

Yuemin Mao

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EDUCATION

Carnegie Mellon University

Bachelor of Science in Mechanical Engineering & Additional Major in Robotics

Pittsburgh, PA

August 2019 - May 2023

- GPA: 3.97/4.0 | Dean's List: 7 semesters
- Tau Beta Pi Engineering Honor Society Member

PUBLICATIONS

- A. Gupta*, **Y. Mao***, A. Bhatia*, J. King, Y. Hou, X. Cheng, M. T. Mason. (*Co-first authors.) "Extrinsic Dexterous Manipulation with a Direct-drive Hand: A Case Study." *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022. (Presented)
- E. Huang, X. Cheng, **Y. Mao**, A. Gupta, M. T. Mason. "Autogenerated Manipulation Primitives." *The International Journal of Robotics Research (IJRR)*, 2023. (Accepted)

RESEARCH EXPERIENCE

Atkeson Laboratory

Undergraduate Research Assistant | Advisor: Christopher G. Atkeson

Carnegie Mellon University

September 2022 - May 2023

- Developing strategies for a Baxter robot to open cabinets by recognizing handles and hinges, based on active articulation model estimation through interactive perception.

The Manipulation Lab (MLab)

Undergraduate Research Assistant | Advisor: Matthew T. Mason

Carnegie Mellon University

May 2021 - May 2022

- Designed and implemented primitives for a direct-drive robot hand with an impedance control to execute pose transitions on small non-prehensile components with robustness and simplicity, applying the theory of "extrinsic dexterity."
- Constructed behavior sequences for a system including an ABB IRB120 manipulator, a direct-drive hand, and a vision subsystem to complete pre-assembly manipulation on small rubber components with high accuracy and efficiency.

Computational Engineering and Robotics Lab (CERLAB)

Undergraduate Research Assistant | Advisor: Kenji Shimada

Carnegie Mellon University

February 2021 - June 2021

- Upgraded the mechanical structure of a wall crawling robot designed for steel structure inspection, allowing modular control for the robot's three body sections.
- Redesigned a steel test rig to better simulate transitions between surfaces inside a ship, performed test drives to improve the robot's maneuverability.

PROJECTS

Pothole Filling Robot (PotBot), Robotics Capstone Project

September 2022 - May 2023

- Prototyping an autonomous mobile robot which detects, fills, and flattens potholes, in order to decrease the time and expense for the operating process.

LQR Controller Based Firmware for Crazyflie 2.1

June 2022 - August 2022

- Designed a firmware for Crazyflie 2.1 based on LQR optimal control, adaptable to autonomous flight and remote control. Modified the built-in controllers of Crazyflie 2.1 to be compatible with the new firmware.

Obstacle Avoidance Mobile Robot

March 2022 - May 2022

- Implemented obstacle avoidance algorithms on an ELEGOO Tumbler self-balancing robot that enables it to travel safely from its starting point to a required goal. Optimized its turning accuracy with a PID controller.

Human-drone Interaction (HDI) Exploration Study

January 2022 - May 2022

- Conducted a Wizard-of-Oz elicitation study to generate models for users' natural body gestures during interaction with drones, giving insights for the design of HDI techniques.

Aero Composites, Carnegie Mellon Racing

September 2019 - May 2021

- Optimized the airfoil design of a Formula SAE race car by analyzing its aerodynamic properties. Simulated manufacturing operations for the diffusers and airfoils and manually fabricated them with carbon fiber.

TEACHING EXPERIENCE

Teaching Assistant, CMU Department of Mechanical Engineering

September 2021 - May 2023

Hold office hours, grade homework and exams for the following courses:

- 24-202: Introduction to Computer Aided Design (Fall 2021)
- 24-352: Dynamic Systems and Controls (Fall 2022)

TECHNICAL SKILLS

Programming: Python, C++, C, MATLAB, Julia

Robotics: ROS, Arduino, Raspberry Pi

Engineering: SolidWorks, Ansys Workbench, AutoCAD

Machines: 3D Printer, Laser Cutter, Mill, Lathe