Zirui Zhao

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No.28 Xianning West Road, Xi'an, China.

Education

Xi'an Jiaotong University (XJTU) — Xi'an, China
Major in Automation (Honor Engineering Program, Qian Xuesen Class, top elite program in XJTU) — *Expected in June 2020*
Major GPA: 3.92/4.3
Cumulative GPA: 3.84/4.3
Ranks: 5/24

National University of Sinpagore (NUS) — Singapore
Participated in "Tele-Robotic and Deep Learning" Program at 2018 Summer Workshop — *Jul 2018 - Aug 2018*

Working

Student Intern of Carnegie Mellon University (CMU) — Pittsburgh, PA, U.S.A.
Work in the Robotics Institute & Dept. Mechanical Engineering. — *Jul 2019 - Aug 2019*

Skills

- **Languages**: Python, C++, Matlab. **Technologies**: GitHub, Carla.
- **Libraries**: TensorFlow, PyTorch, Keras, Scikit-Learn, Numpy, Jupyter, OpenCV, ROS.

Publications

1. **Z. Zhao**, Y. Mao, Y. Ding, P. Ren, N. Zheng, Visual-Based Semantic SLAM with Landmarks for Large-Scale Outdoor Environment, The 2nd China Symposium on Cognitive Computing and Hybrid Intelligence (CCHI'2019).
2. R. chen, W. Wang, **Z. Zhao**, D. Zhao, Active Learning for Risk-Sensitive Inverse Reinforcement Learning , submitted to ICRA 2020, available in Arxiv.

Research Experience

Active Risk-sensitive Inverse Reinforcement Learning — Pittsburgh, PA, U.S.A.
Summer Intern in Safe AI Lab, CMU — *Jul 2019 - Sep 2019*
- **Faculty Advisor**: Ding Zhao, Assistant Professor in Department of Mechanical Engineering & The Robotics Institute, CMU
- **Project Description**: This project is aimed to enable autonomous vehicles knowing the risk situations in dynamic environments by using Inverse Reinforcement Learning. The paper has submitted to IEEE ICRA 2020.
- **Completed work**:
  - Finished the Carla Simulator Experiment Design and Programming, including the vehicle dynamics analysis and control.
  - Reviewed the Lane Change Behavior Analysis.
  - Helped with the Implementation of Inverse Reinforcement Learning in driving scenarios.

Visual-based Semantic SLAM with Landmarks for large-scale outdoor environments — Xi'an, China
Research Intern in Institute of Artificial Intelligence and Robotics (IAIR), XJTU — *Nov 2018 - Present*
- **Faculty Advisor**: Pengju Ren, Associate Professor in IAIR, Xi'an Jiaotong University
- **Project Description**: This project built a visual semantic SLAM system with GPS fusion and landmarks association.
- **Completed work**:
  - Accomplished visual semantic SLAM based on PSPNet101 and ORB SLAM, with GPS Fusion and topological semantic mapping.
  - Developed a new dataset for KITTI sequences, containing the GPS information and labels of landmarks.
  - Paper has been accepted by IEEE CCHI 2019 as the best student paper candidate.

Multi-Robot Cooperative Navigation — Xi'an, China
Research Intern in IAIR, XJTU — *Apr 2018 - Mar 2019*
- **Faculty Advisor**: Pengju Ren, Associate Professor in IAIR, XJTU
- **Project Description**: This project established a multi-robot navigation and exploration system, which consist of UAVs and UGVs.
- **Completed work**:
  - Accomplished road segmentation and map establishment in UAV.
  - Enforced cooperative navigation system of UAV and UGV based on lidar and camera.
- **Demo Video**: Cooperative Navigation System of UAV and UGV.

Tele-Robotics & Deep Learning — Singapore
Student of 2018 Summer Workshop, School of Computing, NUS — *Jul 2018 - Aug 2018*
- **Faculty Advisor**: Soo Yuen Jien, Professor in School of Computing, NUS
- **Project Description**: We built an autonomous blind-guide robot by using Raspberry Pi and Arduino. We have also actualized the computer vision task py inception model and Azure service for obstacle classification.

Scholarships & Honorable Titles

- Siyuan Merit Scholarship in 2017 & 2018 & 2019
- Excellent Student in 2017 & 2018 & 2019
- Second Prize of 1989 Mechanical Alumni Scholarship for Qian Class in 2018 (4 Candidiates out of 119 students in Qian Class)

Contests & Awards

- **2018 National University Student Innovation Program**: Finished Autonomous Logistic UAV and Multi-agents system and got first prize (National Prize).
- **2017 China Undergraduate Mathematical Contest in Modelling**: First Place of Shaanxi Province
- **2018 DAC System Design Contest**: Assistant for image processing, model optimization and got rank of 4/21 in GPU platform
- **2018 Big Data and Artificial Intelligence Contest**: Implemented Deep Convolutional Network SE-ResNet 152 to achieve 98 % accuracy in the contest dataset and got rank of 39/300
- **2018 Global College Technical Summer Training Camp of JD AI research**: Finished the task of Target Black-box attack on deep neural network with second place