

# ZHAOTING LI

Master in Robotics, System and Control program, ETH Zurich, Switzerland

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## Educations & Work Experiences

<b>ETH Zurich</b>	Zurich, Switzerland
Master in Robotics, System and Control program	Sept 2021—present
<b>Southern University of Science and Technology (SUSTech)</b>	Shenzhen, China
Research assistant at Department of Electrical and Electronic Engineering	July 2020—July 2021
<b>Harbin Institute of Technology (HIT)</b>	Harbin, China
Bachelor of Engineering (Automation), School of Astronautics	Sept 2016—June 2020
<b>GPA: 95.65 / 100 (major)</b>	<b>Ranking: 3 / 156</b>
<b>University of California, Berkeley</b>	Berkeley, USA
Visiting student researcher at Mechanical Systems Control Lab	July 2019—Sept 2019

## Publications

- **Z. LI**, T. Li, J. Wang, M. Q.-H. Meng, Learning Robot Exploration Strategy with 4D Point-Clouds-like Information as Observations, IEEE Robotics and Automation Letters, accepted.
- **Z. LI**, J. Wang, M. Q.-H. Meng, Efficient Heuristic Generation for Robot Path Planning with Recurrent Generative Model, 2021 IEEE International Conference on Robotics and Automation (ICRA), accepted.
- **Z. LI**, W. Zhan, L. Sun, C. Chan, M. Tomizuka, Adaptive sampling-based motion planning with a non-conservatively defensive strategy for autonomous driving, 2020 IFAC World Congress, Volume 53, Issue 2, 2020, Pages 15632-15638.
- Y. Yang, **Z. LI**, X. Yu, Z. LI, H. Gao, A Trajectory Planning Method for Robot Scanning System Using Mask R-CNN for Scanning Objects with Unknown Model, Neurocomputing, Volume 404, 2020, pp. 329-339.

## Research Experiences

**Learning Robot Exploration Strategy with Deep Reinforcement Learning** Dec 2020—July 2021

Advisor: Prof. Max Q.-H. Meng, Department of Electrical and Electronic Engineering, SUSTech

- Proposed 4D point-clouds-like information, which consists of 2D points' location information, and the corresponding 1D frontier and 1D distance information.
- Designed the corresponding training framework based on the deep Q-Learning method and modified it to adapt to variable action space.
- Demonstrated the performance of the proposed method on a wide variety of environments, which the model has not seen before, and includes maps whose size is much larger than maps in the training set.

**Efficient Heuristic Generation for Robot Path planning** July 2020—Oct 2020

Advisor: Prof. Max Q.-H. Meng, Department of Electrical and Electronic Engineering, SUSTech

- Designed a novel recurrent generative model to generate efficient heuristic for robot path planning.
- Incrementally constructed the heuristic through the feedback of historical information.

- Combined the generated heuristic with RRT\* algorithm to guide the algorithm to find both initial and optimal solutions in a faster and more efficient way.

### **A sampling-based motion planning method for urban autonomous vehicles**

July 2019—Jan 2020

Advisor: Prof. Masayoshi Tomizuka, Department of Mechanical Engineering, UC Berkeley

- Applied the discrete elastic-band-based motion planning method(EB planner) to generate piecewise linear collision-free path with dynamic programming. Employed pure pursuit controller to smooth this path.
- Used a spatial and speed sampling method together with a cascaded ranking method to optimize the trajectory with many hierarchical features.
- Applied a non-conservatively defensive strategy to avoid overreacting to threats with low probability.
- Adaptively adjust sampling resolution based on the environment and the objectives of the ego vehicle.

### **Path planning for a laser scanning robot system**

Feb 2019—June 2019

Advisor: Prof. Huijun Gao, Research Institute of intelligent control and systems, Department of Automation, HIT

- Designed an automatic and low-cost robot scanning system consisting of a kinect camera, a UR 10 robot and a line laser scanner. Also unified the coordinate systems.
- Proposed an online correction methods based on follow-up control and scanned data to optimize the pose of the laser scanner.
- Proposed a novel path planning methods for laser scanning based on the least square fitting and online correction. This path planning method has been validated in many use cases under various work conditions.

## **Awards and Honors**

Top Ten Learning Stars at Harbin Institute of Technology (Top 1%, 10/3975)	2019
Provincial-Level Merit Student (Top 1%, 5/500)	2019
The national second price in the NXP CUP intelligent car competition (China)	2018
University-level excellent student cadre (Top 10%)	2018
National Scholarship (Top 2%, 8/500)	2018
National Scholarship (Top 2%, 8/500)	2017
First class people's scholarship (Four times, Top 5%)	2017-2019

## **Skills**

Application: Robot Operating System (ROS); SOLIDWORKS; Altium Designer; IAR Embedded Workbench  
Programming: C; C++; Python; MATLAB

## **Volunteer Work**

Peer support, School of Aeronautics	Sept 2016—present
<ul style="list-style-type: none"> <li>• Guided students with learning difficulties to study</li> <li>• Did lectures on the summary of the final exam knowledge points</li> </ul>	
Cloud Classroom, Transmit Childhood Education	Mar 2017—June 2017
<ul style="list-style-type: none"> <li>• Delivered ten science classes for fifth graders</li> <li>• Given elementary school students a vivid and interesting explanation of physics, chemistry, robotics, aerospace and other knowledge</li> </ul>	
"Internet +" distance support education, Department of Basic Education ( HIT )	Sept 2016—Dec 2016
<ul style="list-style-type: none"> <li>• Tutored high school students in math</li> </ul>	