JUNKAI HUANG

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

EDUCATION

Carnegie Mellon University *Aug. 2023 - present, Pittsburgh*
- Master's in Robotics

Vanderbilt University (Undergraduate Exchange Program) *Jan. 2023 - May 2023, Nashville*
- Total GPA: 3.93 / 4.0

The Hong Kong University of Science and Technology (HKUST) *Sep. 2019 - Jul. 2023, Hong Kong*
- BSc in Computer Science and General Mathematics (double major)
- Major GPA: 3.96 / 4.3 (Total GPA: 3.95)
- Selected Awards & Scholarships: The BDR Scholarship - Academic Performance; HKSAR Government Scholarship Fund - Reaching Out Award; HKUST University's Scholarship; HKUST School of Engineering Dean's list for all active semesters.

PUBLICATIONS

Instance Neural Radiance Field
Benran Hu*, **Junkai Huang***, Yichen Liu*, 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 novel views and query instance information at any 3D point. Instance NeRF surpasses previous NeRF segmentation works and competitive 2D segmentation methods in segmentation performance on unseen views.

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 NeRF-RPN, the first significant 3D object detection framework that introduces the Region Proposal Network (RPN) to the Neural Radiance Fields (NeRF). We also prepared a large-scale public indoor NeRF dataset for 3D object detection, based on the existing synthetic indoor dataset Hypersim and 3D-FRONT, and real indoor dataset ScanNet and SceneNN.
- Project selected for the HKUST CSE Department 2022-2023 FYP Best Demo Award. *Presentation Video.*

PROJECTS

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

Artificial Intelligence Methods for Medical Videos *Oct. 2021 - Jan. 2022, HKUST*
- Applied MS-TCN to surgical video workflow prediction with timestamp & cross pseudo supervision. Perform video feature extraction.

Image Style Transfer Application: From Photo to Cyberpunk *Sep. 2021 - Nov. 2021, HKUST*
- Analyzed style transfer models including Neural Style Transfer, CycleGAN, CUT. Introduced gradient loss for sharper style transfer.

Deep learning methods for Mitotic Figure Detection *Jul. 2021 - Aug. 2021, HKUST*
- Implemented whole slide image preprocessing pipeline and mitotic figure detection model training and testing pipeline.
- Analyzed the performance degradation of YOLOv3, Faster R-CNN, and Cascade R-CNN on domain-shifted data.

WORK EXPERIENCE

AI Developer Intern in Sebit Company Limited, Hong Kong *Jun. 2022 - Aug. 2022, Hong Kong*
- Developed a customizable model training module for a medical image analysis platform.

TA for MSBD5016 Deep Learning Meets Computer Vision: Practice and Applications *Feb. 2022 - Dec. 2022, HKUST*
- In this PG-level computer vision course, I was in charge of answering questions, grading homework and setting up virtual machines.

TA for COMP4411 Computer Graphics *Feb. 2022 - May 2022, HKUST*
- I was in charge of delivering the Ray Tracing lab sessions, answering questions and grading homework.

Student Helper for COMP2012 Object-Oriented Programming and Data Structures *Sep. 2021 - Nov. 2021, HKUST*
- I helped in the lab sessions by answering questions regarding the lab work and homework.

EXTRA-CURRICULUM

Deputy Head, HKUST Student Ambassador *Dec. 2021 - Jul. 2023, HKUST*
Project Manager, Mechanical Engineer in HKUST ENTERPRIZE RoboMaster Team *Dec. 2019 - Jun. 2021, HKUST*

SKILLS & PROFICIENCIES

Programming Languages: Python, MATLAB, C/C++, Java
Libraries: PyTorch, Scikit-learn, OpenCV, TensorFlow, Numpy, Matplotlib, SciPy, Panda
Languages: English (fluent), Mandarin (native)