Tixiao Shan

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Research Interests

My research focuses on developing autonomous navigation system for unmanned ground vehicles with constrained computational resources. I have a special interest in SLAM. I have developed localization, mapping and motion planning algorithms that run in real-time on ground vehicles. I also have an interest in deep learning and have used it to solve some real-world problems, such as lidar super-resolution and planning under uncertainty.

Education

2014–Present	**Stevens Institute of Technology**, *New Jersey, US*, PhD, Mechanical Engineering. GPA 4.0/4.0, Top 1%
2011–2014	**Shanghai University**, *Shanghai, China*, MS, Mechanical Electronics Engineering. GPA 3.59/4.0, Top 5%
2007-2011	**Qingdao University**, *Qingdao, China*, BS, Mechanical Engineering and Automation. GPA 3.56/4.0, Top 5%

Research Experience

2014 - Present	**Research Assistant**, *Stevens Institute of Technology*. Design Autonomous navigation system (localization, mapping and motion planning) for unmanned ground vehicles. Utilize deep learning technique to enable lidar super-resolution and planning under uncertainty.
2013 - 2014	**Assistant Engineer**, *Shanghai ABB Engineering CO. Ltd.*. 3D modeling of assembly tools for BMW clutch. Design roll table for BMW engine production line.
2012 - 2014	**Research Assistant**, *Shanghai University*. Design embedded control system circuit board for UAV, a project sponsored by National Natural Science Foundation of China (No.61175092).

Teaching Experience

2017-Present	**ME598**, *Intro to Robotics*, Lab Instructor, Stevens Institute of Technology.
2017-Present	**ME483**, *Control Systems*, Teaching Assistant, Stevens Institute of Technology.
2018	**ME322**, *Engineering Design*, Instructor, Stevens Institute of Technology.
2016	**ME470**, *Systems Laboratory*, Instructor, Stevens Institute of Technology.

Skills

Programming	C/C++, Python
Software Infrastructure	ROS, PCL, OpenCV, Tensorflow, PyTorch, Keras, Numpy, Matplotlib, Matlab, AutoCAD, Solidworks, Gazebo, Linux, Final Cut Pro
Industry	SLAM, Autonomous Navigation, Deep Learning, 3D Modeling

Publications

2019	K. Doherty, T. Shan, J. Wang, and B. Englot, "Learning-aided 3D Occupancy Mapping with Bayesian Generalized Kernel Inference," *IEEE Transactions on Robotics*, Accepted, To Appear.

2019 J. Wang, T. Shan, and B. Englot, "Underwater Terrain Reconstruction from Forward-Looking Sonar Imagery," *IEEE International Conference on Robotics and Automation*, Accepted, To Appear in May 2019.

2019 F. Chen, S. Bai, T. Shan and B. Englot. "Self-Learning Exploration and Mapping for Mobile Robots via Deep Reinforcement Learning." *International AIAA Information-Driven Decision and Control Conference*, 2019

2018 T. Shan, K. Doherty, J. Wang and B. Englot. "Bayesian Generalized Kernel Inference for Terrain Traversability Mapping." *Conference on Robot Learning*, 2018.

2018 T. Shan, and B. Englot. "LeGO-LOAM: Lightweight and Ground-Optimized Lidar Odometry and Mapping on Variable Terrain." *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 4758-4765, 2018.

2017 T. Shan, and B. Englot. "Belief roadmap search: Advances in optimal and efficient planning under uncertainty." *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 5318-5325, 2017.

2016 B. Englot, T. Shan, S.D. Bopardikar, and A. Speranzon. "Sampling-based min-max uncertainty path planning." *IEEE International Conference on Decision and Control*, pp. 6863-6870, 2016.

2015 T. Shan, and B. Englot. "Sampling-based Minimum Risk path planning in multiobjective configuration spaces." *IEEE International Conference on Decision and Control*, pp. 814-821, 2015.

2015 T. Shan and B. Englot, "Tunable-Risk Sampling-Based Path Planning Using a Cost Hierarchy," *IEEE International Conference on Robotics and Automation Workshop*, pp. 2, 2015.

Awards

2014-2017 Stevens Innovation and Entrepreneurship Fellowship

2013 National Scholarship for Graduate Students

2013 Outstanding Students of Shanghai University

2007-2010 Qingdao University Scholarship (6 times)

2008-2010 Outstanding Students of Qingdao University (3 times)

2009 Tsingtao Brewery Education Scholarship