Haotian Wang

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National Key Laboratory of Human-Machine Hybrid Augmented Intelligence,
Xi'an Jiaotong University, China

Research Interests

Computer Vision & Multi-Modal Vision | 3D Vision & Scene Depth Perception

Education

- **Ph.D.** **Xi'an Jiaotong University [🌐]** *09 2019 - 06 2025*
  College of Artificial Intelligence, advised by Prof. Meng Yang. Xi'an, China
- **Joint Ph.D.** **Nanyang Technological University [🌐]** *12 2023 - 12 2024*
  College of Computing and Data Science, advised by Prof. Shijian Lu. Singapore
- **B.S.** **North China Electric Power University [🌐]** *09 2013 - 06 2017*
  School of Electrical and Electronic Engineering Beijing, China

Research Experience

- **Thesis Topic: General and Generalized Depth Perception Framework** *09 2019 - 06 2025*
  Xi'an Jiaotong University Xi'an, China
  - My research focuses on developing a unified model for perceiving diverse 3D scenes in open environments for embodied intelligence. Autonomous agents, equipped with sensors like cameras, LiDAR, ToF, structured-Light, or their combinations, must function effectively across diverse indoor and outdoor scenes. To address these challenges, we propose a general and generalized framework to robustly perform depth estimation/completion/enhancement using a single model, enabling accurate scene depth perception across varying scenes and sensors.

- **Thesis Topic: Generalizable Depth Completion Model** *12 2023 - 12 2024*
  Nanyang Technological University Singapore
  - This research focuses on robustly acquiring accurate dense metric depths from sparse depth measurements, supporting precise spatial perception for downstream applications. We have developed an advanced and highly generalizable depth completion technique capable of performing effectively in zero-shot and few-shot scenarios. Our approach demonstrates impressive generalization on multiple benchmarks, providing reliable metric depth data for comprehensive 3D scene understanding.

Publications and Patents

A=Paper, B=Patent(* denotes advisor)

[A.5] **Haotian Wang**, Aaoran Xiao, Xiaoqin Zhang, Meng Yang, and Shijian Lu. "PacGDC: Label-Efficient Generalizable Depth Completion from Projective Ambiguity and Consistency." In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2025. In submission

[A.4] **Haotian Wang**, Meng Yang, Xinhu Zheng, and Gang Hua. "Scale Propagation Network for Generalizable Depth Completion." *IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**)*, 2025. [Paper] [🐙]

[A.3] **Haotian Wang**, Meng Yang, and Nanning Zheng. "G2-MonoDepth: A General Framework of Generalized Depth Map Inference from Monocular RGB-X Data." *IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**)*, vol. 46, pp. 3753-3771, 2024. [Paper] [🐙]

[A.2] **Haotian Wang**, Meng Yang, Ce Zhu, and Nanning Zheng. "RGB-Guided Depth Map Recovery by Two-Stage Coarse-to-Fine Dense CRF Models." *IEEE Transactions on Image Processing (**T-IP**)*, vol. 32, pp. 1315-1328, 2023. [Paper] [🐙]

[A.1] **Haotian Wang**, Meng Yang, Xuguang Lan, Ce Zhu, and Nanning Zheng. "Depth Map Recovery based on a Unified Depth Boundary Distortion Model." *IEEE Transactions on Image Processing (**T-IP**)*, vol. 31, pp. 7020-7035, 2022. [Paper] [🐙]

[B.4] Meng Yang*, **Haotian Wang**, and Nanning Zheng. "Zero-Shot Depth Completion Based on Scale Propagation Normalization Layer: Method and System." *Chinese Patent*, Patent No. 2023101807430, 2024.

[B.3] Meng Yang*, **Haotian Wang**, and Nanning Zheng. "Generalizable Depth Map Inference with Single-View: Method and System." *Chinese Patent*, Patent No. 2023101807430, 2023.

[B.2] Meng Yang*, **Haotian Wang**, and Nanning Zheng. "Depth Map Structure Restoration Method Based on the Fully Connected Conditional Random Field Model." *Chinese Patent*, Patent No. ZL202111057715.2, 2021.

[B.1] Meng Yang*, **Haotian Wang**, and Nanning Zheng. "An Iterative Method of Depth Map Structure Restoration based on Structural Similarity between RGB and Depth." *Chinese Patent*, Patent No. ZL200010007508.X, 2020.

Research Projects

- **A General Model of Single-View 3D Perception for Multi-Modal Autonomous Agents** *12 2022 - 06 2025*
  ***Responsibility**: Core Member. **Source**: No. 62373298, The National Natural Science Foundation of China* Xi'an, China
- **A General Depth Perception Model** *01 2022 - 12 2023*
  ***Responsibility**: Project Leader. **Source**: No. xzy022022061, The Basic Research Foundation of Xi'an Jiaotong University.* Xi'an, China

Honors and Awards

- **Outstanding Graduate Student** *10 2024*
  Xi'an Jiaotong University
- **Baosheng Hu Scholarship (Top 5%, 1st Place)** *09 2024*
  Xi'an Jiaotong University
- **Academic Star of the IAIR (Top 1%)** *01 2024*
  Xi'an Jiaotong University
- **Academic Scholarship (Top 5%, 1st Place)** *10 2023*
  Xi'an Jiaotong University
- **Qianheng Huang Scholarship** *10 2023*
  Xi'an Jiaotong University
- **Joint Ph.D. Scholarship (6700 people in China)** *07 2023*
  China Scholarship Council (CSC)
- **Invited Oral Presenter** *07 2023*
  Xi'an Jiaotong University
- **College Scholarship** *11 2015*
  North China Electric Power University

Research Skills

- **Programming Languages:** Python / Pytorch / Matlab / C / LaTeX
- **Operation Systems:** Linux / Windows / MacOS
- **Languages:** English / Chinese
- **Certificates:** College English Test Band 6 / National Computer Rank Examination Level 2 (C language) / National Computer Rank Examination Level 3 (Network technology)

References

1. **Prof. Meng Yang** (Email:mengyang@mail.xjtu.edu.cn)
   College of Artificial Intelligence, Xi'an Jiaotong University, China
   Relationship: [Ph.D Advisor]

2. **Prof. Shijian Lu** (Email:Shijian.Lu@ntu.edu.sg)
   College of Computing and Data Science, Nanyang Technological University, Singapore
   Relationship: [Joint Ph.D Advisor]