YANYU ZHANG

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EDUCATION

University of California, Riverside Sep. 2021 - Present
Ph.D. in Electrical Engineering, Mentor: Wei Ren, GPA: 3.9/4.0
Research Interests: State Estimation, Visual-Inertial Navigation, SLAM

Boston University Sep. 2019 - May 2021
M.S. in Electrical and Computer Engineering, GPA: 3.7/4.0

University of Detroit Mercy Sep. 2018 - Jun. 2019
B.S. in Robotics, GPA: 3.4/4.0

Beijing University of Chemistry Technology Sep. 2015 - Jun. 2018
B.S. in Mechanical Design, Manufacture and Automation, GPA: 83%

EXPERIENCE

Estimation and Sensor Fusion for Autonomous Vehicles Internship Jan. 2023 – Apr. 2023
Mitsubishi Electric Research Laboratories (MERL), Mentor: Karl Berntorp
- State estimation, Sensor Fusion, SLAM

Researcher at Boston University Jan. 2020 - May 2021
Boston University Robotics Lab, Mentor: John Baillieul
- Motion planning, SLAM

Securing Integrity of Micro-Service Builds on Cloud Internship Sep. 2020 - Dec. 2020
Thomas J. Watson Research Center (IBM), Mentor: Shripad Nadgowda
- CI/CD, Tekton pipelines design, MOC In-Toto.

RESEARCH PROJECTS

Cooperative Lane Mapping using Fixed-Lag Smoothing
- Propose a novel road-map model using Bezier curve and an adaptive keypoints combination algorithm.
- Propose a loosely-coupled fixed-lag smoothing algorithm for kinematic and dynamic single track models.
- Extend single-vehicle smoothing to a fully distributed road-map monitoring system.

Point-Line Cooperative Visual-Inertial Odometry
- Leverage common points-line features to improve accuracy, especially in low-textured environments.
- Leverage neighbor's observations to bound long-term drifts of VIO.
- IMU-to-camera intrinsic/extrinsic online calibrations, closest point line representation.

Visual Navigation Using Sparse Optical Flow and Time-to-Transit
- Theory of robust Eulerian and Lagrangian optical flow.
- Analyse the geometric and perceived time-to-transit values under different feature densities.

5G Utility Pole Planner Using Google Street View and M-RCNN
- Detect the utility poles based on M-RCNN.
- Leverage an improved immune algorithm to map the poles on Google Static Street View.
- Design a Django webpage to present the layout of poles' position within the selected areas on AWS.

Intelligent Hotel ROS-based Service Robot
- Design a service robot utilizing Hokuyo 2D Lidar and Kinect camera on a Pioneer 3 robot.
- Estimate the best route utilizing the A* algorithm and navigate across floors in an indoor environment.

SKILLS

- Languages: C++, Python, MATLAB, R
- Frameworks/Technologies: Git, OpenCV, ROS

PUBLICATIONS

[1] **Y. Zhang**, H. Zhou, H. Liu, H. Qiu, and W. Ren, "Cooperative Lane Mapping using Fixed-Lag Smoothing", 2024 IEEE International Conference on Robotics and Automation (ICRA 2024). [Submitted]

[2] **Y. Zhang**, M. Greiff, W. Ren, and K. Berntorp, "Distributed Road-Map Monitoring Using Onboard Sensors", 2024 American Control Conference (ACC 2024). [Submitted]

[3] J. Xu, P. Zhu, **Y. Zhang**, and W. Ren, "Cooperative 3-D Target State Estimation and Active Tracking", 2023 IEEE Conference on Decision and Control (CDC 2023).

[4] **Y. Zhang**, P. Zhu, and W. Ren, "PL-CVIO: Point-Line Cooperative Visual-Inertial Odometry", 2023 IEEE Conference on Control Technology and Applications (CCTA 2023).

[5] C. Boretti, P. Bich, **Y. Zhang** and J. Baillieul, "Visual Navigation Using Sparse Optical Flow and Time-to-Transit", 2022 IEEE International Conference on Robotics and Automation (ICRA 2022).

[6] **Y. Zhang**, J Song, and S Li, " 3D Object Detection and Tracking Using Monocular Camera in CARLA", 2021 IEEE International Conference on Electro Information Technology (EIT 2021).

[7] **Y. Zhang** and O. Alshaykh, "5G Utility Pole Planner Using Google Street View and Mask R-CNN", 2020 IEEE International Conference on Electro Information Technology (EIT 2020).

[8] **Y. Zhang**, X. Wang, X. Wu, W. Zhang, M. Jiang and M. Al-Khassaweneh, "Intelligent Hotel ROS-based Service Robot", 2019 IEEE International Conference on Electro Information Technology (EIT 2019).