



Zhihao Liu Ph.D.

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Professional Experience

- Postdoctoral Researcher, KTH Royal Institute of Technology.
- Research Fellow, Centre of Excellence in Production Research (XPRES), Sweden.
- Member of ACM and ACM Europe Technology Policy Committee.
- Member of IEEE and IEEE Technical Committee on Robot Learning, Digital Manuf. and Human Centered Automation, and Human-Robot Interaction & Coordination.
- Journal Reviewer: AI, IEEE TNNLS, IEEE TII, IEEE TIE, IEEE TASE, IEEE TCDS, IEEE THMS, IJHCI, AEI, RCIM, ESWA, EAAI, JMP, IJPR, IJPE, CIE, etc.
- Conference Reviewer: SME-NAMRC52, CIRP-Design34, ICRA2025.

Education

- Guest Ph.D.** KTH Royal Institute of Technology, Sweden. 2019 – 2021
 • Robotics and Artificial Intelligence. Supervisor: Prof. Lihui Wang
- Ph.D.** Wuhan University of Technology, China. 2018 – 2023
 • Information and Communication Engineering. Supervisor: Prof. Quan Liu, Prof. Wenjun Xu
- M.Eng.** Wuhan University of Technology, China. 2016 – 2018
 • Information and Communication Engineering. Supervisor: Prof. Quan Liu, Prof. Wenjun Xu
- B.Eng.** Wuhan University of Technology, China. 2012 – 2016
 • Communication Engineering. Supervisor: Prof. Wenjun Xu

Skills

- AI, Deep Learning, Robot Learning, Deep Reinforcement Learning (Tensorflow, PyTorch)
- Digital Twin and Metaverse (Unity3D)
- Robotic Engineering (ROS1&2, MoveIt1&2, ros2_control, ABB/UR/KUKA, etc.)
- Programming (Python, C, C++, C#, Java, etc.)
- System Design (PCB design, Hardware integration, ARM Embedded Systems, Drivers, etc.)
- Robotic System Design and Development (Collaborative Robotics, Quadrotors, Sensors, etc.)
- Proposal Writing, Project / Team Management, Master Student Supervision
- Public Speaking and Presenting
- WEB development (Html / CSS, Java Web, JavaScript, Database, etc.)
- English (Fluent), Chinese (Native)

Selected Awards

- Academia**
- Honorary Paper, 51st CIRP Conference on Manufacturing Systems, 2018
 - Best Application Paper Award, 11st CIRP Conference on Industrial Product-Service Systems, 2019

Selected Scholarship

- National Scholarship for Ph.D. Candidates, Ministry of Education, China, 2021
- 1st-class Scholarship for Ph.D. Candidates, Wuhan University of Technology, 2021
- 1st-class Scholarship for Ph.D. Freshmen, Wuhan University of Technology, 2018
- 1st-class Scholarship for Postgraduate Students, Wuhan University of Technology, 2017
- Outstanding Scholarship (above the 1st-class) for Postgraduate Freshmen, Wuhan University of Technology, 2016

Selected Honour

- Outstanding Doctoral Thesis Award, Wuhan University of Technology, 2023
- Merit Postgraduate Students, Wuhan University of Technology, 2017
- Outstanding Graduate (Bachelor), Wuhan University of Technology, 2016

Academic Performance

- ♦ **Journal Papers:** 11 (Web of Science indexed)
- ♦ **Conference Papers:** 13
- ♦ **Citations:** 1083 ♦ **H-index:** 13 ♦ **i10-index:** 14 (Google Scholar)
- ♦ **Seminar and Conference Presentations:** 16
- ♦ **Patents:** 7 ♦ **Software Copyright:** 5 ♦ **Book Chapter:** 1
- ♦ **Journal Special Issue (Guest Editor):** 1

