Muchen Sun

CONTACT INFORMATION

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EDUCATION

Northwestern University — EVANSTON, USA
M.S. in Mechanical Engineering — *2019.9 – Present*

Lanzhou University — GANSU, CHINA
B.E. in Computer Science and Technology — *2015.9 – 2019.6*

RESEARCH INTERESTS

- ❑ Robotic motion planning in belief space (especially for human-robot interaction)
- ❑ Optimal control
- ❑ Data-driven methods for dynamic systems

RESEARCH EXPERIENCES

Interactive and Emergent Autonomy Lab
Northwestern University, USA — *2020.1 - Present*
Advisor: Prof.Todd Murphey, Dept of Mechanical Engineering
- Working on algorithms for ergodic planning in belief space.

PISwarm: A Versatile Platform for General Swarm-Robotic Research
Northwestern University, USA — *2019.10 - 2020.3*
Advisor: Prof.Michael Rubenstein, Dept of Mechanical Engineering
- Developed a central monitor with GUI for controlling and communicating with the swarm robots.

Bachelor's Thesis: Analysis of Applying Adaptive Thresholding Method in LiDAR-Based Road Edge Detection Task *(Outstanding Undergraduate Thesis)*
Lanzhou University, China — *2019.1 - 2019.6*
Advisor: Prof.Qingguo Zhou, Dept of Computer Science and Technology
- Exploited Rosin thresholding method to both simulation environment in V-REP and real world data (KITTI datasets) to analyze the application of adaptive thresholding method in LiDAR-based road edge detection task.

Autonomous Driving Research Group
Lanzhou University, China — *2018.10 – 2019.6*
Advisor: Prof.Qingguo Zhou, Dept of Computer Science and Technology
- Developed a LiDAR-based road segmentation and road marking extraction method with PCL in ROS [1].
- Developed a LiDAR-based offline mapping framework with normal distribution transforms(NDT) and sliding window strategy for large-scale 3D map construction in ROS.

StuPyd: Language For Programming Education
Website: https://pypi.org/project/stupyd/
Lanzhou University, China — *2018.5 – 2018.11*
Advisor: Prof.Hao Yan, Dept of Computer Science and Technology
- Developed the compiler front end with Python and ANTLR.
- Developed the compiler back end as a bytecode execution virtual machine and a Jupyter Notebook kernel built upon the compiler.

Publication

[1] Z. Shen, Y. Xu, M. Sun, A. Carballo and Q. Zhou, "3D Map Optimization with Fully Convolutional Neural Network and Dynamic Local NDT," *2019 IEEE Intelligent Transportation Systems Conference (ITSC)*, Auckland, New Zealand, 2019, pp. 4404-4411.

Software

ROS-Lab: Docker-Based Robot Operating System Virtual Lab
Website: `https://pypi.org/project/ros-lab/`

- A Docker-based virtual lab of Robot Operating System(ROS) to help beginners learn and practise.

Robot Operating System Driver for the DeepCam Face Recognition API

- Implemented a ROS driver for the face recognition API of the DeepCam company, and a face scanner demonstration with the driver on the TurtleBot3 robot.

Extended Professional Experience

University of California San Diego — San Diego, USA
University and Professional Studies Program — *2017.9 – 2017.12*
Visiting Student

Honors and Awards

2019	Lanzhou University Outstanding Graduate
2016 – 2017	Second-class Scholarship of Lanzhou University
2015 – 2016	Second-class Scholarship of Lanzhou University

Technical Skills

Computer Languages:	Python, C++, MATLAB
Frameworks and Libraries:	ROS, PCL, OpenCV
Tools:	Make, Git, Docker, ANTLR, LaTeX