Siyu Liu

Boston, MA (Open to Relocate) | liu.siyu5@northeastern.edu | LinkedIn | GitHub | Portfolio

Education

Northeastern University | Boston Campus *May 2026*
Master of Science in Robotics, Concentration in Electrical & Computer Engineering
Courses: Reinforcement Learning, Algorithms, Sensing and Navigating Robotics, Assistive Robotics

China University of Mining and Technology | Xuzhou, China *Jul 2023*
Bachelor of Engineering in Mechanical Engineering
Courses: Mechanical Design, Microcomputer Principles and Control, PLC Control System, Fluid Mechanics, Thermodynamics

Skills

Programming & Data: Python, MATLAB; NumPy, Pandas, SciPy, Matplotlib, Regex
AI & Robotics: Scikit-Learn, PyTorch, TensorFlow, Keras, RL (PPO); ROS, Gazebo, RViz
Biomechanics / Signal: Force-plate analysis, COP alignment, signal resampling
CAE & Tools: SolidWorks, ANSYS, Abaqus; Git, MS Office

Projects

Autonomous Differential-Drive Steering System for Pothole Avoidance | Boston *Feb 2025 – Present*
- Built 2-wheel platform with TOF + IMU sensing; real-time steering avoids 95 % potholes in test track
- Trained PPO policies in PyBullet and deployed to Arduino Nicla Vision with seamless on-device inference

Assistive Exoskeleton Technology Research | Boston *Oct 2024 – Jun 2025*
- Automated a Python pipeline (Pandas, NumPy, regex) that ingests, cleans, and time-aligns hundreds of wearable-sensor files—cutting raw-to-ready prep from hours to ~10 min and boosting usable samples by 30 %
- Designed and trained TensorFlow models (CNN, LSTM, TCN) to predict gait phase; the streamlined data flow halved experiment cycles and raised validation accuracy to ≈ 91 % macro F1

Synchronization & Coordination of Two Mobile Robots | Boston *Oct 2024 – Dec 2024*
- Configured a dual-TurtleBot3 SLAM stack in ROS 1/Gazebo—gmapping + AMCL + move_base—so each robot could map, localize, and navigate autonomously in a custom world
- Engineered multi-robot integration: namespace-isolated launch files and a custom map_merge node fused the two occupancy grids into one live map and eliminated TF-frame collisions
- Debugged cross-package TF/topic conflicts (slam_gmapping ↔ explore_lite), documenting fixes and a scaling roadmap—experience that sharpened ROS troubleshooting and multi-robot coordination skills

Networked Agro-Forestry Monitoring Pan-Tilt | China *Sep 2022 – Jun 2023*
- Engineered a 3-axis electric turntable in SolidWorks/ANSYS: hollow 6061-T6 frame shaved weight 40 % to 14 kg yet survives 1.6 N·m loads with 83 % safety margin and 270 Hz first-mode frequency
- Built an STM32F103 control stack—quad-encoder + MPU-6050 fusion, quaternion-to-Euler solver, incremental PID—achieving ≤ 0.05 ° pointing repeatability while multi-stage DC-DC and MCU standby cut idle power ≈ 30 %
- Delivered 47 CAD drawings, full BOM, and modular quick-swap motor/PCB trays (≤ 5 min field service); design lowers material cost ≈ 40 % and sets a roadmap for solar + 5G/edge-AI upgrades to enable unmanned agro-forestry monitoring

Design of Intelligent Sorting System of Robotic Arm Based on Voice Control | China *Nov 2022 – Dec 2022*
- Designed scanning detection and voice recognition modules using Altium Designer to support the robotic arm's sorting system
- Implemented image recognition system using Halcon to drive the conveyor belt and automatic control
- Utilized Arduino to write programs to control small lights and robotic arms through buttons and voice recognition modules connected to the micro-controller

Natural Field Electromagnetic Exploration System | China *Sep 2020 – Jan 2022*
- Designed the mechanical structure of suspended pod to carry the exploration system safely against vibrational forces
- *Patent: Siyu Liu. 2022. Pod-type aviation low-frequency three-component natural field electromagnetic exploration system and control method. CN 114355459 A, filed January 7, 2022, Patent Pending.*

Experience

Institute of Electrical and Electronic Reliability, Harbin Institute of Technology | Harbin, China *Jul 2023 – Apr 2024*
CAE Engineer
- Simulated insertion force & contact resistance of rocket connectors (Abaqus), predicting failure zones and cutting lab iterations 20 %
- Validated thermal rise & harmonic response in ANSYS, issuing design changes adopted by supplier

Extracurricular Experience

RoboMaster Robotics Competition | Harbin, China | National First Place *Jan 2020 – Oct 2021*
- Co-designed a RoboMaster robot in SolidWorks and ran battle simulations to iterate and resolve design flaws