

Aravindhan K Krishnan

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

Profile

Robotics researcher specializing in Depth Sensing. Experienced in consumer grade 3D sensors, 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.

Education

PhD Systems Engineering (Robotics), Arizona State University 2011 – 2016 | Tempe, USA
Point Cloud Registration, RGB-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)
- Perception Systems Engineering (Sensor characterization, Sensor configuration & Sensor mount position analysis)
- Map evaluation frameworks.

Senior Computer Vision Engineer, Apple 12/2018 – 08/2020 | Cupertino, 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, OpenCV, PCL, ROS, PyTorch, 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 Planning teams to identify and validate the impact of Sensor selection & Sensor Configurations. Has resulted in making program level decisions.

Projects

Mapping & Surface Reconstruction Algorithms

- Log odds mapping on the Astro robot.
- Background mapping using an iToF depth sensor
- 3D Gaussian Splatting
- Lidar mapping with ICP on VLP 16 / Hokuyo lidars
- Contributor to the PCL registration library

Depth Sensing Algorithm Implementation

iToF SDK implementation : Converting raw sensor signals to depth images on a Snapdragon 435.

Sensor System Design

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

Characterization Frameworks

Setup & Algorithms to evaluate & compare depth sensor performance

Simulation Frameworks

Monte Carlo simulation framework to evaluate and prove the Safety system of Astro

Calibration & Validation

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

Industrial Research

Mentored research interns for the team on

- Class Agnostic RGB-D segmentation
- Embodied class agnostic RGB-D Video Segmentation
- 3D Gaussian Splatting

Two RA-L publications accepted.