Ruiqi Mao

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CURRICULUM VITAE Updated January 2023

EDUCATION:

Bachelor of Engineering in Mechanical Engineering and Automation Sep. 2020- Jun. 2024
Huazhong University of Science and Technology, Wuhan, China

- GPA: 3.86/4.0
- *Selected as the Outstanding Undergraduates in Term of Academic Performance (May 2021)*

RESEARCH INTERESTS:

Mechanical Design, Robotics, Human-robot Interactions, Motion Planning, Computer Vision, Embedded Systems.

RESEARCH EXPERIENCE:

Muti-joint snake robot **Nov. 2022–Present**
Huazhong University of Science and Technology, Wuhan, China
Research Advisor: Dr. Hu Li

- Built a manipulator simulation platform based on Simulink MATLAB.
- Proposed an algorithm based on FTL(follow-the-leader) to ensure that each joint of the muti-joint snake robot stays on the planned path during movement.
- Studied the possibility of informed RRT* algorithm in path planning of the muti-joint snake robot.

Deep Learning in Computer Vision **Dec. 2022–Present**
Massachusetts Institute of Technology, Cambridge, U.S.A
Supervisor: Dr. Alexander Amini

- Built a CNN for image classification on the MNIST dataset and evaluated the trained model on an independent test set.
- Built a semantic segmentation pipeline for autonomous driving by using the Cityscapes dataset, which provides a diverse range of pixel-wise annotations across a wide array of different cities and environments.
- Implemented a network for semantic segmentation in image data, and also generate estimates of aleatoric and epistemic uncertainties associated with the segmentation.

Summer Research Internships in University of Alberta **July 2022–Oct. 2022**
University of Alberta, Edmonton, Canada
Supervisor: Prof. Hossein Rouhani

- Took over a project for a motion sensor glove attached to 5 flex sensors and 16 IMUs which can get the motion and position of the user's hand. Tested the sensors and attached them to the glove. Wrote code to get data from sensors on the glove.
- Organized and planned the materials for an augmented cane project which use multimodal sensing and intuitive steering assistance to improve navigation and mobility for people with impaired vision.
- Completed the partial assembly of a prosthetic hand project and the test of the motors. The project proposal was to develop a prosthetic hand that would be accessible with an affordable implantation cost. The hand was functional with an EMG-controlled system, and scalable to customize EMG processing to each user.
- Participated in some other projects about EEG system and motion capture as a volunteer for tests.

National College Students' Science and Technology Innovation Project **Mar. 2021–Apr. 2022**
Huazhong University of Science and Technology, Wuhan, China
Research Advisor: Lunhong Liu

- Designed and manufactured a multi-water ecological pollution removal boat.
- Presided over the development of a cylinder control panel based on ITV2050-312L electric proportion valve.
- Participated in research mobile robot simulation control based on Webots.
- Participated in development of a motor driver software based on serial communication protocol.

Online Research Program in Smart and Advanced Manufacturing **Dec. 2021–Feb. 2022**
University of Cambridge, Cambridge, England
Research Advisor: Prof. Nicola Clayton & Prof. Duncan McFarlane

- Investigated and summarized sustainable technology in the Olympic Games. Proposed a sustainable development direction of using clean energy and adopting eco-friendly facilities in the Olympic Games

- Conducted a survey of paper recycling processes and global waste paper utilization. Explored and researched ways to improve the utilization rate of waste paper.

Joint Experiment Class Summer Internship **June 2021–July 2021**
Qiming Academy HUST, Wuhan, China
Supervisor: Prof. Ying Wang

- Assembled a 3d printer and debugged and verified it. Configured the software environment of the 3d printer and conducted a communication test with the computer
- Designed and printed a horizontal load-bearing components and verified it.
- Analyzed 3d printing algorithm and STL, G code file structure and repeated the slicing algorithm.

COMPETITION PROJECT:

Offshore Oil Cleanup boat **May 2021–June 2022**
Huazhong University of Science and Technology, Wuhan, China

- Put forward and designed the mechanism(a conveyor belt made of linoleum) for the boat to clean up oil pollution.
- Participated in the processing and assembly of the boat.
- Selected and tested Oil absorbing material for the boat.

