JUNKAI HUANG

✉ junkaih@andrew.cmu.edu | 📞 (615) 275-8369 | 🏠 www.junkai.site | ⬡ hjk0918

EDUCATION

Carnegie Mellon University - School of Computer Science, Robotics Institute   *Aug. 2023 - present, Pittsburgh, PA*
- Master of Science in Robotics | GPA: 4.17 / 4.0
- Advisor: Prof. Fernando De la Torre Frade

The Hong Kong University of Science and Technology (HKUST)   *Sep. 2019 - Aug. 2023, Hong Kong*
- Bachelor of Science in Computer Science and Mathematics | GPA: 3.96 / 4.0
- Selected Coursework: Introduction to Computer Vision (A+), Advanced Computer Graphics (A+), Deep Learning in Computer Vision (A), Deep Learning in Medical Image Analysis (A), Design and Analysis of Algorithms (A+), Operating Systems (A+)
- Selected Awards: Academic Medal Award, First Class Honors, The Bright Dream Robotics Scholarship, HKSAR Government Scholarship Fund, HKUST University's Scholarship, Dean's List for all active semesters.

PUBLICATIONS

Instance Neural Radiance Field
Yichen Liu*, Benran Hu*, **Junkai Huang***, Yu-Wing Tai, and Chi-Keung Tang   (* indicates equal contribution.)
The International Conference on Computer Vision (**ICCV**), 2023. 📄 Paper. ▢ Video.
- We proposed one of the first learning-based NeRF 3D instance segmentation pipelines, Instance NeRF, which can generate consistent 2D segmentation maps from unseen views and query instance information at any 3D point in the scene.

NeRF-RPN: A general framework for object detection in NeRFs
Benran Hu*, **Junkai Huang***, Yichen Liu*, Yu-Wing Tai, and Chi-Keung Tang   (* indicates equal contribution.)
The IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023. 📄 Paper. ▢ Video.
- We proposed the first 3D object detection framework that introduces the Region Proposal Network (RPN) to the Neural Radiance Fields (NeRF), along with a large-scale public indoor NeRF dataset based on the existing synthetic and real world indoor datasets.
- HKUST CSE 2022-2023 Final Year Project Best Demo Award. *Presentation Video.*
- The IEEE (Hong Kong) Final Year Project Competition 2022-2023 Second Runner-up Award.

SELECTED PROJECTS

Large-scale Dynamic 3D Reconstruction with 3D Gaussian Splatting   *Fall 2023 - present, CMU*
- Developing a new pipeline for large-scale dynamic 3D reconstruction in real time.

Physically-based Rendering Pipeline with Photon Mapping   *Spring 2024, CMU*
- Implemented the photon mapping rendering algorithm with NEE light sampling, final gathering and caustic photon mapping.
- Technical award winner of the in-class final rendering competition. *Link.*

Semi-Supervised Tumor Infiltrating Lymphocytes (TIL) Segmentation   *Spring 2022, HKUST*
- Conducted experiments on TIL segmentation task with U-Net, TransUNet, and Swin-UNet, incorporating semi-supervised strategies including label guessing and MixMatch using PyTorch. Achieved dice coefficient 55.2% for invasive tumor segmentation.

WORK EXPERIENCE

Software Engineer Intern - Perception & Pose, Rivian Automotive, Inc.   *May. 2024 - Aug. 2024, Palo Alto, CA*
- Developed a 3D occupancy prediction model that took camera and lidar inputs. Validated it on Rivian dataset.
- Improved the point cloud ground segmentation method and the 3D point cloud/occupancy grid visualization workflow.

AI Developer Intern, Sebit Company Limited   *Jun. 2022 - Aug. 2022, Hong Kong*
- Developed and deployed a customizable YOLOv4 training pipeline using PyTorch, OpenCV, and Jenkins.

Teaching Assistant
- TA for MSBD5016 Deep Learning Meets Computer Vision (PG Course)   *Spring & Fall 2022, HKUST*
- TA for COMP4411 Computer Graphics   *Spring 2022, HKUST*

SKILLS & PROFICIENCIES

Technical Skills: Python, PyTorch, OpenCV, Linux, MATLAB, Git, C++, Scikit-Image, TensorFlow, Docker, SolidWorks, Microsoft Azure, etc.
Languages: English (fluent), Mandarin (native)

EXTRA-CURRICULAR

Deputy Head - HKUST Student Ambassador   *2021 - 2023, HKUST*
Project Manager, Mechanical Engineer - HKUST ENTERPRIZE RoboMaster Team   *2019 - 2021, HKUST*
- Developed the chassis and suspension system of the Hero Robot (CAD with SolidWorks and manufacturing.)
- Drafted 2021 mechanical team R&D plan and tracked R&D progress of the team.