Selected Projects

- **EU Horizon 2020 ODIN: Open-Digital-Industrial and Networking pilot lines using modular components for scalable production.** The EU-funded ODIN project uses groundbreaking research in the fields of a) human robot collaborative workplaces; b) autonomous robotics & AI-based task planning; c) mobile robots and reconfigurable tooling; d) digital twins and virtual commissioning; and e) service-oriented robotics integration and communication architectures, aspiring to enable scalable industrial robotics.
Partners: Tecnia, Comau, Pilz, Roboception, Visual Components, etc.
Skills: RGB-D sensing, Deep neural networks, PyTorch, Python programming, Communication, Deliverables development, Scientific writing, Project presentation, etc.
- **Swedish Digital Futures: Towards Safe Smart Construction: Algorithms, Digital Twins and Infrastructures.** The project aims to develop an integrated digital infrastructure system to enhance the level of automation for smart construction. The initial goal will involve the creation of models for the digital twin of the robotic environment on construction sites. The digital twin will be used for remote real-time monitoring, prediction, optimization and multi-robot task planning and control.
Partners: Skanska Sweden, Ericsson Research.
Skills: Digital twins using Unity3D, ROS2 (control and planning using ros2_control and MoveIt2), C++/C# programming, Robotic systems (ABB, UR, KUKA), Architecture design, Work-package management, communication, Scientific writing, Project presentation, etc.
- **SJTU-KTH Collaborative Research and Development Seed Grants: Foundation Models and Large Language Models Driven Proactive Human-Robot Collaboration towards the Futuristic Industry 5.0 Assembly Lines.**
- **SAIC-GM-Wuling Automobile Production Line Energy Consumption Monitoring.**
Partners: SAIC Motor Corporation, General Motors.
Skills: WEB system development, Java programming, Database development (SQL), etc.
- **RFID-based Human-object Integrated Positioning System.**
Skills: WEB system development, Java programming, Database development (SQL), etc.
- **RobotCube: Research Project on Remote Monitoring and Control of ABB Industrial Robots.**
Skills: Robotic system (ABB), ABB RAPID development using PCSDK interface, C# programming, Database development (SQL), Scientific writing, Project presentation, etc.
- **TI (Texas Instruments) Electronics Design Contest: Autonomous Quadrotor Robot Design.**
Skills: Hardware design and development using Altium Designer, Embedded system design (ARM MCUs), C programming, Sensing system (accelerometer, ultrasonic), etc.

Selected Publications

- Vision-Language-Conditioned Learning Policy for Robotic Manipulation. In 2024 Conference on Robot Learning, Workshop on Language and Robot Learning: Language as an Interface.
- Data-efficient multimodal human action recognition for proactive human-robot collaborative assembly: A cross-domain few-shot learning approach. Robotics and Computer-Integrated Manufacturing, 2024, 89: 102785.
- Adaptive real-time similar repetitive manual procedure prediction and robotic procedure generation for human-robot collaboration. Advanced Engineering Informatics, 2023, 58, 102129.
- Turn-taking prediction for human-robot collaborative assembly considering human uncertainty. ASME Journal of Manufacturing Science and Engineering, 2023, 1-14.
- Knowledge-guided robot learning on compliance control for robotic assembly task with predictive model. Expert Systems with Applications, 2023, 234, 121037.
- Robot learning towards smart robotic manufacturing: A review. Robotics and Computer-Integrated Manufacturing, 2022, 77, 102360.
- Deep reinforcement learning-based safe interaction for industrial human-robot collaboration using intrinsic reward function. Advanced Engineering Informatics, 2021, 49, 101360.
- Task-level decision-making for dynamic and stochastic human-robot collaboration based on dual agents deep reinforcement learning. International Journal of Advanced Manufacturing Technology, 2021, 1-20.
- Dynamic risk assessment and active response strategy for industrial human-robot collaboration. Computers & Industrial Engineering, 2020, 141, 106302.
- Human-robot collaboration in disassembly for sustainable manufacturing. International Journal of Production Research, 2019, 57(12), 4027-4044.