Samuel Struthers Title

ROBOTICS ENGINEER · SOFTWARE DEVELOPER

Brooklyn, New York

919-710-5430 | samstitle@gmail.com | samtitle.com | github.com/sstitle | linkedin.com/in/sam-title-380722107

Skills

Languages	Python, C++, Go, TypeScript, Shell, JavaScript, C, Verilog
Operating Systems	Linux, Windows, UNIX
APIs	STL, Boost, ROS, OpenCV, Qt, MFC, React
Technologies	Event-driven and multithreaded models, client-server architecture, TCP/IP sockets, USB communications
Tools	Git, CMake, Docker, GDB, GCC, Clang, MSBuild, Valgrind, UML, LaTeX, Microsoft Office, Adobe Creative Cloud, OnShape

Work Experience

Dirac
Manhattan, NY

Senior Software Engineer — *August 2023 - Present*

- **BuildOS:** Developed Python and C++ infrastructure for physics simulation of mechanical rigid body disassembly.
- Developed distributed microservices architecture using gRPC in Go, TypeScript, Python, and C++.
- Integrated a new CAD kernel to eliminate customer issues from STEP file import and enable colored output in the JavaScript front-end.
- Implemented continuous integration stages for code formatting, linting, unit testing, integration testing and deployment with GitHub actions.
- Contributed to developer and deployment workflows using Docker, Terraform, and Shell scripting.
- Maintained live servers with AWS Cloud infrastructure using Lambda, EC2, S3, and DynamoDB.

Nanotronics
Brooklyn, NY

Senior Software Developer — *June 2022 - June 2023*

- **Modular Autoloader:** Developed flexible architecture for implementing new equipment front-end modules for semiconductor manufacturing.
- Wrote C++ abstractions for robots and sensors used in an AI defect analysis system for microscopic inspection of various substrate materials.
- Integrated sample-handling robots, external motors, pneumatic components, sensors, and other controls for a microscopic scanning system.
- Contributed to 4 new product releases with more than 12 new networked hardware components for handling of materials such as silicon wafers, semiconductor devices, glass and copper panels, and biological specimens.
- Supported our largest-yet microscope stage size of 650 mm x 650 mm, precisely controllable to 1 μm.
- Maintained a Windows MFC desktop application compliant with semiconductor industry communications standards in C++.

Realtime Robotics
Boston, MA

Robotics Engineer → Senior Software Engineer — *July 2018 - February 2022*

- **RapidPlan Create:** Developed 2.0 version of the company's core robot motion-planning product which streamlined the user workflow and increased the modeling accuracy of our state-of-the-art collision checking technology.
- **RapidSense:** Developed a GUI for performing extrinsic and intrinsic calibration of multiple RGBD cameras relative to a robotic arm to generate voxel images. Enabled visualization of voxel images accurate to the centimeter at a resolution of 128^3 at 10Hz.
- **World Builder:** Developed a point-and-click robot workstation modeling prototype. Integrated differential evolution AI algorithm for optimizing robot workcells imported from 3rd party applications. Curated a database of over 60 different robot models from 7 different OEMs.
- Implemented architectural improvements which scaled our system from supporting control of only up to 4 robots to control of up to 16 robots. Optimized memory size of saved project data by enabling implicit sharing on key classes. Achieved a 2-16x reduction in the number of user workflow steps for multi-robot work cells from the original version.
- Wrote reusable modules for hardware-acceleration of motion planning and collision checking algorithms on FPGAs achieving sub-millisecond motion plans for 6 degree-of-freedom robots.
- Wrote Python testing scripts for multi-robot control API ensuring process stability over week-long time spans for applications with up to 4 robots.
- Integrated AI object perception systems as grasp pose estimators for human-robot interaction and pick-and-place demonstrations with ROS, OpenCV, Python and C++.
- Created and maintained an internal GUI for simplifying the process of generating robot model files from CAD files used by both the quality assurance and applications engineering teams, implemented in Qt with C++.
- Created an internal GUI for testing motion planning and collision avoidance of up to 4 robots concurrently in Qt with Python.

Education

Brown University
Providence, RI

Bachelor of Science in Computer Engineering

- **Courses:** Design of Robotic Systems, Collaborative Robotics, Industrial Machine Vision, Design of Computing Systems, Instrumentation Design, Communication Systems, Design of Electronic Instruments, Digital Signal Processing, Digital Electronics System Design

Design Projects

- **MIDI Strings:** Designed and prototyped an embedded system for optics-based real-time MIDI interpretation for acoustic guitar.
- **Modulin:** Designed and prototyped an electronic instrument with Arduino and Max MSP.
- **Aibo Fetch:** Programmed a Sony Aibo robot dog to "fetch" a ball using ROS and JavaScript.