





# Karnik Ram


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INTERESTS	SLAM, 3D Computer Vision, Robot Perception	
EDUCATION	<b>International Institute of Information Technology</b> , Hyderabad, India (IIIT-H)	2018 - 2021
	M.S. by Research in Computer Science & Engineering	
	<b>Thesis:</b> Robust Plane-based Visual-Inertial Odometry for Dynamic Environments	
	CGPA: 9.50/10	
	<b>Sri Sivasubramaniya Nadar College of Engineering</b> , Chennai, India (SSN-CE)	2013 - 2017
	B.Eng. in Electronics & Communication Engineering (ECE) from <b>Anna University</b> , Chennai	
PUBLICATIONS	<b>RP-VIO: Robust Plane-based Visual-Inertial Odometry for Dynamic Environments</b> 	
	<b>Karnik Ram</b> , Chaitanya Kharyal, Sudarshan S. Harithas, K. Madhava Krishna	
	<i>To appear in IEEE/RSJ International Conference on Intelligent Robots and Systems, 2021</i>	
	<b>INFER: Intermediate Representations for Future Prediction</b> 	
	Shashank Srikanth, Junaid Ahmed Ansari, <b>Karnik Ram</b> , Sarthak Sharma, J. Krishna Murthy, K. Madhava Krishna	
	<i>In proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems, 2019</i>	
	<b>CalibNet: Geometrically-Supervised LiDAR - Camera Extrinsic Calibration using 3D Spatial Transformer Networks</b> 	
	Ganesh Iyer, <b>Karnik Ram</b> , J. Krishna Murthy, K. Madhava Krishna	
	<i>In proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems, 2018</i>	
WORK EXPERIENCE	<b>Graduate Research Assistant</b> , 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.	
	<b>Google Summer of Code Student Developer</b> , Mobile Robot Programming Toolkit Summer 2018	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. 	
	<b>Research Intern</b> , 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.	
	<b>Computer Vision Intern</b> , 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.	
RELEVANT COURSEWORK	<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	
ADDITIONAL COURSES	<b>ETH Robotics Summer School</b> , 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.	

TEACHING	<p><b>Head Teaching Assistant</b>, 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.</p> <p><b>Teaching Assistant</b>, 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.</p> <p><b>Event Coordinator</b>, 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.</p>
AWARDS & GRANTS	<ul style="list-style-type: none"> <li>• <b>ETH Robotics Summer School Travel Grant</b>, ETH Zürich 2019</li> <li>• <b>Best Senior Year Project</b>, ECE Department, SSN-CE 2017</li> <li>• <b>First place</b>, inter-college image processing based robotics event, Anna University 2016</li> <li>• <b>Top 10</b> out of 144 teams in the “Apps for Chennai Challenge” 2015</li> <li>• <b>SSN Trust Funding for Student Projects</b>, SSN-CE 2014, 2015</li> </ul>
SERVICES	<ul style="list-style-type: none"> <li>• <b>Lab Systems Administrator</b> for the compute cluster at RRC, IIIT Hyderabad. 2020-21</li> <li>• Served as a reviewer for IEEE/RSJ IROS in the SLAM track. 2021</li> <li>• Conceived, developed, and maintained <b>The SSN App</b>, the official Android app of SSN-CE. 2014-17</li> </ul>
TECHNICAL SKILLS	<p><i>Tools &amp; Libraries:</i> OpenCV, ROS, Ceres Solver, PyTorch, Eigen, Git, AirSim   Familiar: Qt, Android</p> <p><i>Programming Languages:</i> C++, Python   Familiar: Java</p>
REFERENCES	<p>Prof. K. Madhava Krishna, Lab Head at RRC, IIIT Hyderabad Relation: Thesis advisor and course instructor. Email: mkrishna@iiit.ac.in</p> <p>Krishna Murthy Jatavallabhula, PhD Candidate at Mila, Montréal Relation: Research collaborator and mentor. Email: krrish94@gmail.com</p> <p>Prof. G. Satheesh Kumar, Associate Professor at SSN-CE Relation: Undergraduate senior year project advisor and course instructor. Email: satheeshkumarg@ssn.edu.in</p>