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
Advisor: Prof. Michael Kaess

Robotics Institute, Carnegie Mellon University 2017 - 2019
M.S. in Robotics
GPA: 4.09, *Advisor*: Prof. Michael Kaess
Thesis: 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, P Sodhi, J. G. Mangelson, D. Wettergreen, and M. Kaess, **Active SLAM using 3D Submap Saliency for Underwater Volumetric Exploration**, to appear in IEEE Intl. Conf. on Robotics and Automation, ICRA, 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
Advisor: Prof. Michael Kaess *M.S. Student*

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
Advisor: Prof. William L. "Red" Whittaker *RI Summer Scholar*

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
Advisors: Prof. R. Venkatesh Babu, R. K. Sarvadevabhatla *Research Intern*

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] A deep network that beats humans at GeoGuessr—trained on our *50States10K* dataset.	2018
	Task and Motion Planning for Robotic Food Preparation (16-782) [Report] Hierarchical task and motion planning for a 6-DOF robot arm—to prepare yogurt parfaits!	2018
	Thin Structure Reconstruction via 3D Lines and Points (16-822) [Poster] We combine edge data and sparse features in the SfM pipeline to recover thin objects in a scene.	2018
	Factor Graph Optimization for Dynamic Parameter Estimation (16-711) [Report] We implement a method for estimation of MAV poses and dynamic parameters during flight.	2019

AWARDS AND HONORS

RECAL Alumni Award, 2017 (*gold-medalist in undergraduate major*)
Sri. Avinash Memorial Award, 2017 (*best outgoing male student in undergraduate major*)
OPJEMS Scholar, 2017 (*100 undergraduates across India*)
S. N. Bose and Robotics Institute Summer Scholar, 2016
Cargill Global Scholar, 2015 - 2017 (*10 undergraduate sophomores across India*)

TEACHING AND ACTIVITIES

Teaching Assistant, 16-833: Robot Localization and Mapping, CMU (Fall 2019, Spring 2020)
Admissions committee, CMU RI Summer Scholars program (2018, 2019, 2020)
CMU AI undergraduate mentorship program (Fall 2019)
Mentor, Jiteshraj Scholarship, NIT Trichy (2018)

TECHNICAL SKILLS

Programming: C/C++, Python, MATLAB, LaTeX
Tools and Libraries: ROS, OpenCV, GTSAM, TensorFlow

RELEVANT COURSEWORK

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)

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