

Hao-Yu (Max) Hsu

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Research Interests

Machine Learning, Deep Learning, Computer Vision, Robotics, Parallel Computing

Education

University of Illinois Urbana-Champaign (UIUC)

Aug. 2023 - May. 2025 (Expected)

Master of Science in Computer Science

Champaign, IL

National Tsing Hua University (NTHU)

Sep. 2017 - Jun. 2021

Bachelor of Science in Electrical Engineering (**summa cum laude, GPA: 4.23/4.3**)

Hsinchu, Taiwan

Publications (* indicates equal contribution)

[1] Yu-Shan Huang, Sheng-Yu Huang, **Hao-Yu Hsu**, Yu-Chiang Frank Wang. "Interpreting Latent Representation in Neural Radiance Fields for Manipulating Object Semantics". In *IEEE International Conference on Image Processing (ICIP)*, 2023.

[2] **Hao-Yu Hsu***, Sheng-Yu Huang*, Yu-Chiang Frank Wang. "SPoVT: Semantic-Prototype Variational Transformer for Dense Point Cloud Semantic Completion". In *Conference on Neural Information Processing Systems (NeurIPS)*, 2022.

[3] Zhi-Hao Lin, Wei-Chiu Ma*, **Hao-Yu Hsu***, Yu-Chiang Frank Wang, Shenlong Wang. "NeurMiPs: Neural Mixture of Planar Experts for View Synthesis". In *IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)*, 2022.

Research Experience

Text-driven 3D Scene Editing

Sep. 2023 - Present

Graduate Research Assistant at Shenlong's Lab, UIUC

Advisor: Prof. Shenlong Wang

- Developed 3D scene editing pipelines based on textual instructions. (in progress)

Robot Learning on Object Assembly

Jun. 2022 - Feb. 2023

Research Assistant at Robot Learning Lab, National Taiwan University

Advisor: Prof. Shao-Hua Sun

- Developed a robot learning framework by leveraging multi-view observations for solving tasks like doing tangram puzzles and stacking blocks.

Point Cloud Semantic Completion on 3D Objects

Feb. 2022 - Jun. 2022

Research Assistant at Vision & Learning Lab, National Taiwan University

Advisor: Prof. Yu-Chiang Frank Wang

- Proposed a point cloud semantic completion framework to complete partial point clouds of 3D objects.
- Exploited both geometry and semantic cues to construct a variational **Transformer** featuring part prototypes.
- Outperformed other methods **13%** on chamfer distance and **11%** on mIoU scores.

Novel View Synthesis on 3D Indoor Scenes

Sep. 2021 - Feb. 2022

Research Assistant at Vision & Learning Lab, National Taiwan University

Advisor: Prof. Yu-Chiang Frank Wang

- Designed a novel 3D planar representation to effectively capture the geometry and appearance of 7 indoor scenes.
- Boosted indoor scene rendering time by **60x** with custom **CUDA acceleration** on parallel model inference.
- Outperformed NeRF method by **1.03** PSNR in extreme view extrapolation and by **0.68** PSNR in novel view synthesis.

Work Experience

Industrial Technology Research Institute (ITRI)

Jul. 2020 - Sep. 2020

Software Intern on Text Mining, Big Data R&D Center

Hsinchu, Taiwan

- Developed optical character recognition (OCR) system for 20,000 digitized receipts from client-scanned documents.
- Reached **88%** mAP in text localization task on testing dataset of client documents.

Selected Projects

Parallel Low-Poly Image Generation 📱

Jun. 2021

Final Project of "Parallel Computing" [C++, CUDA, OpenCV]

- Designed a low-poly style image processing pipeline in **C++** and parallelized the process using **CUDA**.
- Implemented a 2D jump flooding algorithm on Delaunay triangulation and triangle partitioning for image coloring.
- Achieved overall **20x** speedup compared to sequential version running on CPU.

Skills

Programming Python, C/C++, C#, CUDA, OpenMP, MATLAB, MySQL, JavaScript, Verilog

Frameworks/Tools PyTorch, Tensorflow, Scikit-learn, OpenCV, Git, Unity, LaTeX

Domain Machine Learning, Deep Learning, Computer Vision, Computer Graphics, Robot Learning