depth estimation, improving the model's spatial understanding.
- Achieved similar performance as state-of-the-art methods (LucidDreamer and Text2Room) with more potential for high efficiency to achieve high-quality on-the-fly unconstrained 3D scene generation.

Natural Dexterous Piano Playing at Scale With Video Hand Priors *May 2024*
- Developed a novel method for dexterous robot piano playing from YouTube videos by generating fingering labels using recent hand pose estimation and music transcription, enabling large-scale training data for zero-shot piano playing.
- Achieved learning to play a 14-minute piano piece, surpassing prior methods that were limited to 30-second pieces.

Multimodal Analysis of Embodied Instruction Following on ALFRED *May 2024*
- Performed modality analysis of the ALFRED embodied instruction following task through 16 modality ablations.

GAS-NeXt: Few-Shot Cross-Lingual Font Generator *Jan 2023*
- Developed a novel few-shot cross-lingual font style generation method using FTransGAN and AGIS-Net, surpassing previous state-of-the-art methods in generating Chinese fonts from English and vice versa.

WORK EXPERIENCE

The AirLab, CMU Robotics Institute Pittsburgh, PA
Graduate Research Assistant *Aug 2024 – Present*
- Building a wheelchair system capable of autonomously traversing urban sidewalks (MRSD capstone project).
- Researching user preference learning with quick online adaptation using VLMs.

CMU School of Computer Science Pittsburgh, PA
Teaching Assistant *Jan 2024 – Present*
- Course staff for 10-423/623 Generative AI (Spring & Fall 2024), created homework on multimodal foundation models.
- Course staff for 11-777 Multimodal Machine Learning (Fall 2024 & Spring 2025), mentoring embodied AI projects.

Apple Cupertino, CA
Software Engineer Intern *May 2022 – Aug 2022*
- Built a system-level development tool for Camera App and API developments used by colleagues.

Bilibili Shanghai, China
Algorithm Engineer Intern *Jun 2020 – Feb 2021*
- Trained generic object tracking model based on YOLOv3, released in Jan-2021 version of the B-Cut app.
- Built data labeling SDK for facial interpretation, hand recognition, and body segmentation used by colleagues.

SKILLS

Programming Languages: Python, C, C++, Objective-C.
Tools: PyTorch, ROS2, UnixDocker, IsaacSim, MuJuCo, Xcode, Android Studio.