

CHEN Liheng

EDUCATION

Hong Kong University of Science and Technology

Aug. 2025 – Jun. 2027(expected)

Master of Philosophy in Individualized Interdisciplinary Program (Computer Vision and Computer Graphics)

Supervisors: Hongbo Fu & Anyi Rao

Beijing Normal University

Sep. 2021 – Jun. 2025

Major: Artificial Intelligence

Core Courses: Calculus (95), Fundamental Physics (90), Linux Operating System (93), Database and Data Principles (91)

Awards: First Prize Scholarship for the Competition, 2024 COMAP MCM F Prize

PUBLICATION

Li-Heng Chen, Zi-Xin Zou, Chang Liu, Tianjiao Jing, Yan-Pei Cao, Shi-Sheng Huang, Hongbo Fu and Hua Huang (2025). *GCRayDiffusion: Pose-Free Surface Reconstruction via Geometric Consistent Ray Diffusion*. Accepted by International Conference on Computer Vision 2025. arXiv: <https://arxiv.org/abs/2503.22349>

Huang, S., Chen, G., **Chen, L.**, & Huang, H. (2024). *NeuralIndicator: Implicit Surface Reconstruction from Neural Indicator Priors*. Proceedings of the 41st International Conference on Machine Learning

PROFESSIONAL EXPERIENCE

Vast.AI

Aug. 2024 – Present

Algorithm Researcher Intern, Department of Technology and Engineering

- Developed a 3D reconstruction and camera pose estimation pipeline, using Dinov2 for accurate image feature extraction and 7D ray generation with Plücker coordinates, achieving over 90% accuracy for camera pose estimation on the Objaverse dataset
- Constructed a triplane network with MLP-based geometric feature analysis to generate Signed Distance Functions (SDF)
- Integrated SDF as a conditioning factor for the denoising process, using ray-calculated surface points as query points to significantly enhance the accuracy and fidelity of both 3D object shapes and camera pose estimation

ABB (China)

Jul. 2024

Algorithm Engineer Intern, Department of Digital Systems

- Fine-tuned YOLOv8 parameters to develop a surveillance video integration program for detecting indoor population changes, and configured 5 modes to provide air conditioning strategies based on population density
- Developed interfaces and standardized the database format for integration with the company's industrial software Zee600
- Optimized data updates, real-time writing, and data structure for the smart screen system, eliminating 80% of the manual steps and enabling staff to access real-time data from four modules with a single IP address modification

Xiamen Area of China (Fujian) Pilot Free Trade Zone Port Power Supply & Tech. Co., LTD.

Jan. 2024 – Feb. 2024

System Engineering Intern, Department of Communications

- Contributed to the usability optimization of the EAM system by resolving attribute conflicts in equipment inventory management and implementing automated equipment model selection, significantly reducing user workload
- Contributed to the blueprint design of the project management system for Harbour Electric. Designed the data structure for project information tables, laying the groundwork for subsequent development
- Engaged in testing projects for the Geographic Information System for the power information in the Harbour region,

optimizing various system functionalities

ACADEMIC EXPERIENCE

Pose-Free 3D Surface Reconstruction

Aug. 2024 – Mar. 2025

First Author (under the supervision of Prof. Shi-Sheng Huang , working closely with Dr. Zi-Xin Zou and Dr. Yan-Pei Cao)

- Developed a pose-free surface reconstruction framework that integrates triplane-based signed distance field (SDF) learning with geometric priors from a novel diffusion model
- Proposed GCRayDiffusion, a geometric consistent ray diffusion model that estimates camera poses by representing them as neural ray bundles and denoising their distributions with 3D geometric constraints
- Incorporated explicit on-surface sampling points from the neural rays into the SDF learning process, enabling simultaneous optimization of camera pose and surface reconstruction
- Conducted extensive experiments on Objaverse, Co3D and Google Scanned Object datasets, demonstrating superior accuracy and generalization over prior methods under sparse view settings

Unsupervised Point Cloud-based 3D Model Reconstruction

May. 2023 – Apr. 2024

Research Assistant (under the supervision of Prof. Shi-Sheng Huang)

- Applied an unsupervised learning model for 3D reconstruction, integrating global shape priors and smooth indicator functions constrained by gradient domains
- Proposed a differentiable generation module to generate differentiable smooth indicator functions from a set of oriented points and developed a joint learning framework named NeuralIndicator
- Conducted extensive evaluations on various public synthetic and real-scan point cloud datasets, demonstrating significant advantages of our approach in surface reconstruction, even for input point clouds with complex topology structures and incompleteness or noise

The Power of Momentum: How to Win the Match with Data (2024 MCM Problem C)

Feb. 2024

Team Leader

- Developed a model based on IG-LSTM to measure player momentum, and conducted Correlation Analysis and Stochastic Simulation to assess the impact of momentum swings on match flow
- Utilized an information entropy-based decision tree to extract key features driving momentum swings, and designed an ANN-driven Momentum Swing Prediction Model (MSPM) to forecast match dynamics
- Optimized the model's accuracy and generalizability by incorporating new features, fine-tuning the parameters, and testing it across various tournaments and sports, securing the F prize

Construction of a Speckle Pattern Model with Paddy Field Characteristics

May 2022 – May 2023

Research Assistant (under the supervision of Prof. Yongqiang Cai)

- Utilized OpenCV to perform grayscale conversion, smoothing filtering, and edge enhancement on images, followed by region segmentation and extraction of morphological and textural features
- Extracted object edges using Sobel and Canny algorithms, and enhance effectiveness through subsequent optimization using morphological operations, Hough transform, and other optimizations
- Conducted statistical analysis on image features and boundaries to derive characteristic parameters, and enhanced the conformity between models and actual field shapes by model optimization and reaction-diffusion equation optimization

ADDITIONAL INFORMATION

Languages: Mandarin Chinese (native), English (proficient)

Programming Skills: C/C++, Python, SQL

Hobbies: Piano, Sports (basketball, swimming, cycling, fitness, etc.)