MINZHAO ZHU

Phone: (+86) 156-1166-2982 Email: minzhaozhu@gmail.com

ByteDance Ltd., No.10 Building, Zhongguancun North Second Street, Haidian District, Beijing, China

EDUCATION

Beijing Institute of Technology *(985/211)* Sept. 2017 - Jun. 2020

Master of Engineering (Control Science and Engineering), Supervisor: Mengyin Fu

Beijing Institute of Technology *(985/211)* Sept. 2013 - Jun. 2017

Bachelor of Engineering (Automation), GPA: 92.8/100, **Rank:3/172**

PUBLICATIONS

[1] Mengyin Fu, **Minzhao Zhu**, et al, "LiDAR-based Vehicle Localization on the Satellite Image via a Neural Network", Robotics and Autonomous Systems, vol.129, 103519, July 2020.

[2] **Minzhao Zhu**, Yi Yang, et al. "AGCV-LOAM: Air-Ground Cross-View based LiDAR Odometry and Mapping", in IEEE 32th Chinese Control and Decision Conference, 2020. (Accepted)

RESEARCHES

LiDAR-based Vehicle Localization on the Satellite Image Oct. 2018 - Jul. 2020

● Proposed a method that uses satellite images to achieve localization in the GNSS-denied area.

● A neural network is proposed to compare the spatial-discriminative feature maps of LiDAR grid-map and satellite image patches. The network outputs the probabilities of correspondence. Based on the outputs, a particle filter is used to obtain the probability distribution of the vehicle's pose.

● The average position error on several KITTI sequence is 2.5 m. Compared with traditional methods, this method is more robust in some challenging scenarios such as shadowed areas on satellite images.

Air-ground Cross-view Semantic SLAM Jul. 2019 - Jul. 2020

● Proposed a LiDAR semantic SLAM framework using the satellite image as prior information to reduce localization error and improve semantic segmentation precision.

● To reduce the accumulated error of the LiDAR odometry, the satellite image patch, which is cropped on the pose given by the odometry, is compared with the LiDAR grid-map via a neural network. The network directly outputs the pose correction offset, which is added to the factor graph.

● To improve the precision of semantic segmentation, based on a LiDAR projection image, the semantic information from aerial view is fused with multiple ground views via Bayesian update.

PROJECTS

UAV-UGV Collaborative Target Searching System *(Contest)* Jun. 2018 - Sep. 2018

● Led the team to develop the software of the UAV-UGV collaborative system.

● The UAV constructs a 2D map of an area (3 km×3 km) and searches for a moving target (a vehicle). Once the UAV finds the target, it will follow the target and guide the UGV to approach the target.

Intelligent Mouse & Keyboard Switcher Aug. 2017 - May. 2018

- It is designed to let users freely operate multiple computers with a single mouse & keyboard.
- By recognizing users' face orientation, this device first finds out which computer the user desires to use. Then it automatically switches the mouse & keyboard signals to that computer.
- The accuracy of the face orientation recognition neural network is 98.3%.

Hongqi-H7 Self-driving Car *(Contest)* Sep. 2017 - Nov. 2017

- Designed a lane detection algorithm. The algorithm first extracts lane candidates with semantic segmentation and line detection. The type of lane candidates is obtained by a classification network.
- Designed a LiDAR-based accessible region detection algorithm. The point cloud is divided into sectors and the obstacle is detected by examining the local gradient.

Bank Robot (A mobile robot for bank reception service) Mar. 2017 - Sep. 2017

- Designed a 2D-LiDAR SLAM method based on particle filter. The weight of points with high roughness is enhanced so that scan matching in the longitudinal direction can be more accurate.
- Up until now, the robot has been deployed into service at 35 banks for 3 years.

WORK EXPERIENCE

ByteDance Ltd. Jul. 2020 - Present

Algorithm Engineer in AI Lab at Bytedance

HONORS AND AWARDS

2020	Excellent Postgraduate Thesis of Beijing Institute of Technology	**Top 4% in BIT**
2018	National Scholarship	**Top 2% in BIT**
2018	Unmanned System Challenge (Air-Ground Collaboration Contest)	**National First Prize**
2018	the 46th International Exhibition of Inventions of Geneva	**Gold Award**
2017	2017 China Smart Car Future Challenge Contest	**National First Prize**
2017	the 15th Challenge Cup National Undergraduate Extracurricular Academic Science and Technology Contest	**National First Prize**

SERVICES AND TEACHING ACTIVITIES

Mar. 2019 - Jun. 2019	BIT Teaching Assistant: *Digital Electronic Technology*
Sep. 2018 - Jan. 2019	BIT Teaching Assistant: *Analog Electronic Technology*
May. 2018	Assistant Referee in the 17th China University Robot Contest (ROBOCON)

SKILLS

- **GRE:** 324+4.0
- **Programming languages:** C/C++, Python
- **Tools:** ROS, Git, OpenCV, PCL, MATLAB, Caffe, PyTorch
- Understand basic methods of object detection, semantic segmentation, visual SLAM and 2D/3D LiDAR SLAM.