SEENIVASAN LALITHKUMAR



Lalithkumar Seenivasan © 0000







EDUCATION

Doctor of Philosophy (PhD), Biomedical Engineering

- **2019 Ongoing**
- National University of Singapore
- Scene understanding in robotic surgery semantic segmentation, surgical scene graph, surgical action and phase recognition.
- Natural language processing in robotic Surgery surgical visual question answering and surgical scene captioning.

B.Eng. (Hons) Electrical Engineering

- **2016 2019**
- National University of Singapore
- CAP: 3.94 / 5.0
- Design Centric Programme
- Exchange Student at Tampere University of Technology, Finland.

Diploma in Mechatronics

- **2010 2013**
- ▼ Temasek Polytechnic, Singapore
- GPA: 3.91 / 4.0, Diploma with Merit
- Diploma plus in Life Sciences Fundamentals

PUBLICATIONS

Top Highlights

- Pang, W., Islam, M., Mitheran, S., Seenivasan, L., Xu, M., & Ren, H. (2022). Rethinking feature extraction: Gradient-based localized feature extraction for end-to-end surgical downstream tasks. *IEEE Robotics and Automation Letters & ICRA2023*, 7(4), 12623–12630.
- Seenivasan, L., Islam, M., Krishna, A. K., & Ren, H. (2022). Surgical-vqa: Visual question answering in surgical scenes using transformer. In *International Conference on Medical Image Computing and Computer-Assisted Intervention* (pp. 33–43). Springer.
- Seenivasan, L., Mitheran, S., Islam, M., & Ren, H. (2022). Global-reasoned multi-task learning model for surgical scene understanding. *IEEE Robotics and Automation Letters & ICRA2022*, 7(2), 3858–3865.
- Islam, M., Seenivasan, L., Ren, H., & Glocker, B. (2021). Class-distribution-aware calibration for long-tailed visual recognition. *UDL Workshop, International Conference on Machine Learning*.
- Islam, M., Seenivasan, L., Ming, L. C., & Ren, H. (2020). Learning and reasoning with the graph structure representation in robotic surgery. In *International Conference on Medical Image Computing and Computer-Assisted Intervention* (pp. 627–636). Springer.

Extended List

Islam, M., Seenivasan, L., Sharan, S., Viekash, V., Gupta, B., Glocker, B., & Ren, H. (2023). Paced-curriculum distillation with prediction and label uncertainty for image segmentation. arXiv preprint arXiv:2302.01049, accepted in IJCARs.

AWARDS

National University of Singapore

- Outstanding Undergraduate Researcher Prize AY2017/2018
- FoE 32nd INNOVATION & RESEARCH AWARD (2018)

Temasek Polytechnic, Singapore

- Singapore Manufacturing Federation Metal, Machinery & Engineering Industry Group Project Prize 2013
- Commendation Award for Major Project 2013
- CCA Merit Award in Leadership 2013
- Director's List Award 2013
- Director's List Award 2012

National Service, Singapore Police

- Commander's Outstanding Performance Award 2015
- Sword Of Merit, Police Officer Cadet Course 2014

WORK EXPERIENCE

Research Engineer National University of Singapore

- □ Dec 2020 Ongoing Singapore
- Manage and lead projects with research interns

Engineering Manager Aitech Robotics And Automation Pte Ltd

- **ä** Aug 2019 Jul 2020 **♥** Singapore
- Lead and manage the R&D dept
- Technical adviser & Design overall system architecture

Software Engineer (Part-time), R&D Dept

Aitech Robotics And Automation Pte Ltd

i Jun 2016 - Jul 2019 **♥** Singapore

Associate Engineer, R&D Dept Aitech Robotics And Automation Pte Ltd

- **i** Jan 2016 Jun 2016 **○** Singapore
- Develop robotic solutions in the Robot Operating System (ROS)

