

KARNIK RAM

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EDUCATION	<p>International Institute of Information Technology, Hyderabad 2018 - 2021 M.S. by Research in Computer Science & Engineering Thesis: Robust plane-based visual-inertial odometry for dynamic environments GPA: 9.50/10</p> <p>Anna University, SSN College of Engineering, Chennai 2013 - 2017 B.Eng. in Electronics & Communication Engineering GPA: 7.20/10</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>International Conference on Intelligent Robots and Systems (IROS), 2021</i></p> <p>Learnable Spatio-Temporal Map Embeddings for Deep Inertial Localization 📄 Dennis Melamed, Karnik Ram, Vivek Roy, Kris Kitani <i>International Conference on Intelligent Robots and Systems (IROS), 2022</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>International Conference on Intelligent Robots and Systems (IROS), 2018</i></p> <p>INFER: Intermediate Representations for Future Prediction 📄 Shashank Srikanth, Junaaid Ahmed Ansari, Karnik Ram, Sarthak Sharma, J. Krishna Murthy, K. Madhava Krishna <i>International Conference on Intelligent Robots and Systems (IROS), 2019</i></p> <p>PathFinder: Designing a Map-less Navigation Robot for Blind People in Unfamiliar Buildings Masaki Kuribayashi, Tatsuya Ishihara, Daisuke Sato, Jayakorn Vongkulbhisal, Karnik Ram, Seita Kayukawa, Hironobu Takagi, Shigeo Morishima, Chieko Asakawa <i>CHI Conference on Human Factors in Computing Systems, 2023 (Under review)</i></p>
WORK EXPERIENCE	<p>Carnegie Mellon University Oct 2022 - Present <i>Research Associate, Robotics Institute</i> Advisor: Prof. Srinivasa Narasimhan</p> <ul style="list-style-type: none">- Working with programmable light curtains (PLC), a novel controllable depth sensor.- Working on using PLC for generating dynamic safety envelopes and active robot perception. <p>Carnegie Mellon University Aug 2021 - Oct 2022 <i>Research Associate, Robotics Institute</i> Advisor: Prof. Kris Kitani</p> <ul style="list-style-type: none">- Worked on a low-drift inertial odometry algorithm using map prior information (IROS '22).- Implemented a camera-less localization algorithm on a smartphone for indoor navigation.- Worked on a map-less navigation robot for assisting the visually impaired. <p>International Institute of Information Technology, Hyderabad Aug 2018 - Aug 2021 <i>Graduate Research Student, Robotics Research Center</i> Advisor: Prof. K. Madhava Krishna</p> <ul style="list-style-type: none">- Developed a plane-based monocular visual-inertial odometry algorithm and a dataset for dynamic environments (IROS '21).- Worked on trajectory prediction using intermediate semantic representations (IROS '19).

Google Summer of Code

Student Developer, Mobile Robot Programming Toolkit

Summer 2018

- Developed a GUI app for the extrinsic calibration of depth sensors.
- Implemented calibration algorithms based on plane and line matching.

International Institute of Information Technology, Hyderabad

Research Intern, Robotics Research Center

May 2017 - April 2018

Advisor: Prof. K. Madhava Krishna, J. Krishna Murthy

- Worked on a deep network with geometric supervision for target-less LiDAR-camera extrinsic calibration (IROS '18).
- Implemented a target-based LiDAR-camera extrinsic calibration algorithm.

SERVICES	<ul style="list-style-type: none">- Served as a reviewer in the SLAM track for IROS 2021, 2022- Served as a co-chair for the VI-SLAM session at IROS 2021- Lab systems administrator for the compute cluster at RRC, IIIT Hyderabad 2020-21- Conceived, developed, and maintained The SSN App, the official Android app of SSN-CE 2014-17
AWARDS	<ul style="list-style-type: none">- Best Senior Year Project, ECE Department, SSN-CE 2017- Top 2 out of 136 teams in the ARTPARK Robotics Challenge, IISc 2022- 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 2014-15
RELEVANT COURSEWORK	<p><i>Graduate:</i> Mobile Robotics, Computer Vision, Machine Learning, Topics in Applied Optimization.</p> <p><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</p> <p>2-week summer school on autonomous ground robot navigation with talks, hands-on lectures and exercises, and a competition. 53 selected participants from 15 countries. Awarded full travel grant.</p> <p>Committee: Cesar Cadena, Marco Hutter</p>
TEACHING EXPERIENCE	<p>CSE 483 Mobile Robotics ☞ Fall 2019</p> <p><i>International Institute of Information Technology, Hyderabad</i></p> <p>Designed five new assignments and exams along with regular responsibilities as head teaching assistant with Prof. K. Madhava Krishna.</p> <p>3D Computer Vision Workshop Feb 2020</p> <p><i>International Institute of Information Technology, Hyderabad</i></p> <p>Instructor for the multiple view geometry tutorial session for a large professional audience.</p>
SELECTED PROJECTS	<p>Smartphone-based Indoor Navigation</p> <ul style="list-style-type: none">- Implemented a real-time deep IMU and BLE based localization system on a smartphone. <p>Janitorial Mobile Robot</p> <ul style="list-style-type: none">- Implemented indoor navigation on a mobile robot for pick-and-place janitorial tasks. <p>Automated Stock-counting Quadcopter</p> <ul style="list-style-type: none">- Implemented on-board navigation on a custom-built drone using optical-flow based odometry.
TECHNICAL SKILLS	<p><i>Tools & Libraries:</i> OpenCV, ROS, PyTorch, Ceres Solver, Eigen, Git Familiar: iOS, Qt, Android</p> <p><i>Programming Languages:</i> C++, Python Familiar: Swift, Java</p>