

Sudharshan Suresh

PERSONAL	www.cs.cmu.edu/~sudhars1/ suddhu@cmu.edu linkedin google scholar		
EDUCATION	Robotics Institute, Carnegie Mellon University	2019 - present	
	PhD in Robotics <i>Advisor:</i> Prof. Michael Kaess		
	Robotics Institute, Carnegie Mellon University	2017 - 2019	
	M.S. in Robotics GPA: 4.09, <i>Advisor:</i> Prof. Michael Kaess <i>Thesis:</i> Localization and Active Exploration in Indoor Underwater Environments		
	National Institute of Technology, Tiruchirappalli, India	2013 - 2017	
	B.Tech (Hons) in Instrumentation and Control Engineering GPA: 9.45/10		
PUBLICATIONS	S. Suresh , J. G. Mangelson, and M. Kaess, Incremental shape and pose estimation from planar pushing using contact implicit surfaces , ICRA 2020 workshop - ViTac 2020: Closing the Perception-Action Loop with Vision and Tactile Sensing, May 2020 [PDF]		
	S. Suresh , P. Sodhi, J. G. Mangelson, D. Wettergreen, and M. Kaess, Active SLAM using 3D Submap Saliency for Underwater Volumetric Exploration , IEEE Intl. Conf. on Robotics and Automation, ICRA, May 2020 [PDF , Video]		
	S. Suresh , E. Westman and M. Kaess, Through-water Stereo SLAM with Refraction Correction for AUV Localization , IEEE Robotics and Automation Letters, vol. 4, no. 2, pp. 692-699, Presented at ICRA 2019 and published in RA-L, April 2019. [PDF , Poster , Video]		
	J. Hsiung, A. Tallaksen, L. Papincak, S. Suresh , H. Jones, W. Whittaker and M. Kaess, Localized Imaging and Mapping for Underwater Fuel Storage Basins , Proceedings of the Symposium on Waste Management, Phoenix, Arizona, Mar 2018. [PDF , Slides , Video]		
	R. K. Sarvadevabhatla, S. Suresh and R. Venkatesh Babu, Object Category Understanding via Eye Fixations on Freehand Sketches , IEEE Transactions on Image Processing, vol. 26, no. 5, pp. 2508-2518, May 2017. [PDF , Project]		
	E. Fang, S. Suresh and W. Whittaker, Camera-Only Kinematics for Small Lunar Rovers , Annual Meeting of the Lunar Exploration Analysis Group, Vol. 1960, Nov 2016. [PDF , Poster]		
	S. Suresh , E. Fang and W. Whittaker, Optical Kinematic State Estimation of Planetary Rovers using Downward-Facing Monocular Fisheye Camera , RISS Working Paper Journal, Nov 2016. [PDF , Video , Poster]		
	RESEARCH EXPERIENCE	Robotics Institute, Carnegie Mellon University	Aug 2017 - Aug 2019
<i>Advisor:</i> Prof. Michael Kaess		<i>M.S. Student</i>	
Master's thesis research in the Robot Perception Lab , focused on localization and exploration for autonomous underwater vehicles (AUVs). This comprised of (i) a novel through-water method for visual localization using landmarks above the water surface, (ii) an active SLAM framework for exploration and sonar mapping.			
	Robotics Institute, Carnegie Mellon University	June - Sep 2016	
	<i>Advisor:</i> Prof. William L. "Red" Whittaker		<i>RI Summer Scholar</i>
	Developed a novel visual state-estimation algorithm for planetary rovers via self-perception. Method uses a single downward-facing fisheye camera to robustly estimate 10-DoF kinematic state on rugged terrain.		
	Video Analytics Lab, Indian Institute of Science	May - Aug 2015	
	<i>Advisors:</i> Prof. R. Venkatesh Babu , R. K. Sarvadevabhatla		<i>Research Intern</i>

Research in object category understanding for freehand sketches. Created *SketchFix-160*, as open-source dataset of free-viewing user tests, and developed a computational model for sketch category prediction.

INDEPENDENT PROJECTS	DeepGeo: Photo Localization with Deep Neural Network (10-701) [arXiv] 2018 A deep network that beats humans at GeoGuessr —trained on our <i>50States10K</i> dataset.
	Task and Motion Planning for Robotic Food Preparation (16-782) [Report] 2018 Hierarchical task and motion planning for a 6-DOF robot arm—to prepare yogurt parfaits!
	Thin Structure Reconstruction via 3D Lines and Points (16-822) [Poster] 2018 We combine edge data and sparse features in the SfM pipeline to recover thin objects in a scene.
	Factor Graph Optimization for Dynamic Parameter Estimation (16-711) [Report] 2019 We implement a method for estimation of MAV poses and dynamic parameters during flight.
AWARDS AND HONORS	<p>RECAL Alumni Award, 2017 (<i>gold-medalist in undergraduate major</i>)</p> <p>Sri. Avinash Memorial Award, 2017 (<i>best outgoing male student in undergraduate major</i>)</p> <p>OPJEMS Scholar, 2017 (<i>100 undergraduates across India</i>)</p> <p>S. N. Bose and Robotics Institute Summer Scholar, 2016</p> <p>Cargill Global Scholar, 2015 - 2017 (<i>10 undergraduate sophomores across India</i>)</p>
TEACHING AND ACTIVITIES	<p>Teaching Assistant, 16-833: Robot Localization and Mapping, CMU (Fall 2019, Spring 2020)</p> <p>Admissions committee, CMU RI Summer Scholars program (2018, 2019, 2020)</p> <p>CMU AI undergraduate mentorship program (Fall 2019)</p> <p>Mentor, Jiteshraj Scholarship, NIT Trichy (2018)</p>
TECHNICAL SKILLS	<p>Programming: C/C++, Python, MATLAB, \LaTeX</p> <p>Tools and Libraries: ROS, OpenCV, GTSAM, TensorFlow</p>
RELEVANT COURSEWORK	<p>Graduate: Convex Optimization (10-725), Kinematics, Dynamics and Control (16-711), Geometry-based Methods in Vision (16-822), Planning and Decision-making in Robotics (16-782), Robot Localization and Mapping (16-833), Introduction to Machine Learning (10-701), Computer Vision (16-720B), Mathematical Fundamentals for Robotics (16-811)</p> <p>Undergraduate: Data Structures and Algorithms, Computer Networks, Neural Networks and Fuzzy Logic, Image Processing, Basics of Programming, Control Systems, Logic and Distributed Control, Robotics, Signals and Systems, Circuit Theory, Digital Electronics, Embedded Systems, Linear Integrated Circuits, Sensors and Transducers, Material Science, Numerical Methods</p>