

Jiahui Wang

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RESEARCH INTERESTS

Deep Learning, Computer Vision, Self-Supervised Learning, Few-shot Learning, 3D Semantic Segmentation, 3D Reconstruction, 6D Pose Estimation, Efficient Model, Embodied AI, Multi-Modality Model, VLM, LLM.

EDUCATION

National University of Singapore

Jan 2022 – Jan 2026 (Expected)

Ph.D. in Electrical and Computer Engineering, College of Design and Engineering

📍 Singapore

- **Scholarship:** NUS Research Scholarship (Industrial ring-fenced with Hexagon AB)
- **Supervisors:** Prof.Abdullah Al Mamun, Prof.Lee Tong Heng, and Dr.Bruce Engelmann (CTO of Hexagon AB)

Harbin Institute of Technology

Aug 2016 – Jul 2020

B.S. in Opto-Electronic Information Science and Engineering, School of Physics

📍 Harbin, China

EXPERIENCE

Mechatronics and Automation Lab, National University of Singapore

Jan 2022 – Present

Advisors: Prof.Abdullah Al Mamun, Prof.Lee Tong Heng, Dr.Haiyue Zhu

📍 Singapore

- Conducted extensive research and developed a robust, accurate, and efficient deep learning model for CAD/CAM workpiece recognition, which **automates workflow** and **saves plenty of time**. (*Published in INDIN 2022, IECON 2023*)
- Designed a learning pipeline that can utilize unannotated point clouds through **contrastive pre-training** to **boost the performance** of few-shot learning. (*Published in ICRA 2023*)
- Developed a novel framework to **decouple the few-shot point cloud segmentation task** into shallow similarity learning and deep similarity learning, and achieve promising results. (*Published in IEEE TNNLS 2025*)
- Proposed a model that **incorporates the power of LLM into 3D few-shot point clouds segmentation**, which boosts the few-shot performance and enables promising zero-shot ability. (*Under Review*).
- Designed a **6D pose estimation** framework that **only requires one reference RGB image** and **proposes an efficient fine-tuning method** for foundation models to derive the actual pose of the novel target object (*Accepted to NeurIPS 2025*).
- Working on **enhancing spatial perception** capabilities in Vision-Language Models (VLMs) and **mitigating spatial hallucination** issues.

Ducheng Technology and Consulting LTD.

Oct 2020 – Jul 2021

Software Engineer, ML Researcher

📍 Beijing, China

- Involved in developing an online bidding system aided by computer vision algorithms (using C++ and Python).
- Participated in the development and maintenance of an intelligent scheduling system with physical perception capabilities.

Yuanbo Technological Company

Jun 2020 – Sep 2020

ML Researcher

💻 Remote

- Designed an automatic optimization method for the thermal power unit, achieved a short test cycle, less resource consumption, and high efficiency.
- Worked on dealing with the class-imbalance data of the bank statements of students' campus cards to identify abnormalities.

Space Fundamental Sciences Research Center

Mar 2018 – Jun 2020

Advisors: Prof.Jie Wan, Prof.Peng E

📍 Harbin, China

- Designed and implemented a deep learning framework that fuses visual and temporal data to predict solar flare severity accurately and uses SQL to conduct data management.
- Applied data science and machine learning techniques to investigate how different solar astronomical characteristics and physical parameters influence the formation of solar flares.

