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: NLP, Machine Learning, Reinforcement Learning, Robotic Sensing & Navigation, Assistive Robots

China University of Mining and Technology | Xuzhou, China   *Jul 2023*

Bachelor of Engineering in Mechanical Engineering
   Courses: Python, Electrical and Electronic Technology, Mechanical Design, Microcomputer Control, PLC

Skills

Languages: Python (MATLAB)
ML / DL / NLP: PyTorch, TensorFlow, Keras, Scikit-Learn; CNN, RNN/LSTM, GNN, Transformer; Reinforcement Learning (PPO)
Data & Robotics: NumPy, Pandas, ROS 1/2, Gazebo, RViz
Biomechanics / Signal: Force-plate analysis, COP alignment, signal resampling
CAD / CAE: SolidWorks, ANSYS, Abaqus

Experience

Harbin Sagebot Intelligent Medical Equipment Co., Ltd. | Harbin, China   *Apr 2024 – Aug 2024*
Mechanical Design Engineer
- Designed the main arm and crossbeam of a surgical robot, optimizing joint layout, load distribution, and modular assembly for precision, reliability, and ease of maintenance
- Developed and maintained 3D models and detailed manufacturing drawings in SolidWorks/CATIA; ensured assembly feasibility and adherence to ISO surgical device standards through tolerance analysis
- Supported prototype assembly, simulation, and alignment calibration; identified structural deviations and improved positional accuracy through iterative design refinements

Institute of Electrical and Electronic Reliability, Harbin Institute of Technology | Harbin, China   *Jul 2023 – Apr 2024*
CAE Engineer
- Built detailed FE models of aerospace electrical connectors in Abaqus, modeling pin-socket contact, nonlinear materials, and frictional behavior to simulate insertion/extraction forces and contact resistance
- Performed thermal–electrical coupling and harmonic response analyses in ANSYS to identify heat concentration and vibration resonance; proposed structural changes reducing stress by 12%
- Automated post-processing with Python, extracting von Mises stress, displacement, and temperature data; validated model accuracy through correlation with experimental fatigue tests

Projects

2D CAD Sketch Constraint Recognition with Machine Learning | Boston   *Present*
- Developing ML pipeline to automatically identify 2D CAD sketch constraints using GNN, Random Forest, and XGBoost
- Preprocessing SketchGraphs dataset into graph structures, engineering features, and addressing class imbalance
- Aiming to achieve high F1-score and significantly reduce manual sketch annotation workload

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
- Calibrated sensors and optimized sensor fusion to ensure robust performance across varying surface conditions

Assistive Exoskeleton Technology Research | Boston   *Oct 2024 – Jun 2025*
- Automated data cleaning pipeline (Python), time-aligning wearable sensor files, reducing prep to 10 min and increasing usable samples by 30%
- Built and trained CNN/LSTM/TCN for gait phase, halving cycles and achieving ~91% macro F1

Synchronization & Coordination of Two Mobile Robots | Boston   *Oct 2024 – Dec 2024*
- Set up dual TurtleBot3 SLAM stack in ROS‚ÄØ1/Gazebo, enabling autonomous mapping, localization, and navigation
- Integrated robots with namespace-isolated launch files and a custom map_merge node, resolving TF/topic conflicts and fusing occupancy grids into one live map

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.*

Extracurricular Experience

RoboMaster Robotics Competition | Harbin, China | National First Place   *Jan 2020 – Oct 2021*