

Sudharshan Suresh

PERSONAL INFORMATION

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EDUCATION

Robotics Institute, Carnegie Mellon University 2017 - ongoing
M.S. in Robotics
GPA: 4.08
Advisor: [Prof. Michael Kaess](#)

National Institute of Technology, Tiruchirappalli, India 2013 - 2017
B.Tech (Hons) in Instrumentation and Control Engineering
GPA: 9.45/10

PUBLICATIONS

S. Suresh, E. Westman and M. Kaess, **Through-water Stereo SLAM with Refraction Correction for AUV Localization**, *under review* in IEEE Robotics and Automation Letters, ICRA/RA-L, 2019. [[Pre-print](#), [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**, in 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 - ongoing
Advisor: [Prof. Michael Kaess](#) *M.S. Student*

Ongoing Master's thesis research in the [Robot Perception Lab](#). Research focuses on visual SLAM and navigation for autonomous underwater vehicles (AUVs). Developed a novel through-water stereo SLAM framework for AUV localization in inspection tasks. Currently working on saliency-aware active SLAM for exploration. Additionally, developed a localized inspection prototype for underwater 3D reconstruction.

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. Demonstrated in lunar analogous field tests and agrees well with proprioceptive sensors.

Video Analytics Lab, Indian Institute of Science May - Aug 2015
Advisors: [Prof. R. Venkatesh Babu](#), [R. K. Sarvadevabhatla](#) *Summer Research Intern*

Research in object category understanding and visual saliency for freehand sketches. Created *SketchFix-160*, as open-source dataset of free-viewing user tests collected with a monocular eye-tracker. Analyzed fixation data to reveal multi-level consistency and built a computational model for sketch category prediction.

Dept. of Instrumentation and Control, NIT Trichy

Jan - May 2017

Advisor: **Prof. M. Umapathy***Bachelor's Thesis*

Worked on the design and implementation of sliding mode control for electromechanical domains. Focused on hyperplane design techniques for a cantilever beam system with input disturbance. Analyzed open and closed loop behavior and tuned the controller for required response.

AWARDS AND HONORSRECAL Alumni Award, 2017 (*gold-medallist in undergraduate major*)Sri. Avinash Memorial Award, 2017 (*best outgoing male student in undergraduate major*)**OPJEMS Scholar**, 2017 (*100 undergraduates across India*)Joint **S. N. Bose** and **Robotics Institute Summer Scholar**, 2016**Cargill Global Scholar**, 2015 - 2017 (*10 undergraduate sophomores across India*)**TECHNICAL SKILLS****Programming:** C/C++, Python, MATLAB, L^AT_EX**Tools and Libraries:** ROS, OpenCV, TensorFlow**RELEVANT COURSEWORK**

Graduate: 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, Process Control, Robotics, Signals and Systems, Microprocessors and Microcontrollers, Circuit Theory, Digital Electronics, Embedded Systems, Linear Integrated Circuits, Sensors and Transducers, Material Science, Numerical Methods

INDEPENDENT PROJECTS

DeepGeo: Photo Localization with Deep Neural Network [[arXiv](#)] 2018
A deep neural network to predict the State an input Google Street View image was taken in. We defeat humans playing **GeoGuessr** and open-sourced our *50States10K* dataset.

Fingerprint and Iris Biometric Authentication System 2016
Product design capstone project—a complete system for enrolling and verifying biometric data.

Real-time 3-D Object Reconstruction via Kinect 2016
System scans objects on a bi-directional turntable and outputs a filtered CAD model.

Wearable Fall Detection, Monitoring and Alert System for Outpatients 2015
System worn around outpatient's waist with classifier to differentiate falls from activities of daily life.