

RESEARCH INTERESTS

Robot Navigation, Perception and Localization, Lidar Mapping, Computer Vision

EDUCATION

Ph.D. Robotics, The Robotics Institute, Carnegie Mellon University, 2017

EMPLOYMENT

Systems Scientist, The Robotics Institute, Carnegie Mellon University, 09.2019–Present

Founder and Chief Scientist, Kaarta, 03.2015–08.2019

AWARDS

Winner of Microsoft Indoor Localization Competition (3D Category) 2016, 2017

Rank #1 on KITTI Odometry Benchmark, 01.2014–Present

PUBLICATIONS

Journal Papers

1. J. Zhang, C. Hu, R. Gupta Chadha, and S. Singh. Falco: Fast Likelihood-based Collision Avoidance with Extension to Human-guided Navigation. *Journal of Field Robotics*. vol. 37, no. 8, pp. 1300–1313, 2020.
2. J. Zhang and S. Singh. Laser-visual-inertial Odometry and Mapping with High Robustness and Low Drift. *Journal of Field Robotics*. vol. 35, no. 8, pp. 1242–1264, 2018.
3. J. Zhang and S. Singh. Low-drift and Real-time Lidar Odometry and Mapping. *Autonomous Robots*. vol. 41, no. 2, pp. 401–416, 2017.
4. J. Zhang, M. Kaess, and S. Singh. A Real-time Method for Depth Enhanced Visual Odometry. *Autonomous Robots*. vol. 41, no. 1, pp. 31–43, 2017.
5. J. Zhang and S. Singh. Visual-Inertial Combined Odometry System for Aerial Vehicles. *Journal of Field Robotics*. vol. 32, no. 8, pp. 1043–1055, 2015.
6. M. Bergerman, S. Maeta, J. Zhang, G. Freitas, B. Hamner, S. Singh and G. Kantor. Robot Farmers: Autonomous Orchard Vehicles Help Tree Fruit Production. *IEEE Robotics and Automation Magazine*. vol. 22, no. 1, pp. 54–63, 2015.

Conference Papers

1. J. Zhang, C. Hu, R. Gupta Chadha, and S. Singh. Maximum Likelihood Path Planning for Fast Aerial Maneuvers and Collision Avoidance. *IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS)*. Macau, China, Nov. 2019.
2. J. Zhang, R. Gupta Chadha, V. Velivela, and S. Singh. P-CAL: Pre-computed Alternative Lanes for Aggressive Aerial Collision Avoidance. *The 12th Intl. Conf. on Field and Service Robotics (FSR)*. Tokyo, Japan, Aug. 2019.
3. J. Zhang, R. Gupta Chadha, V. Velivela, and S. Singh. P-CAP: Pre-computed Alternative Paths to Enable Aggressive Aerial Maneuvers in Cluttered Environments. *IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS)*. Madrid, Spain, Oct. 2018.
4. J. Zhang and S. Singh. Aerial and Ground-based Collaborative Mapping: An Experimental Study. *The 11th Intl. Conf. on Field and Service Robotics (FSR)*. Zurich, Switzerland, Sept. 2017.

5. J. Zhang and S. Singh. Enabling Aggressive Motion Estimation at Low-drift and Accurate Mapping in Real-time. IEEE Intl. Conf. on Robotics and Automation (ICRA). Singapore, May 2017.
6. J. Zhang, M. Kaess, and S. Singh. On Degeneracy of Optimization-based State Estimation Problems. IEEE Intl. Conf. on Robotics and Automation (ICRA). Stockholm, Sweden, May 2016.
7. J. Zhang and S. Singh. Visual-lidar Odometry and Mapping: Low-drift, Robust, and Fast. IEEE Intl. Conf. on Robotics and Automation (ICRA). Seattle, WA, May 2015.
8. J. Zhang, M. Kaess, and S. Singh. Real-time Depth Enhanced Monocular Odometry. IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS). Chicago, IL, Sept. 2014.
9. J. Zhang and S. Singh. LOAM: Lidar Odometry and Mapping in Real-time. Robotics: Science and Systems Conference (RSS). Berkeley, CA, July 2014.
10. J. Zhang, A. Chambers, S. Maeta, M. Bergerman, and S. Singh. 3D Perception for Accurate Row Following: Methodology and Results. IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS). Tokyo, Japan, Nov. 2013.
11. J. Zhang and S. Singh. INS Assisted Monocular Visual Odometry for Aerial Vehicles. The 9th Intl. Conf. on Field and Service Robotics (FSR). Brisbane, Australia, Dec. 2013.
12. J. Zhang, G. Kantor, M. Bergerman, and S. Singh. Monocular Visual Navigation of an Autonomous Vehicle in Natural Scene Corridor-like Environments. IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS). Vilamoura, Portugal, Oct. 2012.
13. J. Zhang, S. Singh, and G. Kantor. Robust Monocular Visual Odometry for a Ground Vehicle in Undulating Terrain. The 8th Intl. Conf. on Field and Service Robotics (FSR). Matsushima, Japan, July 2012.

Patents

1. J. Zhang, S. Singh, and K. Dowling. Laser Scanner with Real-time, Online Ego-motion Estimation. Intl. Patent 2018071416, 2018.

SERVICE

Editor/Organizer

- Session Co-chair, IEEE/ION Position, Location, And Navigation Symposium (PLANS) 2020.
- Session Chair, IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS) 2019

Reviewer

- IEEE Transactions on Robotics, 2015, 2017-2020.
- Journal of Field Robotics, 2011-2020.
- Autonomous Robots 2017-2019.
- IEEE Robotics and Automation Letters, 2015-2020.
- Computer Vision and Image Understanding, 2016.
- IEEE Intl. Conf. on Robotics and Automation (ICRA) 2014, 2016-2020.
- IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS) 2012, 2014-2020
- Intl. Conf. on Field and Service Robotics (FSR) 2017