Omnidirectional Mobile Robot with Variable Modes **Nov. 2021–Oct. 2022**
Huazhong University of Science and Technology, Wuhan, China

- Investigated mobile robot path planning and motion planning algorithms.
- Participated in simulation and kinematics analysis of robot in Rviz based on ROS platform.
- Carried out relevant research on the application scenarios of omnidirectional mobile robot with variable modes.

Intelligent Tracking Arduino Car **Oct. 2020–Jan. 2021**
Huazhong University of Science and Technology, Wuhan, China

- Equipped a tracking car based on infrared sensor.
- Improved the performance and sensitivity of the infrared sensor on the car.
- Test the tracking and turning performance of the car.
- Added handle remote control to the original car.

Arduino Fighting Robot **Oct. 2020–Apr 2021**
Huazhong University of Science and Technology, Wuhan, China

- Participated in robot programming and completed the robot movement code under the stage.
- Designed the robot fighting algorithms and strategies.
- Participated in robot debugging and improvement.

Carbon Free Automatic Car **Mar. 2022–July 2022**
Huazhong University of Science and Technology, Wuhan, China

- Design the transmission system and gear train ratio of the car.
- Machined the gears and side plates of the car.
- Tested the trajectory error and obstacle avoidance ability of the car.

Automatic noodle cooking machine **Sept. 2022–Present**
Huazhong University of Science and Technology, Wuhan, China

- Designed the Bottom strip mechanism.
- Carried out package design for gear group.
- Completed the overall assembly design of the cooking machine.

PATENT:

- Yuanlong Xie, Zhiyuan Wu, **Ruiqi Mao**, Yiyang Hu, et al. 2022. *A method and device for path planning of surface unmanned boats based on RRT algorithm.* China Patent Number: CN202210431753.2.
- Yuanlong Xie, Yu Huang, Yu Liu, Tifan Xiong, Hongyang Zhang, Yuxiang Wang, Qingliang Luo, **Mao Ruiqi**. 2022. *A positioning method for mobile robots in indoor scenes based on visible light positioning*. China Patent Number: CN202211159128.3

- Yuanlong Xie, Yu Huang, Yu Liu, Tifan Xiong, Hongyang Zhang, Yuxiang Wang, Qingliang Luo, **Mao Ruiqi**. 2022. *A mobile robot relocalization method based on Monte Carlo localization method*. China Patent Number: CN202211175519.4

UNIVERSITY SERVICE:

Deputy Minister of Propaganda Department Nov. 2021–Nov. 2022

Huazhong University of Science and Technology, Wuhan, China

- Operated and managed the College's media accounts.
- Organized and arranged at least ten times photography of college activities and meetings.
- Provided photos for tweets.
- Planned and conducted interviews with outstanding students.

FELLOWSHIPS:

- Outstanding academic scholarship Oct. 2021
- Xiaomi Scholarship Dec. 2021
- Advanced Individual of Cultural and sports activities scholarship (twice) May 2021&Oct. 2021

HONORS & AWARDS:

First prize in the 20th National Robotics Competition for College Students (ROBOCON 2021) July 2021
Provincial first prize of the 10th National College Mechanical Innovation Competition (2022) Aug. 2022
Successful Participant in Mathematical Contest in Modeling (MCM 2022) Mar. 2022
Silver Prize, the 8th China International College Students "Internet+" Competition Sept. 2022
Grand Prize in the 15th National 3D Digital Innovation Design Competition Dec. 2022
Third prize of 'Mindray Cup' the 17th School Robot Competition Apr. 2021
Outstanding Report Winner in the Creative Thinking and Research Methods program, HUST Dec. 2020
First prize in 1km in the 2021 Huazhong University of Science and Technology Spring Sports Meeting May 2021

SKILLS:

Languages: Chinese(native), English
Software: SolidWorks (advanced), AutoCAD(advanced), Lightroom(advanced), MATLAB (proficient), Inventor (proficient), Altium Designer(familiar), TwinCAT (familiar), Unigraphics N.X. (familiar), Keil4(familiar)
Programming: C (proficient), C++ (familiar), MATLAB(proficient), Arduino(proficient), Python (familiar)