Kiran Kumar Lekkala

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Education

University of Southern California **Los Angeles, USA**
PhD., Computer Science *August 2018 – November 2024*
Advisor: Prof. Laurent Itti

Thesis: *Pretraining Transferable Encoders for Visual Navigation using Unlabeled Datasets*

Indian Institute of Information Technology **SriCity, India**
BTech (Hons.), Computer Science and Engineering *August 2013 – May 2017*
Thesis: *Enhancing Visual SLAM systems for Autonomous Quadcopters*

Research Interests

Artificial Intelligence/Machine Learning: Transformers, GPT, LLMs, VLMs, Retrieval-Augmented Generation (RAG), RLHF, Reinforcement Learning, Lifelong Learning, Continual Learning, Meta Learning, Multi-task Learning, Self-Supervised Representation Learning, Contrastive Learning, Visual Navigation
Robotics: Autonomous Driving, Mobile Robots, Simulators, Visual SLAM, State Estimation and Sensor Fusion
3D Computer Vision: Graphics, Gaussian Splatting, Text-to-3D Diffusion, 3D-LLMs, NeRFs, 3D Reconstruction
ML Systems: Distributed Systems, Distributed RL, Model/Data Parallelism, Edge Computing

Experience

Dolby Laboratories **Sunnyvale, CA**
PhD. Research Intern *September 2024 – December 2024*
Multi-modal (combination of language, video, audio, multi-view imagery, and 3D) understanding for LLMs

Klover.AI **Remote**
Applied Scientist Intern *May 2024 – September 2024*
Worked on an LLM-agent system that uses entropy-driven methods for decision making

ILab, USC **Los Angeles**
Graduate Research Assistant *August 2018 – May 2024*
Worked on multiple projects funded by C-BRIC and DARPA, along with working on my PhD research

Computer Graphics and Immersive Technologies (CGIT) **Los Angeles, CA**
Graduate Research Assistant *December 2017 – March 2018*
Implemented a novel Contour Approximation algorithm using recursive Convex hull estimation

JeVois Inc **Los Angeles, CA**
Research Engineer Intern *August 2017 – August 2018*

Implemented a Multi-view ML based perception system on a quad-core ARM Cortex JeVois smart camera

Google Summer of Code **Remote**
Student Developer *May 2016 – August 2016*
Created easy-to-use APIs and firmware for Beaglebone Blue in collaboration with Beagleboard.org and UC San Diego

GeoScience Consulting **Singapore**
Research Intern *March 2016 – May 2016*
Worked on generating 3D point-cloud of outdoor environments using an Earthmine omnidirectional stereo camera system

Awards and Achievements

Best Paper Award: International Conference on Robotics and Automation 2024

Research Award: USC Graduate Symposium 2024 (award for high-impact projects)

Research Award: USC Graduate Symposium 2023 (award for high-impact projects)

Annenberg Fellowship: Four-year graduate fellowship awarded to top 0.5% of PhD. applicants

Dean's Award for Research contribution: Award for outstanding Undergraduate research.

Dean's List of Academic Excellence: Award for achieving academic distinction for 4 semesters

ACM-ICPC: Honorable Mention in ACM-ICPC 2014 Asia Region.

Publications

[1] Kiran Lekkala*, Henghui Bao*, Piexu Cai, Kevin Lim, Chen Liu, Laurent Itti, "USCILab3D: A Large-scale, Long-term, Semantically Annotated Outdoor Dataset", *Neural Information Processing Systems (NeurIPS)*, December, 2024

[2] Kiran Lekkala, Chen Liu, Laurent Itti, "Bird's Eye View Based Pretrained World model for Visual Navigation", *International Symposium of Robotics Research (ISRR)*, December, 2024

[3] Henghui Bao*, Kiran Lekkala*, Laurent Itti, "Real-world Visual Navigation in a Simulator: A New Benchmark", *Computer Vision and Pattern Recognition (CVPR) Workshop on Robotics and Autonomous Driving*, June, 2024

[4] Abby O'Neill, ..., Kiran Lekkala, ..., Zipeng Lin [192 additional authors; All authors listed alphabetically], "Open X-Embodiment: Robotic Learning Datasets and RT-X Models", *International Conference on Robotics and Automation (ICRA)*, May, 2024

