Jiahui Wang

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RESEARCH INTERESTS

Machine Learning, Deep Learning, Computer Vision, Self-Supervised Learning, Few-/Zero-shot Learning, Spatial Understanding, 3D Computer Vision, 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

TikTok PTE. LTD. Oct 2025 – Present
AI Engineer Singapore

- Involved in developing multimodality models for an efficient and accurate search & retrieval system.
- Responsible for post-training of VLMs and LLMs for better adaptability in various specific application cases.

Mechatronics and Automation Lab, National University of Singapore Jan 2022 – Oct 2025
Ph.D Candidate; 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 monocular **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 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

Student Researcher; 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.

REPRESENTATIVE 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 by 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 by 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.*

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, Stable Diffusion, COMSOL, Linux, UE
Liraries: OpenCV, PyTorch3D, HuggingFace, triton, Minkowski Engine, PCL, Trimesh, Langchain