Hengrui (Henry) Zhang

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EDUCATION

Carnegie Mellon University

Bachelor of Science in Mechanical Engineering; Additional Major: Robotics   Class of 2019

Master of Science in Robotics, School of Computer Science   Class of 2021

- GPA: 4.0/4.3
- Relevant Courses: Introduction to Computer Systems, Machine Learning, Computer Vision, Mathematical Foundations for Robotics, Robot Localization and Mapping, Mobile Robots, Robot Kinematics and Dynamics, Parallel Computer Architecture and Programming

WORK EXPERIENCE

Facebook, Inc.   Redmond, WA

Optical Systems Software Engineer Intern   Summer 2020

- Developed an integrated system validation pipeline with object-orientated Python, enabling the team to evaluate sensor performance efficiently.
- Implemented a depth characterization module to evaluate depth accuracy, precision, and depth map quality.
- Deployed and tested the validation pipeline on launching AR product.

Team Explorer, Carnegie Mellon DARPA Subterranean Challenge Team   Pittsburgh, PA

Perception Software Team   Summer 2019 - Now

- Developed a generalized calibration pipeline for multi-sensor perception payloads on multiple robots.
- Implemented a ROS driver for FLIR BOSON 640 thermal cameras that supports multiple functionalities (raw images, rectified images, camera info, camera reset).
- Conducted research in thermal-inertial odometry methods and published result TP-TIO to IROS 2020.
- Developing degeneracy detection on visual-inertial odometry system.

The Air Lab, The Robotics Institute, Carnegie Mellon University   Pittsburgh, PA

Research Assistant Intern   Summer 2018

- Implemented thermal camera intrinsic and thermal-LiDAR extrinsic calibration pipeline.
- Implemented external hardware sensor triggering and time synchronization for the sensor pod.

PROJECT

Parallel LiDAR Depth Image Projector   Spring 2020

- Developed software pipeline which projects 3D LiDAR point clouds to depth images in camera frame.
- Implemented pipeline with single CPU core, OpenMP multi-threaded, and CUDA GPU versions.
- Benchmarked all three versions and achieved 120x speedup with CUDA implementation.

Robotics Capstone Project   Spring 2019

Washbot, an autonomous driveway cleaning robot

- Designed and assembled the mechanical structure of the robot.
- Integrated ORB-SLAM with robot's Intel Realsense RGBD camera for state estimation.

PUBLICATION

- Shibo Zhao, Peng Wang, **Hengrui Zhang**, Zheng Fang, Sebastian Scherer. TP-TIO: A Robust Thermal-Inertial Odometry with Deep ThermalPoint. *International Conference on Intelligent Robots and Systems (2020)*

Skill

Programming: C++, Python, MATLAB, Git, Ceres, Simulink, ROS, MS tools