

# 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

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- iNeRF** |  [code](#) | *python, pytorch* Jan 2021  
Unofficial implementation of *arxiv 2020 paper – iNeRF: Inverting Neural Radiance Fields for Pose Estimation*
- 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 4<sup>th</sup> in the Partners for the Advancement of Collaborative Engineering Education (PACE) Collaborative Innovation Challenge (CIC) held at Cincinnati, Ohio, USA.

## AWARDS AND ACHIEVEMENTS

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

## TEACHING EXPERIENCE AND SERVICE

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- Reviewer** December 2020  
*International Conference on Robotics and Automation (ICRA) 2021*
- 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  $\sim 60$  students.
- Peer Mentor** | *Robotics Institute - CMU* Fall 2020
- Robotics Mentor** | *IEEE - SJCE Robotics Workshop* | **Prof. S. B. Rudraswamy** 2016