Hengrui (Henry) Zhang

Email: hengruiz@andrew.cmu.edu
Phone: (412) 313 4476
Webpage: hengruizhang.com

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 - Spring 2020

- 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).
- Trained, evaluated, and deployed object detection networks on RGB and thermal datasets for artifact detection.
- Conducted research in thermal-inertial odometry methods and published result TP-TIO to IROS 2020.

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, Simulink, ROS, MS tools