Akshay Krishnan

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Education

Ph.D., Robotics — Aug 2022 – Dec 2026
School of Interactive Computing, Georgia Institute of Technology — *Atlanta, GA*
GPA: 4.0/4.0 (in progress), *Advisor: Prof. James Hays*

M.S., Electrical and Computer Engineering — Aug 2018 – May 2020
Georgia Institute of Technology — *Atlanta, GA*
GPA: 4.0/4.0

B.Eng., Electronics and Communication Engineering — Aug 2014 – May 2018
Sri Jayachamarajendra College of Engineering — *Mysuru, India*
GPA: 9.42/10.0

Experience

Student Researcher — May 2023 – present
Google Research / DeepMind — *San Francisco, CA*
- Representations and models for 3D reconstruction from single in-the-wild images.

Computer Vision Engineer — June 2020 – Aug 2022
Waymo — *Seattle, WA*
- Stereo vision: trained and deployed a deep model for estimating long-range depth from cameras in real-time.
- Automatic calibration: A framework to calibrate sensors automatically as cars drive in the real world.

Computer Vision Intern — May 2019 – Aug 2019
Blue River Technology — *Sunnyvale, CA*
- Researched and implemented geometric approaches for calibration of LiDARs and stereo cameras.
- Developed an algorithm for extrinsic calibration of thermal and RGB cameras.

Software Engineering Intern — Jan 2018 – May 2018
Amagi Media Labs — *Bangalore, India*
- Developed a web application to post-process archived videos and extract text from them.

Graduate Research Assistant — Aug 2019 - May 2020
Georgia Institute of Technology (Advisors: Prof. Frank Dellaert, Prof. Sonia Chernova) — *Atlanta, GA*
- Representations and optimization methods to estimate 3D line structure and camera poses from images.
- GTSfM: a distributed end-to-end global SfM pipeline.
- Human-Robot Collaboration: Quantifying a person's ability to collaborate with robots using

Summer Research Fellowship — May 2016 - July 2016
SERC, Indian Institute of Science (Advisor: Prof. N. Balakrishnan) — *Bangalore, India*
- Formulated a model and developed an application to detect vulnerabilities of nearby Wi-Fi networks in real-time.

Publications

- "Orchid: Image Diffusion for Joint Appearance and Geometry Generation", *Under review*
  Akshay Krishnan, Xinchen Yan, Vincent Casser, Abhijit Kundu
- "OmniNOCS: A unified NOCS dataset and model for 3D lifting of 2D objects", *ECCV 2024 Oral*
  Akshay Krishnan, Abhijit Kundu, Kevis-Kokitsi Maninis, James Hays, Matthew Brown
- "LANe: Lighting-Aware Neural fields for Compositional Scene Synthesis", *WACV 3D for science workshop, 2024*
  Amit Raj*, **Akshay Krishnan***, Nikita Jaipuria, Sandhya Sridhar, Alexandra Katherine Carlson, Xianling Zhang, James Hays

- "Distributed Global Structure-from-Motion with a Deep Front-End", *arXiv 2023*
  Ayush Baid, John Lambert, Travis Driver, **Akshay Krishnan**, Hayk Stepanyan, Frank Dellaert
- "Taking Recoveries to Task: Recovery-Driven Development for Recipe-based Robot Tasks", *ISRR 2019*
  Siddhartha Banerjee, Angel Daruna, David Kent, Weiyu Liu, Jonathan Balloch, Abhinav Jain, **Akshay Krishnan**, Muhammad Asif Rana, Harish Ravichandar, Binit Shah, Nithin Shrivatsav, Sonia Chernova
- "Depth Camera based Autonomous Mobile Robot for Indoor Environments", *IEEE I2CT 2018*
  Akshay Krishnan, Sowrabh Nayak, Anup Rao, Sudarshan Patilkulkarni

Projects

Lighting-aware composable object NeRFs for self-driving scenes
- Using controllable and composable NeRFs for new-view synthesis.

GTSfM: A library for large-scale parallelized Structure-from-Motion using factor graphs
- Developed an optimizer to estimate global translations of cameras from two-view translation directions.
- Implemented the 1DSfM outlier rejection algorithm to reject noisy translation directions before optimization.

FetchIt! Mobile Manipulation Challenge, ICRA 2019 *(1^{st} place Winner)*
- Developed a ROS based framework for indoor localization and navigation of the Fetch mobile manipulator.

Learning disentangled motion and content representations from unlabeled videos
- Proposed a deep model and a self-supervised loss to learn representations for the motion and content in videos.
- Evaluated the performance of the model on downstream tasks like action recognition and action transfer.

PointNav: Embodied point-to-point navigation in unseen environments *(Habitat Challenge, CVPR 2020)*
- Trained a deep network to estimate an agent's pose and 2D map of environment from noisy depth and odometry.
- Evaluated performance of the network when used with an RL policy on unseen scenes from Gibson 3D dataset.

Handwriting classification using line and texture-based features
- Designed and extracted geometric features from handwriting to be used with a classifier for writer recognition.

Multi-robot teams for surveillance of an area
- Designed scalable local behaviors for multi-robot teams to patrol and protect an area using networked control.
- Demonstrated results on real robots at the GaTech Robotarium.

Robots to collect farm produce *(4^{th} place, E-Yantra National Robotics Competition, IIT Bombay, 2018)*
- Implemented perception algorithms for robots to pick fruits from a farm and drop them in a truck.

Depth camera based autonomous mobile robot for indoor environments
- Implemented localization and path planning algorithms for indoor navigation using depth and odometry data.

Technical Skills

Programming Languages:	C++, Python, C, MATLAB, HTML, JavaScript
Libraries and Tools:	PyTorch, TensorFlow, scikit-learn, NumPy, Matplotlib, ROS, Git, OpenCV, Point Cloud Library, OpenAI Gym, OpenMP, MPI, OpenGL

Awards

- **1st prize**, FetchIt! Mobile Manipulation challenge, ICRA 2019 (team award)
- **4th prize**, e-Yantra National Robotics Challenge, IIT Bombay, 2018 (team award)
- **Summer Research Fellowship**, Indian Academy of Sciences, 2016

Leadership

- Served as Editor-in-Chief at IEEE SJCE Student Branch's editorial board for 2017-18.
- Led a team to the finals of the e-Yantra Robotics Competition 2018 held at IIT Bombay.
- Volunteered to teach children at orphanages for IEEE-SJCE's social initiative 'Prayas'.