Muchen Sun

Contact Information

Department of Mechanical Engineering,
Northwestern University,
2145 Sheridan Road, Evanston, IL 60208

(773) 313-5186
muchensun2021@u.northwestern.edu
https://muchensun.github.io

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 Experiences

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

- Analyzed and established an assumption for LiDAR point cloud data distribution using a simulation model built in V-REP.
- Exploited Rosin thresholding method to both simulated data and real world data 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

- Implemented a LiDAR-based road segmentation method with Point Cloud Library(PCL) in ROS[1].
- Implemented a LiDAR-based mapping framework with normal distribution transforms(NDT) and sliding window strategy for road marking extraction with Point Cloud Library(PCL) in ROS.

StuPyd: Language For Programming Education
Website: https://github.com/StuPyd/stupyd-lang
Lanzhou University, China *2018.5 – 2018.11*
Advisor: Prof. Hao Yan, Dept of Computer Science and Technology

- Designed and implemented part of the compiler parser with Python and Another Tool for Language Recognition(ANTLR).
- Designed and implemented the back end of the compiler as a bytecode execution virtual machine.
- Implemented a Jupyter Notebook kernel based on 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://github.com/MuchenSun/ros-lab

- Built a docker image to enable users to access Ubuntu desktop environment with Robot Operating System(ROS) in the web browser.
- Implemented a REPL user interface to simplify Docker operations.

Robot Operating System Driver for the DeepCam Face Recognition API

- Implemented a Robot Operating System(ROS) driver for the face recognition API of the DeepCam company.
- Implemented a face scanner demonstration with this 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

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, Keras
Tools: Make, Git, Docker, ANTLR, LaTeX

Related Coursework

- ❑ Data Structure
- ❑ C++ Programming
- ❑ Principle of Compiling
- ❑ Numerical Analysis
- ❑ The Design and Analysis of Algorithm
- ❑ Operating Systems
- ❑ Digital Logic
- ❑ Linux Embedded Development