Akash Sharma

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	https://akashsharma02.github.io	

EDUCATION

Carnegie Mellon University

Ph.D. student in Robotics, Advisor: Michael Kaess	2021 - 2026
GPA: `4.11/4.33`	
M.S. in Robotics, Advisor: Michael Kaess	2019 - 2021
Thesis: `Incorporating semantic structure in SLAM`	

Sri Jayachamarajendra College of Engineering

B.E. in Electronics and Communication	2013 - 2017
GPA: `9.61/10.00`	

RESEARCH EXPERIENCE

FAIR at Meta, Pittsburgh, PA
Visiting Researcher   2023 - 2025
Perception for dexterous manipulation: Working on self-supervised (SSL) representation learning for tactile sensors. Currently working on generative modeling of dexterous manipulation tasks using vision and touch modalities. Published at CoRL 2024.

The Robotics Institute, CMU, Pittsburgh, PA
Graduate Student Researcher   2019 - 2025
Semantic SLAM with Object Landmarks: Worked on a SLAM system that reconstructs an environment as a collection of objects. The system fuses sensor data from RGBD cameras, object detection and segmentation networks in a non-linear optimization framework to estimate object shape and color, 6DoF pose and camera poses. Published at ICRA 2021

PROFESSIONAL EXPERIENCE

Reality Labs Research, Meta, Redmond, WA
Research Scientist Intern, Surreal Vision team   Summer 2022
Representation Learning for robust odometry: Proposed an end-to-end transformer that learns a 3D representation from a stream of multi-modal data (vision and IMU) to predict odometry. Predicted odometry was auto-regressively composed to estimate the trajectory of (⚲ `Project Aria`) AR glasses.

Fyusion Inc., San Francisco, CA
Research Intern   Summer 2021
Free viewpoint view synthesis for car interiors: Developed a neural radiance field representation-based novel view synthesis method tuned for free viewpoint synthesis specific for 360° outward facing cameras. I experimented with multiple different methods in both image-based rendering as well as physically based rendering.

OpenCV (Google Summer of Code), Virtual / Pittsburgh, PA
Student Developer   Summer 2020
3D Spatial Hashing for Large scale dense reconstruction: Implemented and extended Kinect Fusion using spatial hashing and submap based mapping for reconstruction of large scale environments.(⚲ `blog`)

Infinera, Bangalore, India
Software Engineer   2017 - 2019
Improved the optical device infrastructure: Developed a configurable system infrastructure software for optical amplifier devices to monitor faults and performance. *Enabled fast optical traffic startup*: Bypassed an auto-discovery mechanism in the optical amplifier hardware for improved laser power control and faster optical power startup. Mentored incoming undergraduate students in the optical line system team.

PUBLICATIONS

[In submission] **Akash Sharma**, C. Higuera, C. K. Bodduluri, T. Fan, T. Hellebrekers, M. Lambeta, B. Boots, M. Kaess, M. Kalakrishnan, T. Wu, M. Mukadam. "Sparsh-skin: Perception via Self-supervision for Dexterous hands covered with tactile skin"

[In submission] Zhao-Heng Yin, C. Wang, L. Pineda, F. Hogan, C. K. Bodduluri, **Akash Sharma**, P. Lancaster, I. Prasad, M. Kalakrishnan, J. Malik, M. Lambeta, T. Wu, P. Abbeel, M. Mukadam. "DexterityGen: Foundation Controller for Unprecedented Dexterity"

Carolina Higuera*, **Akash Sharma***, C. K. Bodduluri, T. Fan, M. Kalakrishnan, M. Kaess, B. Boots, M. Lambeta, T. Wu, M. Mukadam. "Sparsh: Self-supervised touch representations for vision-based tactile sensing." *8th Annual Conference on Robot Learning (CoRL), 2024* (* equal contribution)

Ming-Fang Chang, **Akash Sharma**, Michael Kaess, Simon Lucey. "Neural Radiance Fields with LiDAR Maps" *IEEE/CVF International Conference on Computer Vision (ICCV), 2023*

Ruoyang Xu, Wei Dong, **Akash Sharma**, Michael Kaess. "Learned Depth Estimation of 3D Image Radar for Indoor Mapping" *IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS) 2022* | **pdf**

Akash Sharma, Wei Dong, Michael Kaess. "Compositional Scalable Object SLAM" *IEEE Intl. Conf. on Robotics and Automation (ICRA) 2021* | **pdf** | **code**

Press Coverage	*Advancing embodied AI through progress in touch perception, dexterity, and human-robot interaction*	
	AI at Meta, blog 🔗	2024
	TechRadar 🔗	2024
	VentureBeat 🔗	2024
	Business Today 🔗	2024
	Interesting Engineering 🔗	2024
	Maginative 🔗	2024
	The Decoder 🔗	2024
	MarkTechPost 🔗	2024

Teaching	*Teaching Assistant*: Probabilistic Graphical Models (Prof. Andrej Risteski)	Fall 2022
	Teaching Assistant: Geometry-based methods for Computer Vision (Prof. Michael Kaess)	Fall 2021
	Teaching Assistant: Robot Localization and Mapping (Prof. Michael Kaess)	Fall 2020
	"*Guest lecture on algorithms for dense SLAM*"	
	16833 - Robot Localization and Mapping, CMU	2022
	16833 - Robot Localization and Mapping, CMU	2020

Talks	"*Sparsh: SSL touch representations for tactile sensing*".	
	Franka Robotics, GmbH	2024
	Conference, FAIR at Meta	2024
	FAIR Embodied AI seminar	2024
	"*Self-supervised learning in Vision*". GUM Reading Group, Meta.	2024
	"*ViTs for mean-teacher distillation with no labels*". Misc-Reading Group at CMU.	2022
	"*Learning a multimodal state representation for odometry estimation*". Surreal team, Meta.	2022

Service & Leadership	*Thesis committee*: Vivek Roy (Now @ Apple)	2022
	Admissions committee: MS Robotics	2021 - 2022
	Conference reviewer: CVPR 24-25, NeurIPS 24, RA-L 23-24, IROS 2022, ICRA 22 - 21.	

Mentorship	*Angela Chen*, RI (PhD) Peer Mentor Program	2022
	Mrinal Verghese, RI (MSR) Peer Mentor Program	2020
	Mary Hatfalvi, RI (MSR) Mentoring Program	2020