Akash Sharma

✉ Email | ⌂ Website | ⓞ Github | ℊ Google Scholar | in LinkedIn

EDUCATION

Carnegie Mellon University   Pittsburgh, PA
Ph.D. in Robotics   *2021 – Present*
Advisor: Prof. Michael Kaess   *CGPA: NA*

Carnegie Mellon University   Pittsburgh, PA
Master of Science in Robotics   *2019 – Present*
Advisor: Prof. Michael Kaess   *CGPA: 4.26/4.33*

Sri Jayachamarajendra College of Engineering   Mysore, India
Bachelor of Engineering in Electronics and Communication   *2013 – 2017*
Advisor: Prof. Sudharshan Patil Kulkarni   *CGPA: 9.61/10.00*

RESEARCH INTERESTS

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

PUBLICATIONS

Compositional Scalable Object SLAM | % paper | % code
Akash Sharma, Wei Dong, Michael Kaess
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

Research Intern   May 2021 – Aug 2021
Fyusion Inc.   *Virtual / San Francisco, CA*
Manager: Krunal Chande/Rodrigo Cayon
  Worked on free viewpoint novel view synthesis for car interiors.
  Experimented with both Image Based Rendering and Physically Based Rendering methods.

Graduate Research Assistant   Oct 2019 – Present
Carnegie Mellon University – *The Robotics Institute*   *Pittsburgh, PA*
Advisor: Prof. Michael Kaess
  Developing algorithms for dense metric and semantic SLAM systems.
  Working towards distributed SLAM for multi robot systems with semantic mapping.

Research Assistant   Aug 2020 – Present
Carnegie Mellon University   *Pittsburgh, PA*
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

Student Developer   May 2020 – Aug 2020
OpenCV – *Google Summer of Code (GSoC)* | % blog   *Virtual/Pittsburgh, PA*
  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

Software Engineer   Jul 2017 – Jul 2019
Infinera   *Bangalore, India*
>   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.

Projects

iNeRF | ⚲ code | *python, pytorch*   Jan 2021
>   *Unofficial* implementation of *IROS 2021 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

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

Reviewer   December 2020
>   *International Conference on Robotics and Automation (ICRA) 2021*

Teaching Assistant | *16822 - Geometry based methods for Computer Vision* | **Prof. Michael Kaess**   Fall 2021

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.

Peer Mentor | *Robotics Institute - CMU*   Fall 2020

Robotics Mentor | *IEEE - SJCE Robotics Workshop* | **Prof. S. B. Rudraswamy**   2016