Hao Luan

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Education

Harbin Institute of Technology Shenzhen, CHN
Bachelor of Engineering in Automation *Sep. 2017 – Jun. 2021*

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

Research Experience

Research Assistant Aug. 2021 – Present
Robotic Perception & Intelligence Lab, South. U. Sci.&Tech. Shenzhen, CHN
Supervisor: Prof. Max Q.-H. Meng, IEEE Fellow *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, Harbin Inst. Tech. 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 (MAS) 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 & Preprints

* indicates co-first authors.

- 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)*, 2022. **Under Review**. [Page] [PDF]
- **H. Luan**, J. Mei, H. Yu, and G. Ma, "Distributed constrained consensus of multi-agent systems with uncertainties and disturbances under switching directed graphs." 2022. **Under Review**. [Page] [Abstract]

Selected Academic Activities

Conference Reviewing

- IEEE Conference on Robotics and Automation (ICRA 2022)
- IEEE Conference on Robotics and Biomimetics (ROBIO 20/21)

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

Selected Projects

Robotic Autonomous Trolley Collection at Airports Aug. 2021 – Present
Advisors: Prof. Max Q.-H. Meng, IEEE Fellow; Dr. Jiankun Wang *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 effectivess 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/Simulink, Wolfram Mathematica, Microsoft Office, ROS, VS Code, LaTeX

Extracurricular Activities

Team member of the HITSZ Student Soccer Team	2017 – 2021
Volunteer services on the 2018 Hong Kong Universities and Colleges Forum at HITSZ	2018