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https://scholar.google.com/citations?user=M3tpOPcAAAAJ&hl=en&oi=ao

Profile

Robotics researcher specializing in Depth Sensing & Geometric Reconstruction. Experienced in Photorealistic Geometric Reconstruction, consumer grade 3D sensors (algorithms & characterization frameworks), Perception Systems Design, Obstacle Mapping, Point Cloud Registration, Computer Vision, & Sensor calibration Algorithms. Delivered production code that ran onboard Robots and Security cameras. Track record of academic research and research mentorship in the industry resulting in publications in top Robotics conferences and journals.

Education

PhD Systems Engineering (Robotics), *Arizona State University* 2011 – 2016 | Tempe, USA
Point Cloud Registration, RBG-Depth-Thermal Mapping, 3D Change Detection in Earthquake zones, Multispectral cameras.

Professional Experience

Senior Applied Scientist, *Amazon Lab126* 08/2020 – present | Sunnyvale, USA
Perception for the Astro robot
- Depth Sensors (iToF, Stereo, Lidar)
- Obstacle Mapping (Sensor data processing, Sensor modeling, Mapping & Fusion algorithms)
- 3D Gaussian Splatting
- Perception Systems Engineering (Sensor characterization, Sensor configuration & Sensor mount position analysis)
- Map evaluation frameworks.

Senior Computer Vision Engineer, *Apple* 12/2018 – 08/2020 | Cuptertino, USA
HomeKit Secure Video (through Apple's acquisition of Lighthouse AI)
- Camera calibration tools and Face quality metrics.

Senior RGBD Engineer, *Lighthouse AI (Acquired by Apple)* 08/2016 – 12/2018 | Palo Alto, USA
3D Perception system for a Security Camera
- Built the system from scratch
- Wrote the SDK for an iToF sensor
- Implemented an on-board mapping algorithm on a Snapdragon 435.

Skills

Programming Languages & Tools
C++, Python, PyTorch, LibTorch, OpenCV, PCL, Open3D, ROS, Ceres, grid_map

Production Coding
iToF SDK, Obstacle Mapping algorithms, Factory Calibration validation algorithms, Depth Sensing Characterization frameworks, Map Evaluation frameworks.

Technical Leadership
Experience working across Sensors, Simulation, Mapping, & Motion Planing teams to identify and validate the impact of Sensor selection & Sensor Configurations. Has resulted in making program level decisions.

Establishing workstreams on technology explorations with well defined deliverables to guide the future direction of the team.

Projects

Mapping & Surface Reconstruction Algorithms
- 3D Gaussian Splatting (C++, libtorch)
- Log odds mapping on the Astro robot. (C++)
- Background mapping using an iToF depth sensor (C++)
- Lidar mapping with ICP on VLP 16 / Hokuyo lidars (C++)
- Contributor to the PCL registration library (C++)

Depth Sensing Algorithm Implementation
iToF SDK implementation : Converting raw sensor signals to depth images on a Snadragon 435. (C++)

Sensor System Design
- iToF depth sensor**:** Impact of Modulation frequency on band jumping (bias). (Python)
- Active Stereo : Identify the best configuration of the dot projectors. (C++)
- Evaluation of Depth Engine for Disparity Estimation. (C++)

Characterization Frameworks
Setup & Algorithms to evaluate & compare depth sensor performance (Python)

Map Evaluation framework to validate the Geometric Reconstruction Accuracy (Python)

Simulation Frameworks
Monte Carlo simulation framework to evaluate and prove the Safety system of Astro (Python)

Calibration & Validation
- Extrinsic calibration of RGB & Thermal with lidar (C++)
- Calibration Validation setup & implementation in the factory (C++)

Industrial Research
Mentored research interns for the team on
- Class Agnostic RGB-D segmentation
- Embodied class agnostic RGB-D Video Segmentation
- 3D Gaussian Splatting

Three IEEE Robotics and Automation Letters (RA-L) publications accepted.