

# Akshay Krishnan

E-mail: akshay.krishnan.30@gmail.com | Ph: +1 470-424-2167 | Website: akshay-krishnan.github.io

## EDUCATION

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### M.S., Electrical and Computer Engineering

*Georgia Institute of Technology*

GPA: 4.0/4.0

Aug 2018 – May 2020

*Atlanta, GA*

### B.Eng., Electronics and Communication Engineering

*Sri Jayachamarajendra College of Engineering*

GPA: 9.42/10.0

Aug 2014 – May 2018

*Mysuru, India*

## RESEARCH EXPERIENCE

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### Graduate Research Assistant

*Georgia Institute of Technology (Advisors: Prof. Harish Ravichandar, Prof. Sonia Chernova)*

Jan 2020 – May 2020

*Atlanta, GA*

- Setup online experiments and analyzed data to investigate whether people's reactions to sequences of visual stimuli predict their ability to collaborate with robot teams.

### Graduate Student Researcher

*Georgia Institute of Technology (Advisor: Prof. Frank Dellaert)*

Aug 2019 – May 2020

*Atlanta, GA*

- Developed representations and optimization functions to estimate 3D lines and camera poses from images.
- Implemented a translation averaging algorithm using factor graphs to recover global camera translations in SfM.

### Summer Research Fellowship

*SERC, Indian Institute of Science (Advisor: Prof. N. Balakrishnan)*

May 2016 – July 2016

*Bangalore, India*

- Formulated a model and developed an application to detect vulnerabilities of nearby Wi-Fi networks in real-time.

## INDUSTRIAL EXPERIENCE

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### Computer Vision Engineer

*Waymo*

June 2020 – Present

*Seattle, WA*

- Trained and deployed a deep model for estimating long-range depth from stereo cameras in real-time.
- Developed a framework to calibrate cameras automatically as cars drive in the real world.

### Computer Vision Intern

*Blue River Technology*

May 2019 – Aug 2019

*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

*Amagi Media Labs*

Jan 2018 – May 2018

*Bangalore, India*

- Developed a web application to post-process archived videos and extract text from them.

### Engineering Intern

*Toyota*

May 2017 – July 2017

*Bangalore, India*

- Developed an embedded controller for a Rail Guided Vehicle to transport parts on the manufacturing floor.

## TEACHING

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### Graduate Teaching Assistant

*College of Computing, Georgia Institute of Technology*

Aug 2019 – Dec 2019

*Atlanta, GA*

- Held office hours and graded assignments and projects for CS 4641: Machine Learning.

## PROJECTS

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### 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<sup>st</sup> 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<sup>th</sup> 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.

## PUBLICATIONS

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- “Taking Recoveries to Task: Recovery-Driven Development for Recipe-based Robot Tasks”, 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, *International Symposium on Robotics Research (ISRR)*, 2019
- “Depth Camera based Autonomous Mobile Robot for Indoor Environments”, **Akshay Krishnan**, Sowrabh Nayak, Anup Rao, Sudarshan Patilkulkarni, *IEEE International Conference for Convergence in Technology (I2CT)*, 2018
- “Text-Independent Handwriting Classification Using Line and Texture-Based Features”, T Shreekanth, MB Punith Kumar, **Akshay Krishnan**, *Springer Lecture Notes in Computational Vision and Biomechanics*, 2018

## TECHNICAL SKILLS

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**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

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- **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

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- 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'.