Richard **Gao**

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Skills

Programming Python, C, C++, Java, Javascript, MATLAB, ROS, rviz, Gazebo, Arduino, PyTorch, Docker, Git, Unix
Web HTML5, CSS3, SASS, React, Redux, Node.JS, Django, Firebase, MongoDB, SQL, Hugo

Education

Olin College of Engineering
Needham, MA

Candidate for Bachelor of Science in Engineering with Computing — *May 2022*

- GPA: 3.96/4.0
- *Coursework includes:*
  Software Design, Data Structures and Algorithms, Discrete Math, Machine Learning,
  Fundamentals of Robotics, Computational Robotics*, Software Systems (* currently enrolled)

Experience

Implementing a Particle Filter
Needham, MA

Robot Localization Project; (`https://github.com/hardlyrichie/robot_localization`) — *October 2020*

- Conducted a deep dive into robot localization by implementing the particle filter algorithm in ROS and visualized with rviz

Real Steel
Needham, MA

Real Time Human Tracking Shadow Boxing Robot; (`https://youtu.be/1XufNJylf4Q`) — *October 2019 - December 2019*

- Created multithreaded framework centered around Python's multiprocessing queues to perform skeleton tracking, joint solving, visualizations, and communication simultaneously
- Performed human skeleton tracking using the Kinect v1 and opensource software OpenNI2 and NiTE2 to obtain joint coordinates
- Implemented inverse kinematics solver given human joint coordinates using ikpy and onshape-to-robot to obtain robot joint angles
- Simulated robot motions in a physics engine using pybullet to facilitate easy integration with mechanical team

EnergySage
Boston, MA

Software Development Internship — *June 2019 - August 2019*

- Created Django templates and views, aiding in bringing the Buyer's Guide Epic, a comparison platform for energy products, to production
- Upgraded dependencies and wrote characterization tests in preparation for migrating from Python 2 to Python 3
- Improved test coverage by writing Django unit tests that maintained the code base for agile development

The Gauntlet
Needham, MA

Quantitative Engineering Analysis Final Project; (`https://bit.ly/2Npzn7T`) — *April 2019 - May 2019*

- Created a MATLAB script that takes LIDAR data from a Neato robot vacuum and directs the robot toward an intended target using a potential field behavior architecture
- Applied RANSAC and gradient descent algorithms to strategically drive the robot around obstacles detected

Activities

Software Design TA
Needham, MA

Teaching assistant for Olin's core software class — *January 2020 - Present*

- Aided students in developing fundamental software skills by leading weekly office hours and giving lectures on object oriented python concepts
- Held meetings with students to give guidance on projects and check in on mental health throughout the duration of the class

Olin Robotics Lab
Needham, MA

Researcher at HIRo (Human Interactions Robotics Laboratory); (`https://youtu.be/_iO4P9R-ilU`) — *September 2018 - February 2020*

- Used ROS and OpenCV's Canny edge detection to draw google search images using a UR5 robotic arm

Honors & Awards

MIT Reality Virtually Hackathon
Boston, MA

Best in Mobility/Communication — *January 2019*

- Created an AR experience on the Magic Leap headset that uses IBM Watson Text to Speech and a Keras model for hand gesture recognition to display a virtual speech bubble, aiding in learning sign language and easing communication for the hearing impaired

Eagle Scout
Freehold, NJ

Project: CABC - Lines, Signs, and Landscaping — *October 2016*