

Qiayuan Liao

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"Design, build, and control cool robot optimally!"

Skills

Able to design, build and control a complex robot system except for the circuit independently; manage and work with dozens of people (35 Formal and 45 preparatory team members typically); handle more than ten robotics projects whose development cycle is about one year at the same time.

Mechanic	Design robot prototypes rapidly using Fusion 360, Solidworks. Manufacture using CNC and 3D print.
Control	Experience using Trajectory Optimization, MPC, TVLQR, LQR, PID controller on real robots.
Framework & Tools	Frequent use of ROS1 with ros-control, Gazebo and Linux. Beginner of Casadi, qpOASES and Github Actions.
Programming	C++, Python, OpenCV, LaTeX & MATLAB.
Languages	Chinese (Native), English (Fluent).

Experience

Undergraduate Research, SUSTech CLEAR Lab (Prof. Wei Zhang)

Online & Shenzhen, China

RESEARCHER INTERN

Nov 2021 – March 2022

- Development of `cheetah_ros`, a hardware and simulation interface of quadruped robot (Unitree's Aliengo) based on ros-control, and Cheetah-Software.
- Working on control the quadruped robot bumps the ball in the air to the desired position using trajectory optimization and MPC.
- Research results submitted to IROS2022 (under review)
Title: Real-time Trajectory Optimization and Control for Ball Bumping with Quadruped Robots
Author List: Qiayuan Liao*, Hua Chen, Wei Zhang

Full-Stack Developing and Management, GDUT DynamicX Robot Team

Guangzhou, China

CAPTAIN & FOUNDER

Oct 2019 - Oct 2021

- Found and lead a team of up to 45 people in participated RoboMaster Robotics Competition which required us to design, build and control 7 different robots. More than 400 universities around the world participated and 8000 young engineers competed on the stage.
- Designed and manufacture the mechanical structure of mecanum and swerve chassis, 2-axis gimbal, ball shooter, and 5-axis robot arm. Supervised all the designs before manufacturing.
- Developed `rm-controls` an control and simulation framework for RoboMaster competition robot based on ROS. Implemented the PID, LQR, and some kinematics algorithms and programs of the robots mentioned above before.
- Developed a ROS driver of the high-speed camera made by Daheng Image, and a target detecting and tracking program for Robomaster competition robot using OpenCV.

Intern(RoboMaster High-School Students Vacation Camp), DJI Technology Co., Ltd.

Shenzhen, China

EMBEDDED DEVELOPER

2018 summer, 2019 winter & summer

- Use PID to control BLDC motor by CAN interface on STM32 and DJI Manifold(Jetson TX2).
- Control Mecanum wheel chassis's velocity and position of 3-axis robot arm's end-effector using kinematics.
- Localization accounting AprilTag and IMU, navigate using navigation ROS package.

Full Stack Developing, High & Middle schools

Chaozhou, China

INDIVIDUAL DEVELOPER

2015 - 2018

- Reproduced several open-source FDM 3D printers (kossel) in middle school.
- Developed a novel desktop [Selective-Laser-Sintering 3D printer](#) in high school.

Education

GDUT (Guangdong University of Technology)

Guangdong, China

B.S. IN ELECTROMECHANICAL ENGINEERING

Sept 2019 - Expected June 2023

Honors & Awards

INTERNATIONAL

- 2021 **Top 32 Team, Second Prize**, RoboMaster University Championship
- 2018 **First Place**, Denmark Young Scientists Fair and Contest

*Shenzhen, China
Copenhagen,
Denmark*

DOMESTIC

- 2022 **Third Prize**, RoboMaster University Championship
- 2019 **Champion**, RoboMaster Winter Camp for High School Students
- 2017 **First Prize**, Guangdong Youth Science and Technology Innovation Competition

*Shenzhen, China
Shenzhen, China
Guangzhou, China*