- Seenivasan, L., Islam, M., Xu, M., Lim, C. M., & Ren, H. (2023).
 Task-aware asynchronous multi-task model with class incremental contrastive learning for surgical scene understanding. *International Journal of Computer Assisted Radiology and Surgery*, 1–8.
- Seenivasan, L., Islam, M., Ng, C.-F., Lim, C. M., & Ren, H. (2022).
 Biomimetic incremental domain generalization with a graph network for surgical scene understanding. *Biomimetics*, 7(2), 68.
- Xu, M., Seenivasan, L., Yeo, L. L. L., & Ren, H. (2020). Stent deployment detection using radio frequency-based sensor and convolutional neural networks. *Advanced Intelligent Systems*, 2(10), 2000092.
- Ren, H., Chen, C. X., Cai, C., Ramachandra, K., & Lalithkumar, S. (2017). Pilot study and design conceptualization for a slim single-port surgical manipulator with spring backbones and catheter-size channels. In 2017 ieee International Conference on Information and Automation (ICIA) (pp. 499–504). IEEE.

Collaborations

- Huaulmé, A., Harada, K., Nguyen, Q.-M., Park, B., Hong, S., Choi, M.-K., ... Dou, Q., et al. (2022). Peg transfer workflow recognition challenge report: Does multi-modal data improve recognition? arXiv preprint arXiv:2202.05821.
- Nwoye, C. I., Alapatt, D., Yu, T., Vardazaryan, A., Xia, F., Zhao, Z., ... Wang, H., et al. (2022). Cholectriplet2021: A benchmark challenge for surgical action triplet recognition. arXiv preprint arXiv:2204.04746.
- Lal, R., Swaminathan, R., Seenivasan, L., Qiu, L., & Ren, H. (2021).
 Scoopnet: 6dof pose estimation pipeline for origami-inspired worm robots. In 2021 ieee International Conference on Development and Learning (ICDL) (pp. 1–6). IEEE.
- Seenivasan, L., Bai, F., Ji, M., Gu, X., Tse, Z. T. H., & Ren, H. (2020).
 Shape tracking of flexible morphing matters from depth images.
 IEEE Sensors Journal, 21(6), 8234–8244.

Book Chapters

- Cai, X., Cai, C. J., Seenivasan, L., Tse, Z., & Ren, H. (2023). Untethered soft ferromagnetic quad-jaws cootie catcher with selectively coupled degrees of freedom. In *Deployable Multimodal Machine Intelligence: Applications in Biomedical Engineering* (pp. 347–376). Springer.
- Lalithkumar, S., Cai, X., Ramachandra, K., Wong, F., & Ren, H. (2020). Tendon routing and anchoring for cable-driven single-port surgical manipulators with spring backbones and luminal constraints. Flexible Robotics in Medicine: A Design Journey of Motion Generation Mechanisms and Biorobotic System Development, 169.
- Ramachandra, K., Cai, C. J., Lalithkumar, S., Cai, X., Tse, Z. T., & Ren, H. (2020). Tunable stiffness using negative poisson's ratio toward load-bearing continuum tubular mechanisms in medical robotics. In *Control Theory in Biomedical Engineering* (pp. 317– 358). Elsevier.

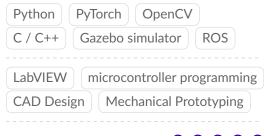
 Develop autonomous navigation stack (robot localization, navigation and obstacle avoidance)

Temp Technical Support Officer Temasek Polytechnic

i Oct 2013 − Jan 2014 Singapore

 Involved in a research project in developing an indoor micro-aerial vehicle with autonomous navigation features without the aid of GPS

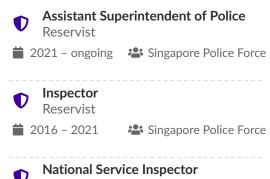
SKILLS



English Tamil



NATIONAL SERVICE



Active

苗 2014 - 2016 🐸 Singapore Police Force

LEADERSHIP

Vice-Captain, Touch Rugby

= 2018 − 2019 **=** NUS Raffles Hall

Captain, Touch Rugby

Quartermaster, Temasek Polytechnic International Students Group

CO-CURRICULAR

Touch Rugby Softball Photography
International Students Group Scouts