


INTERESTS	SLAM, 3D Computer Vision, Robotic Perception
EDUCATION	<p>International Institute of Information Technology, Hyderabad, India (IIIT-H) 2018 - 2021 M.S. by Research in Computer Science & Engineering Thesis: Robust Plane-based Visual-Inertial Odometry for Dynamic Environments CGPA: 9.50/10</p> <p>Sri Sivasubramaniya Nadar College of Engineering, Chennai, India (SSN-CE) 2013 - 2017 B.Eng. in Electronics & Communication Engineering (ECE) from Anna University, Chennai</p>
PUBLICATIONS	<p>RP-VIO: Robust Plane-based Visual-Inertial Odometry for Dynamic Environments 📄 Karnik Ram, Chaitanya Kharyal, Sudarshan S. Harithas, K. Madhava Krishna <i>Submitted to IEEE/RSJ International Conference on Intelligent Robots and Systems, 2021</i></p> <p>INFER: Intermediate Representations for Future Prediction 📄 Shashank Srikanth, Junaid Ahmed Ansari, Karnik Ram, Sarthak Sharma, J. Krishna Murthy, K. Madhava Krishna <i>In proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems, 2019</i></p> <p>CalibNet: Geometrically-Supervised LiDAR - Camera Extrinsic Calibration using 3D Spatial Transformer Networks 📄 Ganesh Iyer, Karnik Ram, J. Krishna Murthy, K. Madhava Krishna <i>In proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems, 2018</i></p>
WORK EXPERIENCE	<p>Graduate Research Assistant, Robotics Research Center, IIIT Hyderabad 2019 - Present Researching algorithms for improving the robustness of visual SLAM algorithms in dynamic environments. In particular, developed and evaluated a visual-inertial odometry algorithm for dynamic environments using only planar features and their induced planar homographies. Also worked on a deep auto-regressive model for the trajectory prediction of vehicles in a dynamic scene. Advisor: Prof. K. Madhava Krishna. Outcome: 2 research papers and open-source code.</p> <p>Google Summer of Code Student Developer, Mobile Robot Programming Toolkit Summer 2018 Developed a GUI app for the extrinsic calibration of range sensors. The app includes implementations of algorithms for estimating the extrinsics between RGB-D / LiDAR sensors based on plane-matching and line-matching, within a user-friendly GUI. Outcome: Open-source code. 📄</p> <p>Research Intern, Robotics Research Center, IIIT Hyderabad May 2017 - April 2018 Researched algorithms for markerless LiDAR-camera extrinsic calibration for an autonomous car. In particular, we developed and evaluated an approach to estimate the extrinsics using direct photometric error minimization, as well as a geometrically-supervised deep network with spatial transformer networks for the same task. Advisor: Prof. K. Madhava Krishna, J. Krishna Murthy. Outcome: 1 research paper.</p> <p>Computer Vision Intern, Navstik Autonomous Systems, Pune, India Summer 2016 Worked on person detection algorithms for a drone, and in particular, evaluated the performance of a HOG feature-based detector on an Nvidia Jetson embedded board.</p>
RELEVANT COURSEWORK	<p><i>Graduate:</i> Mobile Robotics, Computer Vision, Machine Learning, Topics in Applied Optimization. <i>Undergraduate:</i> Robotics & Automation, Digital Image Processing, OOP & Data Structures, Computer Architecture, Probability & Random Processes, Embedded & Real Time Systems</p>
ADDITIONAL COURSES	<p>ETH Robotics Summer School, ETH Zürich July 2019 2-week all-expenses-paid summer school, included lectures and hands-on exercises on autonomous navigation, and talks by renowned researchers. Also worked in a team of six on a semi-autonomous ground robot for search-and-rescue applications. Approx. 50 selected participants from 15 countries.</p>

TEACHING	Head Teaching Assistant , Mobile Robotics, IIIT-H  Fall 2019 Designed 5 new assignments and 2 exams on topics including single-view geometry, epipolar geometry, stereo reconstruction, bundle adjustment, EKF localization. Responsibilities also included conducting tutorial classes, office hours, and grading. Approx. 80 students.
	Teaching Assistant , 3D Computer Vision Workshop, IIIT-H Feb 2020 Conducted a tutorial session on multiple-view geometry concepts including epipolar geometry and bundle adjustment with hands-on exercises for a professional audience from industry. Approx. 80 participants.
	Event Coordinator , SSN-ECE Tech Club, SSN-CE Spring, 2017 Taught introductory concepts in robotics and computer vision to approx. 20 sophomores and juniors over a semester. Also organized an Internet-of-Things themed inter-college hackathon for approx. 40 participants.
AWARDS & GRANTS	<ul style="list-style-type: none"> • ETH Robotics Summer School Travel Grant, ETH Zürich 2019 • Best Senior Year Project, ECE Department, SSN-CE 2017 • First place, inter-college image processing based robotics event, Anna University 2016 • Top 10 out of 144 teams in the “Apps for Chennai Challenge” 2015 • SSN Trust Funding for Student Projects, SSN-CE 2014, 2015
SERVICES	<ul style="list-style-type: none"> • Student System Administrator for the compute cluster at RRC, IIIT Hyderabad. 2020-21 • Served as a reviewer for IEEE/RSJ IROS in the SLAM track. 2021 • Conceived, developed, and maintained The SSN App, the official Android app of SSN-CE. 2014-17
TECHNICAL SKILLS	<i>Tools & Libraries:</i> OpenCV, ROS, Airsim, Gazebo, PyTorch, Eigen, Git Familiar: Qt, Android <i>Programming Languages:</i> C++, Python Familiar: Java
REFERENCES	Prof. K. Madhava Krishna, Lab Head at RRC, IIIT Hyderabad Relation: Thesis advisor and course instructor. Email: mkrishna@iiit.ac.in Prof. G. Satheesh Kumar, Associate Professor at SSN-CE Relation: Undergraduate senior year project advisor and course instructor. Email: satheeshkumarg@ssn.edu.in