

Akash Sharma

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EDUCATION

Carnegie Mellon University

Master of Science in Robotics

Advisor: Prof. Michael Kaess

Pittsburgh, PA

2019 – Present

CGPA: 4.25/4.00

Sri Jayachamarajendra College of Engineering

Bachelor of Engineering in Electronics and Communication

Advisor: Prof. Sudharshan Patil Kulkarni

Mysore, India

2013 – 2017

CGPA: 9.61/10.00

RESEARCH INTERESTS

Simultaneous Localization and Mapping (SLAM), Computer Vision, 3D Reconstruction

PUBLICATIONS

Compositional Scalable Object SLAM | [📄 preprint](#)

Akash Sharma, Wei Dong, Michael Kaess

Submitted to International conference in Robotics and Automation (ICRA) 2021

Automated Vision Inspection for Cylindrical Metallic Components | [📄 paper](#)

Krithika Govindaraj, Bhargavi Vaidya, Akash Sharma, Shreekanth T

International Conference on Computing and Communication (IC3) 2018

EXPERIENCE

Graduate Research Assistant

Carnegie Mellon University – The Robotics Institute

Advisor: Prof. Michael Kaess

Developing algorithms for dense metric and semantic SLAM systems.

Working towards distributed SLAM for multi robot systems with semantic mapping.

Oct 2019 – Present

Pittsburgh, PA

Research Assistant

Carnegie Mellon University

Advisor: Prof. Katerina Fragkiadaki

Research in estimating camera egomotion using deep models for outdoor forest environments

Working on implicit map representations for 3D reconstructions to support *Truncated signed distance function* (TSDF) inpainting

Aug 2020 – Present

Pittsburgh, PA

Student Developer

OpenCV – Google Summer of Code (GSoC) | [📄 blog](#)

Implemented and improved RGBD fusion methods using spatial hashing and submap based local registrations to enable reconstruction of large scale environments.

Reviewing extension of implementation to GPU in OpenCL

May 2020 – Aug 2020

Virtual/Pittsburgh, PA

Software Engineer

Infinera

Built abstract infrastructure for *fault, configuration and performance management* of the optical line system.

Implemented the *bypass auto-discovery* feature, and supported *input power control* for faster optical traffic turn up, and increased traffic capacity respectively.

Was responsible for mentoring incoming graduate software developers in optical line system team.

Jul 2017 – Jul 2019

Bangalore, India

Summer Research Fellow (Indian Academy of Sciences)

PES University – Invent labs

Worked with the TI F28335 peripheral explorer kit Digital Signal Controller (DSC), and explored algorithms for sound reconstruction from visual feed of vibrating speaker system.

Apr 2016 – Jul 2016

Bangalore, India

Research Intern



Indian Institute of Science

Worked on a hardware accelerator for RSA encryption using Verilog HDL. Implemented and simulated the results on the Zynq Z7020 FPGA.

June 2015 – Aug 2015

Bangalore, India

PROJECTS

- SuperGlue** |  [code](#) | *python, pytorch* Aug 2020
Unofficial implementation of *CVPR 2020 paper – Superglue: Learning feature matching with Graph neural networks*
training code in pytorch.
- Simple SLAM** |  [code](#) | *python* Nov 2019
Implementation of sparse feature based simple visual odometry using **g2o** for graph optimization.
- Visual SLAM for Quadrotors in Indoor environments** | *C++, python, ROS, hardware* Dec 2016 – May 2017
Built hardware for a quadrotor based on an arduino platform with onboard Odroid XU4 and Kinect
Tested algorithms for indoor localization such as RTAB-mapping, and KinectFusion
- Navigate a Terrain** | *python, arduino* Nov 2016 – Jan 2017
Built a robot to follow a laser. A laser pointer mounted on a servo base leads the robot avoiding obstacles to reach a goal.
Qualified for pre-finals *e-Yantra Robotics Challenge (eYRC) 2016* at IIT Bombay
- Mobile Inverted Pendulum robot** | *hardware, arduino, C++* Jan 2016 – Apr 2017
Implemented a Kalman filter for IMU sensor fusion. Implemented a cascaded PI-PD controller for speed and angle control. Control was implemented at 200Hz using hardware interrupts to control stepper motors
Implemented simple line following (high contrast lines) via visual servoing
- Hybrid Gear shifter and Vehicle Control System** | *arduino* Sep 2015 – Jul 2016
Designed and conceptualized a hybrid gear actuator system based on capacitive touch panels attached to the steering wheel
Placed 4th in the Partners for the Advancement of Collaborative Engineering Education (PACE) Collaborative Innovation Challenge (CIC) held at Cincinnati, Ohio, USA.

AWARDS AND ACHIEVEMENTS

- Ranked **7th** in a class of ~ 160 [Undergrad]
- Won most promising project award (cash prize) in the *Infinera India Hackathon (2018)*, **2nd** place among over 50 teams. Implemented a method to prevent system shutdown, in case of realtime process failures. [Infinera]
- Secured **1st** place in (state-level) C coding competition, held by *Hackerearth* and *IEEE – SJCE*. [Undergrad]
- Placed **2nd** in the (state-level) line following robot competition held at *SJCE*. [Undergrad]
- Placed **1st** in the *Algorithms for Robot autonomy* course offered by *University at Buffalo (SUNY)*, at *SJCE*. [Undergrad]
- Placed **1st** in Grade 10 with 95%, across all *Indian Certificate of Secondary Education (ICSE)* schools in Mysore. [Secondary School]

TEACHING EXPERIENCE AND SERVICE

- Graduate Teaching Assistant** | *16833 - Robot Localization and Mapping* | **Prof. Michael Kaess** Fall 2020
Delivered a lecture on dense SLAM methods.
Created new homework scripts in python.
Office hours, grading, and project guidance for ~ 60 students.
- Robotics Mentor** | *IEEE - SJCE Robotics Workshop* | **Prof. S. B. Rudraswamy** 2016