BENRAN HU

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Computer Science — *Dec 2024 (Expected)*

Hong Kong University of Science and Technology — Hong Kong SAR
Bachelor of Science in Data Science and Technology, and in Computer Science — *Jun 2023*

- Achieved CGA: 4.14/4.30, Major CGA: 4.19/4.30.

RESEARCH EXPERIENCE

NeRF Instance Segmentation [ICCV'23] | — HKUST, Hong Kong SAR
Advisors: *Prof. Chi-Keung Tang* and *Prof. Yu-Wing Tai* — *Dec 2022 - Jul 2023*

- Proposed one the first 3D instance segmentation methods in NeRFs by optimizing a Neural Instance Field.

Shading Reprojection Scheduling — HKUST, Hong Kong SAR
Advisor: *Prof. Pedro Sander* — *Sep 2022 - Present*

- Maximized rendering quality under performance constraints by scheduling temporal reprojection of shading based on error prediction.

Object Detection in NeRF [CVPR'23] | — HKUST, Hong Kong SAR
Advisors: *Prof. Chi-Keung Tang* and *Prof. Yu-Wing Tai* — *May 2022 - Nov 2022*

- Proposed the first significant 3D object detection method in Neural Radiance Fields and created the first dataset for NeRF 3D object detection.

Perception-Driven VR Rendering — HKUST, Hong Kong SAR
Advisor: *Prof. Pedro Sander* — *Sep 2021 - Sep 2022*

- Devised a perception-driven rendering algorithm for VR utilizing binocular fusion and reprojection to improve rendering performance while minimizing visual quality loss.

PUBLICATIONS

Yichen Liu*, **Benran Hu***, Junkai Huang*, Yu-Wing Tai, and Chi-Keung Tang. Instance Neural Radiance Field. In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, October 2023. |

Benran Hu*, Junkai Huang*, Yichen Liu*, Yu-Wing Tai, and Chi-Keung Tang. NeRF-RPN: A general framework for object detection in NeRFs. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2023. |

TECHNICAL PROJECTS

Metarenderer

- Developed a rendering playground for introductory graphics courses based on three.js and WebGL, featuring interactive experiments of camera and shading models, lighting and illumination, culling, textures, and shadow mapping.
- Implemented PCSS, microfacet materials, and PRT with interreflection and glossy BRDF.

Geometry Processing Pipeline

- Implemented the whole pipeline from shape acquisition to rigged models, including surface reconstruction, mesh smoothing, mesh parametrization, mesh deformation, skinning, and skeletal animation.

Trace

- Implemented a CPU renderer supporting path tracing, microfacet materials, and photon mapping.