PUBLICATIONS

- Jiahui Wang** Haiyue Zhu, Haoren Guo, Abdullah Al Mamun, Cheng Xiang, Tong Heng Lee. “SingRef6D: Monocular Novel Object Pose Estimation with a Single RGB Reference”. *Accepted to The Thirty-Ninth Annual Conference on Neural Information Processing Systems (NeurIPS) 2025*
- Jiahui Wang**, Changhao Chen, “DynaNav: Dynamic Feature and Layer Selection for Efficient Visual Navigation”. *Accepted to The Thirty-Ninth Annual Conference on Neural Information Processing Systems (NeurIPS) 2025*
- Jiahui Wang**, Haiyue Zhu, Haoren Guo, Abdullah Al Mamun, Cheng Xiang, Clarence W. de Silva and Tong Heng Lee, “SDSimPoint: Shallow-Deep Similarity Learning for Few-Shot Point Cloud Semantic Segmentation,” *Published in IEEE Transactions on Neural Networks and Learning Systems (TNNLS), vol. 36, no. 6, pp. 10043-10056, June 2025*
- Jiahui Wang**, Haiyue Zhu, Haoren Guo, Abdullah Al Mamun, Cheng Xiang, Tong Heng Lee. “Few-Shot Point Cloud Semantic Segmentation via Contrastive Self-Supervision and Multi-Resolution Attention”. *Published in IEEE International Conference on Robotics and Automation (ICRA), London, United Kingdom, 2023, pp. 2811-2817.*
- Jiahui Wang**, Haiyue Zhu, Haoren Guo, Abdullah Al Mamun, Cheng Xiang, Tong Heng Lee. “EPSegFZ: Efficient Point Cloud Semantic Segmentation for Few- and Zero-Shot Scenarios with Language Guidance”. *Under Review*
- Haoren Guo, Haiyue Zhu, **Jiahui Wang**, Vadakkepat Prahlad, Weng Khuen Ho, Tong Heng Lee. “Enhancing Multivariate Time-Series Domain Adaptation via Contrastive Frequency Graph Discovery and Language-Guided Adversary Alignment”. *Published in The Thirty-Ninth AAAI Conference on Artificial Intelligence (AAAI).*
- Jiahui Wang**, Haiyue Zhu, Haoren Guo, Abdullah Al Mamun, Clarence W De Silva, Tong Heng Lee. “Few-Shot Point Cloud Semantic Segmentation for CAM/CAD via Feature Enhancement and Efficient Dual Attention”. *Published in 2023- 49th Annual Conference of the IEEE Industrial Electronics Society (IECON), Singapore, Singapore, 2023, pp. 1-6.*
- Jiahui Wang**, Haiyue Zhu, Haoren Guo, Abdullah Al Mamun, Prahlad Vadakkepat, Tong Heng Lee. “CAM/CAD Point Cloud Part Segmentation via Few-Shot Learning”. *Published in IEEE 20th International Conference on Industrial Informatics (INDIN). IEEE, 2022: 359-365.*
- Haoren Guo, Haiyue Zhu, **Jiahui Wang**, Vadakkepat Prahlad, Weng Khuen Ho, Clarence W de Silva, Tong Heng Lee. “Remaining Useful Life Prediction via Frequency Emphasizing Mix-Up and Masked Reconstruction”. *Published in IEEE Transactions on Artificial Intelligence, vol. 5, no. 9, pp. 4686-4695, Sept. 2024.*
- Haoren Guo, Haiyue Zhu, **Jiahui Wang**, Vadakkepat Prahlad, Weng Khuen Ho, Clarence W de Silva, Tong Heng Lee. “Lightweight Compressed Temporal and Compressed Spatial Attention with Augmentation Fusion in Remaining Useful Life Prediction”. *Published in 2023- 49th Annual Conference of the IEEE Industrial Electronics Society (IECON), Singapore, Singapore, 2023, pp. 1-6.*
- Haoren Guo, Haiyue Zhu, **Jiahui Wang**, Prahlad Vadakkepat, Weng Khuen Ho, Tong Heng Lee. “Masked Self-Supervision for Remaining Useful Lifetime Prediction in Machine Tools”. *Published in IEEE 20th International Conference on Industrial Informatics (INDIN). IEEE, 2022: 353-358.*

TEACHING ASSISTANT

Courses : EE5104 Adaptive Control, EE6104 Adaptive Control(Advanced), EE5101 Linear Systems, EE4302 Advanced Control Systems, CEG5301 Machine Learning with Applications, EE4305 Fuzzy Systems, EE3031 Innovation & Enterprise I

SKILLS

Language : Mandarin (Native), English (Proficient in speaking, reading, and writing)
Programming Related : Python, C/C++, Rust, HTML, CUDA, Git, Docker, vim, PyTorch, TensorFlow, SQL
Tools : MATLAB, Simulink, Blender, NVIDIA ISAAC, MeshLab, Cloud Compare, COMSOL, Linux, Nix
Liraries :OpenCV, PyTorch3D, HuggingFace, triton, Minkovski Engine, PCL, Trimesh, Langchain