

SHILOH S. S. CURTIS

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shilohc.github.io/portfolio

EXPERIENCE MIT CSAIL - LIS Cambridge, MA Spring 2020	MEng Research (ongoing) <i>Gazebo, Python, ROS</i> Designing a bio-inspired hierarchical spatial representation to improve planning in large and complex indoor environments Recognizing spatial affordances to produce human-interpretable plans
Robust AI Palo Alto, CA Summer 2020	Robotics Engineer Intern <i>C++, Python, Bazel, MediaPipe, gRPC, scikit</i> Modified MediaPipe to use RealSense D435i for hand skeleton tracking Collected dataset of hand poses; designed and developed ML pipeline to classify hand skeletons into pose categories
Artificial Palo Alto, CA Summer 2019	Robotics Engineer Intern <i>Python, asyncio, OpenCV, Docker</i> Designed 2-finger gripper interface for robot software framework Developed drivers for Robotiq 2F-85 and OnRobot RG2 Created demo of reactive object grasping using SCARA arm Used OpenCV to detect objects with colored markers
MIT CSAIL - DRL Cambridge, MA Fall 2018 - Spring 2019	UROP Research <i>C++, Python, ROS</i> Implemented ROS node to segment RGB-D data into object point clouds using pretrained Mask R-CNN model on depth data Refactored monolithic planar segmentation node into efficient, unit-tested C++ library with backward-compatible ROS wrapper
Iron Ox San Carlos, CA Summer 2018	Robotics Engineer Intern <i>C++, Python, ROS, Gazebo, OnShape</i> Implemented fiducial-based localization using ROS Created static fiducial maps using Ceres Solver Used robot_localization to fuse pose estimates with other sensor data Helped design power/safety circuits for 1,000 lb Module Mover robot
Google Mtn. View, CA Summer 2017	Engineering Practicum Intern <i>C++, gRPC, gUnit, Bazel</i> Developed C++ backend for internal data storage debug tool Helped design RPC API (protocol buffer) to interface with frontend Integrated with access control system to protect sensitive user data
Fetch Robotics San Jose, CA Winter 2015-16	Robotics Engineer Intern <i>Python, ROS, Gazebo</i> Developed autonomous mapping ROS node, incorporating research on Next-Best-View problem to select navigation goals Used Voronoi diagrams for room segmentation in 2D grid map Mapped large, unstructured office environment using "Freight" robot
EDUCATION BS 2020 GPA: 4.8/5.0 MEng 2021	Massachusetts Institute of Technology <i>EECS (Course 6-2)</i> 6.834, 6.877 Cognitive Robotics, Principles of Autonomy (planning) 6.881 Intelligent Robot Manipulation (manipulator planning) 6.832 Underactuated Robotics (planning, controls) 6.302, 2.151 Feedback Systems, Advanced System Dynamics and Control 6.141 Intro to Robotics Lab assistant: 6.002 Intro to Circuits, 6.036 Intro to Machine Learning
PROJECTS	ADDITIONAL SKILLS ROS (Robot Operating System), RViz, Gazebo Embedded C for Atmel AVR microprocessors, MicroPython, Arduino Surface-mount and through-hole soldering; PCB design (gEDA) 3D printing and 3D CAD (SolidWorks, OnShape)
	See my portfolio for more details!

PROJECTS	DESCRIPTIONS
map2gazebo 2020 - present	Tool that converts maps to Gazebo worlds <i>Python, trimesh, ROS</i> Created ROS package providing a skeleton Gazebo world and a node that converts 2D maps to 3D meshes by extruding occupied pixels up Can also be used to generate a mesh from a drawing published as a map Project page: github.com/shilohc/map2gazebo
Handle Detector 2019 - 2020	Handle identifier using quadric fitting <i>Python</i> <i>Class project for 6.881 Intelligent Robot Manipulation.</i> Designed and implemented handle detection pipeline for use on a segmented point cloud, using a recent algorithm for fast approximate quadric fitting and some simple heuristics on quadric shape Read more: shilohc.github.io/blog/posts/handle_detector/6881_paper.pdf
"Typewriter" 2018 - 2019	Custom mechanical keyboard <i>OnShape, QMK</i> Designed, 3D printed MX-switch adapters for vintage typewriter keys Assembled keyboard using DZ60 PCB, 3D-printed case, Kailh Box Navy switches, and typewriter keys Used open-source QMK firmware to program custom keyboard layout Read more: shilohc.github.io/blog/posts/typewriter_keyboard
Sting Operation 2016 - present	Telepresence robot <i>MicroPython, ROS, git</i> Augmented wheeled robot base with LIDAR, Pyboard, Raspberry Pi, iPad Wrote motor and LIDAR controllers in MicroPython for Pyboard Designed serial protocol between Pyboard and Raspberry Pi
H-NAV 2013 - 2015	Navigation aid for the blind <i>C, gEDA, AVR, git</i> Designed, built, and tested LIDAR-based haptic navigation aid hat Designed rigid and flexible PCBs Wrote C software for Atmel microprocessors (ATMega324, ATTiny2313) 2015 Bronze Medalist, International I-SWEEP National Today Show Make the Future Award 2014 Project of the Year, California State Science Fair Americas Regional Finalist, Google Science Fair National Finalist, Junior Science and Humanities Symposium National Popular Mechanics Next Generation Breakthrough Award U.S. Patent 62/920,958 (pend.) Read more: shilohc.github.io/blog/posts/hnav
Turplebot 2012	Mock turtlebot <i>Python, ROS, SolidWorks, git</i> Designed, built robot consisting of iRobot Create, automotive mother-board, Asus Xtion depth camera, USB foam-dart turret Brought up, calibrated ROS navigation stack Wrote ROS nodes to control foam-dart turret, process joystick input
Doohingus Maximus 2011 - 2013	Tablebot <i>NXC</i> Constructed LEGO Mindstorms NXT robot for Tabletop Challenge (an autonomous robot on a table must locate a block and push it into a goal) Wrote software in NXC, a C-like programming language for the NXT 2011 - 13 RoboGames Tabletop Challenge medalist (2 gold, 1 silver)
Ausgangssucher 2010 - 2011	Floor-based robot <i>Python</i> Replaced Neato XV11 dustbin with BeagleBoard running Linux Designed, implemented subsumption behavioral controller
ORGANIZATIONS	Member: SWE, IEEE, ACM, ARRL