Curriculum Vitae
Xuanang LEI

xualei@ethz.ch · github.com/Leon-LXA

Education

ETH Zurich, Zurich, Switzerland Sept. 2022- Present

Master in Robotics, Systems and Control.
Selected major courses:

- *Computer Vision(5.75/6)*, *Planning and Decision Making for Autonomous Robots(5.75/6)*, *Vision Algorithm of Mobile Robotics(5/6)*, *Probabilistic Artificial Intelligence(5.5/6)*
- *Foundations of Reinforcement Learning Vision*, *Introduction to Machine Learning*, *Model Predictive Control*
- *Robotics Summer School*

Tsinghua University, Shenzhen, China June. 2021- Sept. 2022

Research Assistant, Advisor: Prof Xueqian Wang

Harbin Institute of Technology (HIT), Shenzhen, China Sept. 2018- June. 2022

B.E. in Automation. GPA: 92.9/100.
Academic awards and scholarship:

- National Scholarship(2020)
- First Prize scholarship of university(2020-2021)
- First Prize scholarship of university(2019-2020)
- Second Prize scholarship of university(2018-2019)
- First prize in ABU ASIA-PACIFIC ROBOT CONTEST 2020
- Excellent Student Leader(2018-2019)

Publication

[1] Dynamic Control Barrier Function-based Model Predictive Control to Safety-Critical Obstacle-Avoidance of Mobile Robot
Zhuozhu Jian*, Zihong Yan*, Xuanang Lei, Zihong Lu, Bin Lan, Xueqian Wang, Bin Liang
IEEE International Conference on Robotics and Automation (ICRA), 2023.

Research Experience

Adaptive Mechanism Design in Sequential Social Dilemmas | ETH Zurich Apr. 2023- June. 2023

Student Advisor: Dr. Vinzenz Thoma at D-INFK, ETH AI Center.

- Re-implement the AMD algorithm using ray.rllib. Compatible with any multi-agent environment. Validated by using the prisoner's dilemma and further modify the algorithm to accommodate complex environments
- Provide open-source implementations of the Wolfpack and Gathering environments.

Navigation of Mobile Robots on Rough Terrain | Tsinghua University July. 2021- Sep.. 2022

Research Assistant Advisor: Prof. Wang Xueqian at the School of Control Science and Engineering, TsingHua University.

- real-time slam and navigation on SCOUT|AgileX Robotics on extreme rough terrain
- Local planning(Collision Avoidance) with MPC, CBF and global planning by PF-RRT*
- Mapping with Point Cloud of the complex terrain

VINS-RGBD-FAST | HIT Oct. 2020- Sep. 2021

Research Assistant Advisor: Prof. Haoyao Chen at the School of Mechanical Engineering and Automation, HIT.

VINS-RGBD-FAST is a SLAM system based on VINS-RGBD. I do some refinements to accelerate the system's performance in resource-constrained embedded paltform, like HUAWEI Atlas 200DK, Raspberry Pi

- extract FAST feature instead of Harris feature and solved feature clusttering problem
- added stationary initialization
- added IMU-aided feature tracking and extracted-feature area's quality judgement
- lower the required bandwidth of the system

Automatic Parking based on Corridor-based Minimum Snap | HIT Sep. 2020- Dec. 2020

Research Assistant Advisor: Prof. Haoyao Chen at the School of Mechanical Engineering and Automation, HIT.

- Revise the Corridor-based Minimum Snap method to apply to the motion planning of differential drive robot.
- Obtain the head-down map by using Perspective Transform on the slant front view.
- Recognize the parking area by mixing minAreaRect with Color/Shape detect.

CPG based parallel quadruped robot | HIT May. 2020- Aug 2020

Research Assistant Advisor: Prof. Yunjiang Lou, Dean at the School of Mechanical Engineering and Automation, HIT.

- Employed an ODE Hoff oscillator to complete the gait generation of the quadruped robot with very low computational complexity
- Adopted novel equations and applied them to the parallel eight-degree-of-freedom quadruped robot; drew on the ideas from a fish robot using the Central Pattern Generator (CPG) method
- Won the National Second Prize in the ABU ASIA-PACIFIC ROBOT CONTEST 2020

MAV Active Track | HIT Dec. 2018- Sep. 2019

Research Assistant Advisor: Prof. Haoyao Chen at the School of Mechanical Engineering and Automation, HIT.

- Detect the targeted person and obtain the distance with the target by Depth camera.
- Analyse the previous position of the target and predict the following position the target will be by curve fitting method.
- Control and order the drone by speech recognition.

LEADERSHIP IN COMPETITION

ABU ROBOCON Team: WTR Dec. 2019- Mar. 2021

Captain Advisor: Yunjiang Lou, Professor and Dean at School of Mechanical Engineering and Automation, HIT.

- Led the team and won the national first prize in the ABU ROBOCON 2020, as the top 16 of 75 participating universities.
- Joined the team and won the national second prize in the ABU ROBOCON 2019 in the first year
- Established a robotics forum on campus to promote technological advancement, which attracted over 300 students to participate

SKILLS

- 5 years of programming and engineering experience, solid expertise in C++, Python and MATLAB
- Expert in Robot Operating System (ROS) and OpenCV
- Abundant experience in embedded programming, such as STM32 and Arduino
- Proficient in 3D modeling and simulation software such as: SolidWorks, Webots and CoppeliaSim