Sudharshan Suresh

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RESEARCH AREA Robot manipulation | SLAM | Learning for perception | Touch sensing

EDUCATION

Robotics Institute, Carnegie Mellon University 2019 - Jan 2024 [expected]
Ph.D. in Robotics
Advisor: Prof. Michael Kaess
Thesis: Perception amidst interaction - spatial AI with vision and touch for manipulation

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, Trichy, India 2013 - 2017
B.Tech (Honors) in Instrumentation and Control Engineering
GPA: 9.45/10

EXPERIENCE

Part-time researcher, FAIR (Meta) Pittsburgh	2022 - present
Research scientist intern, FAIR (Meta) Menlo Park	Summer 2023
AI research intern, FAIR (Meta) Pittsburgh	Summer 2022
Graduate research assistant, Robot perception lab, CMU	2018 - present
Research intern, Planetary robotics lab, CMU	Summer 2016
Research intern, Video analytics lab, IISc Bangalore	Summer 2015

PUBLICATIONS

PEER-REVIEWED PUBLICATIONS

[1] H. Qi, B. Yi, S. Suresh, M. Lambeta Y. Ma, R. Calandra, and J. Malik, "General In-Hand Object Rotation with Vision and Touch," In *Proc. Conf. on Robot Learning, CoRL*, Atlanta, USA, Nov 2023 paper / website

[2] S. Suresh, Z. Si, S. Anderson, M. Kaess, and M. Mukadam, "MidasTouch: Monte-Carlo inference over distributions across sliding touch," In *Proc. Conf. on Robot Learning, CoRL*, Auckland, New Zealand, Dec 2022, **Oral, 6.5% Acceptance Rate** paper / website / code / presentation

[3] S. Suresh, Z. Si, J. Mangelson, W. Yuan, and M. Kaess, "ShapeMap 3-D: Efficient shape mapping through dense touch and vision," In *Proc. IEEE Intl. Conf. on Robotics and Automation (ICRA)*, May 2022. paper / website / code / presentation

[4] S. Suresh, M. Bauza, K.-T. Yu, J. Mangelson, A. Rodriguez, and M. Kaess, "Tactile SLAM: Real-time inference of shape and pose from planar pushing," In *Proc. IEEE Intl. Conf. on Robotics and Automation (ICRA)*, Xi'an, China, May 2021, **Best paper award in service robotics finalist** paper / website / presentation

[5] M. Hsiao, J.G. Mangelson, S. Suresh, C. Debrunner, and M. Kaess, "ARAS: ambiguity-aware robust active SLAM based on multi-hypothesis state and map estimations," In *Proc. IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS)*, Oct. 2020. paper

[6] S. Suresh, P Sodhi, J. G. Mangelson, D. Wettergreen, and M. Kaess, "Active SLAM using 3D submap saliency for underwater volumetric exploration," In *Proc. IEEE Intl. Conf. on Robotics and Automation (ICRA)*, Paris, France, pp. 3132-3138, May 2020. paper / presentation

JOURNAL PUBLICATIONS

[7] S. Suresh, E. Westman, and M. Kaess, "Through-water stereo SLAM with refraction correction for AUV localization," *IEEE Robotics and Automation Letters (RA-L)*, vol. 4, no. 2, pp. 2377-3766, presented at ICRA 2019, Apr. 2019. paper / presentation

[8] 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. paper / website

Workshops/other Publications

[9] S. Suresh, J. G. Mangelson, and M. Kaess, "Incremental shape and pose estimation from planar pushing using contact implicit surfaces," In *ICRA 2020 workshop - ViTac 2020: Closing the Perception-Action Loop with Vision and Tactile Sensing*, May 2020. paper / presentation

[10] J. Hsiung, A. Tallaksen, L. Papincak, S. Suresh, H. Jones, W. Whittaker, and M. Kaess, "Localized imaging and mapping for underwater fuel storage basins," In *Proceedings of the Symposium on Waste Management*, Phoenix, Arizona, Mar. 2018. paper / presentation

[11] S. Suresh, N. Chodosh, M. Abello, "DeepGeo: Photo Localization with Deep Neural Network," *arXiv preprint arXiv:1810.03077*, 2018. paper / code

[12] E. Fang, S. Suresh and W. Whittaker, "Camera-only kinematics for small lunar rovers," In *Annual Meeting of the Lunar Exploration Analysis Group*, Columbia, Maryland, Vol. 1960, Nov 2016. poster / paper / video

Invited Talks

FRC seminar- Localization and active exploration in indoor underwater environments, July 2019
Tartan SLAM series- Tactile SLAM: inferring object shape and pose through touch (video), Aug. 2021
R-PAD lab, CMU- Towards shape perception via touch and vision for manipulators, Oct. 2021
RoboTouch lab, CMU- ShapeMap 3D: Efficient shape mapping through dense touch and vision, Oct. 2021
FAIR embodied AI seminar- Monte-Carlo inference over distributions across sliding touch, Aug. 2022

Awards and Honors

Best paper award in service robotics finalist, ICRA '21 **[4]**
Hima and Jive Fellowship in Computer Science, '20
RECAL Alumni Award and Sri. Avinash Memorial Award, '17 (*gold-medalist in undergraduate major*)
OPJEMS Scholar, '17 (*100 undergraduates across India*)
Cargill Global Scholar, '15 - '17 (*10 undergraduate sophomores across India*)

Service

Reviewer: IROS '20, '21, '22, '23 | ICRA '21, '22, '23 | RA-L | T-RO
Organizing committee: Debates on the Future of Robotics Research, ICRA '21, '22 (Technical chair)
Student volunteer: CoRL '23
Admissions committee: CMU MSCV '23, CMU RI Summer Scholars program ('18, '19, '20)
Mentorship: CMU AI undergraduate mentorship program ('19), NIT Trichy Jiteshraj Scholarship ('18)

Teaching

Teaching Assistant, 16-833: Robot Localization and Mapping @ CMU 2019, 2020

Select 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 (16-720), 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, robotics, signals and systems, circuit theory, embedded systems, linear integrated circuits, sensors and transducers, material science, numerical methods

Last updated: 17th Nov, 2023