[5] Kiran Lekkala*, Eshan Bhargava*, Laurent Itti, "Evaluating Pretrained models for Deployable Lifelong Learning", *Winter Conference on Applications of Computer Vision (WACV), Workshop on Pretraining*, January, 2024

[6] Yixin Xu, Zijian Zhao, Yi Xiao, Tongguang Yu, Halid Mulaosmanovic, Dominik Kleimaier, Stefan Duenkel, Sven Beyer, Xiao Gong, Rajiv Joshi, Xiaobo Hu, Shixian Wen, Amanda Sofie Rios, Kiran Lekkala, Laurent Itti, Eric Homan, Sumitha George, Vijaykrishnan Narayanan, Kai Ni, "Ferroelectric FET based Context-Switching FPGA Enabling Dynamic Reconfiguration for Adaptive Deep Learning Machines", *Science Advances*, January, 2024, Volume 10, Issue 3

[7] Kiran Lekkala, Henghui Bao, Sumedh Sontakke, Erdem Biyik, Laurent Itti, "Value Explicit Pretraining for Learning Transferable Representations", *Conference on Robot Learning (CoRL), Pretraining for Robotics*, November, 2023

[8] Adam M Jones, Gozde Sahin, Zachary W Murdock, Yunhao Ge, Ao Xu, Yuecheng Li, Di

Wu, Shuo Ni, Po-Hsuan Huang, Kiran Lekkala, Laurent Itti, "USC-DCT: A Collection of Diverse Classification Tasks", *MDPI Data*, September 2023, Volume 8, Issue 10

[9] Yunhao Ge, Yuecheng Li, Di Wu, Ao Xu, Adam M Jones, Amanda Sofie Rios, Iordanis Fostiropoulos, Shixian Wen, Po-Hsuan Huang, Zachary William Murdock, Gozde Sahin, Shuo Ni, Kiran Lekkala, Sumedh Anand Sontakke, Laurent Itti, "Lightweight Learner for Shared Knowledge Lifelong Learning", *Transactions on Machine Learning Research (TMLR)* May, 2023

[10] Kiran Lekkala, Laurent Itti, "Shaped Policy Search for Evolutionary Strategies using Waypoints", *International Conference on Robotics and Automation (ICRA)*, June, 2021

[11] Kiran Lekkala, Laurent Itti, "Attentive Feature Reuse for Multi Task Meta learning", *International Conference on Learning Representations (ICLR), Embodied Multimodal Learning*, May, 2021

[12] Kiran Lekkala, Sami Abu-El-Haija, Laurent Itti, "Meta adaptation using importance weighted demonstrations", *Arxiv Preprint*, November, 2019

[13] Kiran Lekkala, VK Mittal, "Accurate and augmented navigation for quadcopter based on multi-sensor fusion", *INDICON*, December, 2016

[14] Kiran Lekkala, VK Mittal, "Simultaneous aerial vehicle localization and human tracking", *TENCON*, November, 2016

[15] Kiran Lekkala, VK Mittal, "Artificial intelligence for precision movement robot", *International Conference on Signal Processing and Integrated Networks (SPIN)*, February, 2015

[16] Kiran Lekkala, VK Mittal, "PID controlled 2D precision robot", *International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT)*, July, 2014

Teaching Experience

- CSCI-561 Foundations of Artificial Intelligence
- CSCI-570 Analysis of Algorithms
- CSCI-585 Database Systems
- CSCI-455 Introduction to Programming Systems Design

Professional activity

Student mentoring

- Lead and Managed multiple teams of 36 BS and MS students during my PhD [Mentee list]

Reviewer

- International Conference on Learning Representations (ICLR) 2025
- International Conference on Robotics and Automation (ICRA) 2025
- Robotics and Automation Letters (RA-L)
- Internation Conference on Intelligent Robots and Systems (IROS) 2024
- International Conference on Robotics and Automation (ICRA) 2024
- International Conference on Artificial Neural Networks (ICANN) 2024
- Neural Information Processing Systems (NeurIPS) 2023
- Conference on Robot Learning (CoRL) 2023
- International Conference on Artificial Neural Networks (ICANN) 2023

Program committee

- X-Embodiment Robot Learning, Conference on Robot Learning