Xiaoyu Lin

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Education

Huazhong University of Science and Technology, Wuhan, China Sept 2022 – June 2025 (expected)

M.Eng. in Mechanical Engineering, State Key Laboratory of Intelligent Manufacturing Equipment and Technology **GPA: 3.76/4.0**

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**

Research Interests

Robotic Measurement and Inspection, Large-scale Metrology, Graph-based Optimization Methodology

Academic Papers

[1] **Xiaoyu Lin.**, et al. "A Tracker Pose Optimization Method for Robotic Measuring System Based on Spatial Distance Constraints", (R&R, now under review) ***Measurement***. (**JCR Q1, IF=5.2**)

[2] Ziwei Wang, **Xiaoyu Lin.**, et al. "Geometry Distance Constrained Robust Registration Framework of Featureless Point Clouds", (R&R) ***IEEE Transactions on Industrial Informatics***. (**JCR Q1, IF=11.7**)

[3] Ziwei Wang, Yifan Yang, Sijie Yan, **Xiaoyu Lin.**, et al. "High Accuracy and Robust Robotic Inspection by Constrained Pose Graph Optimization", (Major revision submitted) ***IEEE Transactions on Industrial Electronics***. (**JCR Q1, IF=7.5**)

[4] Shuming Yi, Sichao Liu, **Xiaoyu Lin**, et al. "An automatic hand-eye calibration system using next-best-view guiding", (Currently Working)

Research Experiences

Precise and Efficient Visual Inspection of Large-scale Components With Scarce 3D Features | *Current Project for Master's Thesis* Sept 2022 – Current

Advisor: *Prof. Xiaojian Zhang, School of Mechanical Science and Engineering, Huazhong University of Science and Technology*

- 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.
- Implemented 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.
- 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%.

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

Cooperated with Dr. Ziwei Wang, School of Mechanical Science and Engineering, Huazhong University of Science and Technology

- 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.
- Investigated 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.

Design and Development of an automatic mobile robot based on three-wheel independent steering system (3 WIS) | *Undergraduate Graduation Project* Jul 2021 – Jun 2022

Advisor: *Prof. Xiaojian Zhang, School of Mechanical Science and Engineering, Huazhong University of Science and Technology*

- Implemented a user interface for the VS open file switcher (ctrl-tab) and extended it to tool windows
- Created a service to provide gradient across VS and VS add-ins, optimized its performance via caching
- Programmer Productivity Research Center (Summers 2001, 2002)
- Built an app to compute the similarity of all methods in a code base, reducing the time from $\mathcal{O}(n^2)$ to $\mathcal{O}(n \log n)$
- Created a test case generation tool that creates random XML docs from XML Schema

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

- Represented the delegation of UK on the topic of "Enhancing the Implementation of Paris Agreement".
- *Team leader*, won the prize of "**Outstanding Delegation**" (ranked 2/73).

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 10%)**, Huazhong University of Science and Technology 2021

Skills & Languages

Technical skills: Matlab, QT (C++), Pytorch (Python), Solidworks, Polyworks, Latex

Languages: English (Preparing for IELTS), Mandarin (Native), Spanish (Basic)