Jingkun (Allen) Liu

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Technical Skills

Robotics: ROS/ROS2, AI, Machine Learning, Computer Vision, Robot Dynamics, Motion Planning, Navigation, Networks
Programming Languages: C++, C, Python, Rust, MATLAB, Java, Forth, C#, SQL, Swift, Kotlin, JavaScript, TypeScript
Tools: Shell, Git, Docker, CMake, Unit Testing, AWS, Google Cloud, Visual Studio, Xilinx
Platforms/Frameworks: Linux, PIC32, NVIDIA Jetson, React, SpringBoot, .NET
Mechanical: SOLIDWORKS, ANSYS, Simulink, LoggerPro, LabView, KiCAD, Machine Shop, PCB Design

Professional Experience

Whelix, Inc. **June 2024 - Present**
Head of Robotic Engineer *Boston, MA*

- Led development of an intelligent cell-culturing robot, acquiring **$1M** venture funding from Draper Associate.
- Refactored system architecture for modularity and scalability, cutting integration time by **60%**.
- Engineered a C++ CAN stepper motor driver, streamlining motion control and reducing system latency by **50%**.
- Developed a Agentic AI system that enable user to manipulate robot by directly talking with the robot reducing **80%** time in protocol setup and robot interaction.

Robotic Engineer Intern *Pittsburgh, PA*

- Deployed a vision model for precise flask detection with **90%** of accuracy, reducing **80%** manipulation error.
- Integrated the embedded C++ motor control software for precise motion control with **1%** error.

DEKA Research and Development, Corp. **July 2022 – July 2023**
Robotic Embedded Software Engineer *Manchester, NH*

- Developed ROS C++ software for real-time data streaming and hardware monitoring over an internet connection on an autonomous-driving delivery robot, reducing **80%** time in system diagnostics.
- Engineered novel firmware in C and C++ for custom multi-channel cellular modem reducing cost of **$100K**.

Research Experience

Breast Cancer Early Detection | *C++, Arduino, MATLAB, Robot Kinematics, Machine Shop* **June 2021**

- Engineered a 4-DOF robotic arm for accurate breast cancer location detection at early stage through force and displacement data increasing treatment lead time by **2 months**.
- Implemented a C++ embedded software for low-level control of the robotic arm, enabling precise manipulation.
- Developed a MATLAB GUI application for high-level control of the arm, enabling user-interaction and data-collection.

Projects

Autonomous Tangram Solver with 4-DOF Robot Arm | *ROS2, Machine Learning, Computer Vision* **April 2024**

- Developed a ROS2-based C++ and Python software enabling a robot arm to solve and assemble tangram puzzles.
- Trained and implemeted a Convolutional Autoencoder model for solving tangram puzzle.
- Applied Computer Vision algorithm to detect the pose and shape for each tangram piece.
- Incorporated a Inverse Kinematic solver algorithm and robot controller to move the robot within cartesian space.

Extended Kalman Filter based SLAM from scratch on Turtlebot3 | *ROS2, C++, SLAM, Extended Kalman Filter* **January 2024**

- Developed C++ SLAM software on ROS2 for Turtlebot3's autonomous localization in dynamic settings.
- Implemented kinematics and odometry models for Turtlebot3, offering precise location and orientation estimates.
- Integrated both Unsupervised and Supervised Learning models for effective data clustering and landmark detection from 2D LiDAR inputs, facilitating precise landmark positioning recognition.

Robot Translator using a 7-DOF Robot Arm | *ROS2, Python, MoveIt2, YOLOv8, OCR* **November 2023**

- Developed Python Software on ROS2 for Franka Panda, enabling real-time text translation and whiteboard writing.
- Applied OCR and YOLOv8 for text and human detection, facilitating interactive text translation.
- Integrated MoveIt! with AprilTags for exact trajectory planning and whiteboard detection, ensuring robot safety.

Education

Northwestern University **Sept 2023 - Dec 2024**
Master of Science in Robotics *Evanston, IL*

Rose-Hulman Institute of Technology **Sept 2018 - May 2022**
Double Major in Bachelor of Science in Mechanical Engineering and Computer Science *Terre Haute, IN*
Minor in Multidisciplinary Robotics and Dynamics and Control Systems