

Hao Luan

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Website: <https://edmundluan.github.io/>

EDUCATION

Harbin Institute of Technology

Bachelor of Engineering in Automation

Shenzhen, CHN

Sep. 2017 – Jun. 2021

- Overall GPA: 3.8/4.0
- Overall Average Grade: 90.1/100

RESEARCH EXPERIENCE

Research Assistant

Aug. 2021 – Present

Robotics Perception&Intelligence Lab, South. U. Sci.&Tech.

Shenzhen, CHN

Supervisor: Prof. Max Q.-H. Meng, Department Head

Dept. Electrical & Electronic Eng., SUSTech

Co-Supervisor: Dr. Jiankun Wang

Dept. Electrical & Electronic Eng., SUSTech

- Building an autonomous navigation platform for mobile robots working in dense crowds.
- Researching on novel high-efficiency robot motion planning and trajectory generation.

Undergraduate Research Assistant

Oct. 2019 – Jun. 2021

MAS Lab, HIT Shenzhen

Shenzhen, CHN

Supervisor: Assoc. Prof. Jie Mei

School of Mechanical Engineering and Automation, HITSZ

- Proposed a consensus control framework addressing the distributed consensus problem for multi-agent systems (MASs) with time-varying state constraints, uncertainties, and disturbances under switching directed topologies.
- Presented distributed consensus algorithms, theoretical proof of convergence, numerical simulations, and physical experiments for validation.

Visiting Research Student

Nov. 2015 – May 2016

Robotics Laboratory, Sun Yat-sen University

Guangzhou, CHN

Supervisor: Prof. Hui Cheng

School of Data and Computer Science, SYSU

- Optimized and implemented a centralized offline task-allocation algorithm for multi-robot systems based on the Ant Colony System.

PUBLICATIONS

- A. Xiao*, **H. Luan***, Z. Zhao*, Y. Hong, J. Zhao, J. Wang, and M. Q.-H. Meng, “Robotic Autonomous Trolley Collection with Progressive Perception and Nonlinear Model Predictive Control,” *2022 International Conference on Robotics and Automation (ICRA)* (submitted), 2021.
- **H. Luan**, J. Mei, H. Yu, and G. Ma, “Distributed constrained consensus of multi-agent systems with uncertainties and disturbances under switching directed graphs,” *IEEE Transactions on Neural Networks and Learning Systems* (under review), 2021.

HONORS & AWARDS

Outstanding Bachelor’s Thesis (top 4%)	2021
Honorable Mention in the Mathematical Contest In Modeling (MCM)	2020
Undergraduate Academic Merit Scholarship	2018, 2019, 2020
Third Prize in the National Olympiad in Informatics in Provinces (Guangdong)	2016
Honor Roll in the American Mathematics Contest (AMC) 12, and invited to the AIME	2016

* indicates equal contribution.

SELECTED PROJECTS

Robotic Autonomous Trolley Collection at Airports

Aug. 2021 – Present

Advisor: Prof. Max Q.-H. Meng, Fellow, IEEE

SUSTech

- Developing decision-making modules for a robotic solution to autonomous trolley collection at airports, including task assignment, path planning, motion planning, etc.
- Proposed a prototype of safety-critical local planner tackling obstacle avoidance, and balancing observation and planning. Conducted realistic tests and validated the effectiveness and robustness of the prototype.

Unmanned Palletizing Using Six-axis Robot Arm

Apr. 2020 – Jul. 2020

Advisor: Prof. Yunjiang Lou, Associate Dean

HITSZ

- Designed robot manipulator control algorithms using forward and inverse kinematics and LFPB trajectory planning. Built position management system to add, store, modify and delete position information of objects.
- Achieved fast palletizing motions with high accuracy.

Vision-Based Auto Parking

Oct. 2019 – Dec. 2019

Advisor: Prof. Haoyao Chen

HITSZ

- Identified a specific parking sign by adopting filtering, color segmentation, perspective transformation, Canny edge detection and rectangle envelope.
- Designed an online close-loop controller to control angular and linear velocities of an autonomous car, by employing multiple control schemes and using image information of the detected parking sign.
- Integrated searching, detection, and motion control on ROS and successfully realized fully automated parking.

SKILLS

Languages: English, Mandarin Chinese, Cantonese

Programming: C/C++, Julia, Pascal, Python

Tools: Git, MATLAB, Wolfram Mathematica, Microsoft Office, ROS, VS Code, \LaTeX

EXTRACURRICULAR ACTIVITIES

Soccer player on the HITSZ Student Soccer Team

2017 – 2021

Volunteer services on 2018 Hong Kong Universities and Colleges Forum at HITSZ

2018