Xiaoyu Lin

E-mail: xiaoyulin1037@gmail.com | Personal Homepage: kikido16.github.io/

Address: Huazhong University of Science and Technology, Wuhan, Hubei, China

Education

Huazhong University of Science and Technology, Wuhan, China	Sept 2022 – June 2025 (expected)
M.Eng. in Mechanical Engineering	**GPA: 3.76/4.0**

Relevant Courses: Introduction to Robotics (93), Autonomous Mobile Robots (90), Industrial Photogrammetry Technology (88), Object Oriented Programming (94)

Huazhong University of Science and Technology, Wuhan, China	Sept 2018 – June 2022
B.Eng. in Mechanical Design, Manufacturing and Automation	**GPA: 3.89/4.0**

Relevant Courses: Engineering Measurement Technology (97), Computer Control System (94), Machine Design (91), Principle of Microcomputer (91), Mechanical and Electrical Transmission Control (93)

Research Interests

Robotic Measurement and Inspection, Robot Perception and Navigation, Graph-based Optimization Methodology

Skills & Languages

Programming languages: Matlab, C++, Python

Programming tools: OpenCV, g2o, PyTorch, ROS, git

Software: Solidworks, QT, Cloud Compare, Polyworks, Jupyter

Languages: English (Fluent, **IELTS: 8.0**), Mandarin (Native), Spanish (Basic)

Academic Papers

[1] **Lin X.**, et al. "A Tracker Pose Optimization Method for Robotic Measuring System Based on Spatial Distance Constraints." *Measurement*. (**Accept**)

[2] Wang Z, **Lin X.**, et al. "Geometry Distance Constrained Robust Registration Framework of Featureless Point Clouds." *IEEE Transactions on Industrial Informatics*. (**Accept**)

[3] Wang Z, Yang Y, Yan S, **Lin X.**, et al. "High Accuracy and Robust Robotic Inspection by Constrained Pose Graph Optimization." *IEEE Transactions on Industrial Electronics*. (**Minor revision**)

[4] Qi B, **Lin X.**, et al. "A Simultaneous Calibration Method for A Mobile Robotic Measurement System Based on Mobile-Photogrammetry-Tracking." (Under review)

Research Experiences

Precise and Efficient Visual Inspection of Large-scale Components with Scarce 3D Features | *Current Project for Master's Thesis*	May 2023 – Current

Advisor: Prof. Xiaojian Zhang, State Key Laboratory of Intelligent Manufacturing Equipment and Technology, HUST

- Built an **integrated robotic measuring system** comprising a 6-DOF robot, an AGV, a structured light scanner, and a photogrammetry tracker to achieve the **full-field scanner pose estimation** with robustness and accuracy.
- Introduced an **accurate hand-eye calibration algorithm** for large-scale tracking based visual measurement system, enabling the complete measurement and 3D reconstruction of complex and large profiles without using any point cloud registration method.
- Proposed a **tracker pose optimization algorithm based on spatial distance constraints** to tackle the tracker base frame transformation problems, and **reduced the tracker's spatial positioning error by more than 50%**, compared with the most commonly used method in tracking systems.

Robust Registration Framework of Featureless Point Clouds and Global Optimization	Oct 2023 – Current

Method

Cooperated with Ph.D. student Ziwei Wang, State Key Laboratory of Intelligent Manufacturing Equipment and Technology, HUST

- Utilized the integrated robot measuring system to achieve point cloud acquisition, and conducted the **coarse registration of featureless point clouds** via the photogrammetry tracking system.
- Applied the fine registration methods for featureless point clouds, and conducted fine registration using the *Fast and Robust Iterative Closest Point* method to achieve comparisons with our proposed method.
- Investigated the global optimization method for multi-pose robotic scanning, and adopted the **pose graph optimization method using the** g_2o **framework** to obtain more accurate global poses of point clouds.

Automatic Robot Polishing Workstation for Thin-walled Workpiece   Oct 2022 – Jun 2023

Advisor: *Prof. Xiaojian Zhang, State Key Laboratory of Intelligent Manufacturing Equipment and Technology, HUST*

- Designed an integrated robotic polishing system with a **radius-adaptive clamping device** and a **force-control grinding unit** to achieve automatic defect repair and burr removal.
- Investigated the simulation method for the polishing process using Robot Studio and implemented the designed system for actual polishing scenarios.

Design and Development of an Automatic Wheeled Robot Based on a 3-WIS   Jul 2021 – Jun 2022
Omnidirectional Mobile Platform | *Undergraduate Graduation Project*

Advisor: *Prof. Xiaojian Zhang, State Key Laboratory of Intelligent Manufacturing Equipment and Technology, HUST*

- Designed a novel **differential steering wheel** for the **omnidirectional mobile platform** by introducing bevel gears, removing the wire twining problem of traditional wheels and achieving fast and precise direction adjustment.
- Investigated **robot positioning schemes**, and developed a **multi-sensor fusion system** (odometer, gyroscope, laser range sensor, and depth camera) to achieve autonomous full-field robot positioning.

Leadership Experiences & Activities

China University Robot Competition, ABU Robocon   2020-2024

The largest and most competitive robot competition in China

- *Core member for robot design (2020-2021)*: investigated and designed an independent steering wheel system for the robot DR, and won the **National First Prize** (ranked top 8/83).
- *Team leader (2021-2022)*: designed the robot R1 (locomotion, actuators, positioning and sensing schemes), coordinated the multi-robot debugging for competition, and won the **National First Prize** (ranked 3/67).
- *Team supervisor (2022-2024)*: trained junior team members, guided the scheme formulation, facilitated the preparation process, and won the **National First Prize** (ranked top 16/68, 2023; ranked 2/86, 2024).

Teaching Assistant of Engineering Graphics for First-year College Students   2022

School of Mechanical Science and Engineering, Huazhong University of Science and Technology

- Assisted the teacher in designing course syllabus, making course slides, and grading homework and final papers.
- Guided students in after class tutorship and question answering, and provided help in lab sessions.

China National Model United Nations Conference   2019

- *Team leader*, won the prize of "**Outstanding Delegation**" (ranked 2/32).

Honors & Awards

- **First-class Scholarship for Postgraduates (top 20%)**, Huazhong University of Science and Technology   2023,2024
- **Outstanding Graduate (top 20%)**, Huazhong University of Science and Technology   2022
- **National Scholarship (top 1%)**, Huazhong University of Science and Technology   2021
- **Merit Student (top 5%)**, Huazhong University of Science and Technology   2021