

Quanxiang Liu (刘权祥)

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Research Interests: Spatial Intelligence, Robotics



Education

Northwestern Polytechnical University

Bachelor

Software Engineering; GPA: 3.57/4.0, Rank: 21/299

Sep. 2019 – Jun. 2023

Northwestern Polytechnical University

Master

Information and Communication Engineering; Supervisor: Prof. Yuchao Dai

Sep. 2023 – Apr. 2026

The Hong Kong Polytechnic University

PhD

Flight Mechanics and Control; Supervisor: Prof. Bing Wang

May 2026 – Present

Projects and Experience

Autonomous Logistics Drone

Sep. 2020 – May 2022

UAV Challenge at the China Robotics Competition in 2020 and 2021

Key Contributions: To address the demand for high-precision, real-time pose estimation in autonomous logistics drones, Open-VINS was deployed on UAVs for precise indoor localization; containerized the system using Docker to simplify environment setup; developed a ROS node called "pose-remap" to convert Open-VINS outputs into the coordinate frame used by the drone system. For more details, see our videos from the 2020 and 2021 competitions.

RoboMaster University AI Challenge

Sep. 2023 – Nov. 2023

Intelligent Perception Technology Competition for Unmanned Aerial Vehicles

Key Contributions: Responsible for project scheduling and task allocation; built a physical platform for the drone. Designed and validated algorithms using the official AirSim simulator. Implemented drone control via cascaded PID controller, a decision and planning module splitting tasks into stages and finite state machines, and high-speed robust stereo depth estimation based on Correlate-and-Excite (CoEx). Packaged and deployed competition code using Docker; wrote technical reports and edited video presentations. For more details, visit our technical report video.

Teaching Assistant for CVlife Course Platform

Dec. 2023 – Aug. 2025

Courses on NeRF-based SLAM, 3DGS-based SLAM, and Hands-on 3DGS SLAM Implementation

Key Contributions: Assisted instructors with Q&A support, assignment design and grading, and course material improvements. Familiar with NeRF and 3DGS codebases, as well as SLAM algorithms based on NeRF and 3DGS, including NICE-SLAM, Co-SLAM, and MonoGS.

3D Reconstruction Internship

Dec. 2024 – Nov. 2025

KIRI Innovations (Shenzhen) Co., Ltd.

Key Contributions: Addressed the high memory consumption issue in large-scale 3D reconstruction by designing a precise and robust scene partitioning strategy inspired by VastGaussian, which utilizes camera poses to divide and merge sub-scenes, significantly improving reconstruction efficiency and scalability. Enhanced RGB-D reconstruction quality by introducing Prompt Depth Anything to refine noisy and low-quality depth maps, particularly improving the results on data captured by iPhone sensors. In scenarios with limited depth information, combined Structure-from-Motion (SfM) with the 3D foundation model VGGT, using SfM-derived poses and matches to guide and optimize model outputs, achieving dense RGB reconstruction quality comparable to RGB-D pipelines. For more details, visit GeoMaster.

Honors and Awards

- Second Class Scholarship of Northwestern Polytechnical University Sep. 2024
- First Class Scholarship of Northwestern Polytechnical University Sep. 2023
- Second Prize in 2023 Unmanned Aerial Vehicle Intelligent Perception Technology Competition (Online) Dec. 2023
- Second Prize in the 2021 China Robotics Competition Drone Challenge Apr. 2022
- Guangdong-Hong Kong-Macao Scholarship of Northwestern Polytechnical University Sep. 2021
- First Class Scholarship of Northwestern Polytechnical University Sep. 2021
- First Prize of the 22nd National Robotics Championship in the category of practical application of aerial flying robots Dec. 2020
- Second Prize in the 2020 China Robotics Competition Drone Challenge Nov. 2020
- Second Class Scholarship of Northwestern Polytechnical University Sep. 2020

Open-Source Contributions

awesome-NeRF-and-3DGS-SLAM

A curated collection of resources and implementations for NeRF and 3DGS-SLAM.

Key Contributions: Identified a documentation error and submitted a pull request to correct it.

Contributor

Stars: 2k

gaustudio

A modular framework for 3D Gaussian Splatting and beyond.

Key Contributions: Fixed the `image_name` sorting issue in the ScanNet dataloader.

Contributor

Stars: 1.7k

GeoMaster

Advanced geometry enhancement tools for high-resolution 3D modeling.

Key Contributions: Extended the initialization pipeline by adding TSDF-Fusion support to generate improved initial meshes from depth data; integrated Prompt Depth Anything to refine noisy sensor depth and implemented depth alignment to compute scale and shift; incorporated depth-based supervision into the mesh refinement pipeline, replacing NCC with depth as the supervision signal for mesh refinement.

Contributor

Stars: 88

RANSAC

A RANSAC-based random sampling framework for plane fitting in point clouds.

Key Contributions: Developed the RANSAC framework in C++ and Python, demonstrating 2D line fitting and 3D plane fitting with corresponding test datasets.

Owner

Stars: 38

Qt-based-LIDAR-mapping-simulator

A Qt-based simulator for 2D mobile robot mapping using LiDAR.

Key Contributions: Designed and implemented a Qt-based interface to visualize 2D LiDAR scanning and mapping; decoupled logic from the UI for modularity; integrated interactive obstacle insertion and removal for demonstrations.

Owner

Stars: 23

Skills

Dev Languages: C/C++, Python, Java

Frameworks: PyTorch, CUDA, ROS, OpenCV, Qt

Tools: Git, Docker, Conda, CMake