

Summary

- Design, build, and deliver scalable (200+ nodes) low-latency multithreading C++ application service and product with 7+ years of experience
- 7+ years of experience in APIs and hardware interface design and development
- Hands-on experience in continuous integration and deployment (CI/CD) complex system in production
- Expert in advanced algorithm development for interdisciplinary projects with 10+ years of experience
- Languages & Tools: *C++, Python, Golang, Kotlin, Docker, Nomad, AWS, gRPC, Azure, SQL, React*

Professional Experiences

Senior Robotics Software Engineer, Rapid Robotics, California 4/22 - 5/23

- Created multithreading C++ software solution with scalability that handles motion, state, and fault recovery, and developed solutions for monitoring and controlling robotic devices using different communication protocols. (Tools: C++, gRPC, Docker, Kotlin)

Senior Robotics Software Engineer, Kindred AI, California 5/19 - 4/22

Robotics Software Engineer, Kindred AI, California 8/17 - 5/19

- Designed and implemented low-latency concurrent distributed robotics solutions and robot control systems to serve as a QOS and robust autonomy solution to the customer. (Tools: C++, Python, Golang, React, ROS, gRPC, Docker)

Education

Ph.D in Computer Science

Texas A&M University, College Station, TX

May 2016

Professional Projects

Rapid Robotics Rapid Machine Operator

- **Motion & Communication protocol** (Tool: C++, gRPC, Kotlin, SQL)
 - Designed and implemented low-latency robotics solution for UR robots including robot behaviors, error recovery and path planning.
 - Developed large-scale monitoring data platform.

Kindred SORT and INDUCT product

- **Motion** (Tool: C++, Python, ROS, Golang, React)
 - Created an automated harness for quantifying and optimizing motion performance to improve overall sorting speed, throughputs, and scalability.
 - Developed systematic analysis and the tools to study the FANUC robotic arm configuration which layed the foundation for the multi-arm project design.
 - Led, developed and coordinated control of multi-arm system, including concept generation and selection, architecture design, core implementation, and finally integrated with the large system.
- **Gripper & Tool Changer** (Tool: C++, Python, Golang, React)
 - Developed tool changing (supporting initial functionality, stability tuning, and performance optimization) to cover broader item variety.
 - Developed driver support and full featured production ready services for various grippers.
- **Sensor** (Tool: Python, OpenCV, React)
 - Redesign a more reliable depth camera calibration routine and added troubleshooting tools to improve the performance and the scalability of the end-to-end pick-and-place robotic solution.
 - Developed RFID scanning strategy as a substitution for the Keyence barcode scanner.

Uniform Sampling Framework for Sampling-Based Motion Planning [Dissertation]

- Developed a uniform sampling framework for the Probabilistic Roadmap method and applied it to study problems in robotics. (Tool: C++)
- This framework provided guarantee of uniform sampling distribution on the surfaces which has remained an open problem, and improved the efficiency to solve problems by 66% in average. [Paper Link] [Paper Link]

UOBPRM: Uniform Sampling Distribution Guarantee on Obstacle Surfaces [Website]

- An instance of the uniform sampling framework which generated uniformly distributed samples near obstacle surfaces and improved the efficiency to solve the actual motion planning problems by 80% in average. (Tool: C++) [Paper Link]

UMAPRM: Uniform Sampling Distribution Guarantee on Medial Axis Surfaces [Website]

- An instance of the uniform sampling framework which generated uniformly distributed samples on medial axis surfaces and improved the efficiency and the quality of the planning paths to solve the actual motion planning problems by 30% in average. (Tool: C++) [Paper Link]