# Kiran Kumar Lekkala

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*I'm a final-year PhD candidate with research interests in Applied Artificial Intelligence and Machine Learning.*
*I've extensively worked with LLMs and VLMs for Robotics, RAG and Generative AI applications.*
*I'm looking for Full-time opportunities starting from September 2024 (August/October 2024 if needed).*

## Education

**University of Southern California** — **Los Angeles, USA**
*PhD. Candidate, Thomas Lord Department of Computer Science* — *August 2018 – August 2024*
Advisor: Prof. Laurent Itti
Thesis: *Evaluating Transferable Pretrained Encoders for Visual Navigation*

**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*

## 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

## Relevant Experience

**Klover.AI** — **Remote**
*Independent Consultant* — *May 2024 – Present*
Working on a product that uses novel Artificial General Intelligence (AGI) based methods for decision making

**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* — *Mar 2016 – May 2016*
Worked on generating 3D point-cloud of outdoor environments using an Earthmine omnidirectional stereo camera system

**Gram Suchana Private limited** — **Bengaluru, India**
*Product developer* — *May 2014 – January 2015*
Worked on developing frontend and backend of the app based on the MVC framework, catering to the needs of rural India.

## Selected Publications

**Open X-Embodiment: Robotic Learning Datasets and RT-X Models**: *Co-Authored* [Link] [Press Coverage]
*Published* at ICRA 2024. *Nominated for Best Paper, Best Student Paper, Best Manipulation paper award.*

**Real-world Visual Navigation in a Simulator using Scene Generation. A New Benchmark**: *Henghui Bao*, Kiran Lekkala*, .., Laurent Itti* [Webpage]
In submission to NeurIPS 2024. *Presented* and *awarded cash prize* at the 2023 Annenberg Research Symposium.

**Lightweight Learner for Shared Knowledge Lifelong Learning**: *Co-Authored* [Link][Press Coverage]

*Published* in Transactions on Machine Learning Research.

**USC-DCT: A Collection of Diverse Classification Tasks**: *Co-Authored* [Link]
*Published* in MDPI.

**Value Explicit Pretraining for Learning Transferable Representations**: *Kiran Lekkala, Henghui Bao, Sumedh Sontakke, Laurent Itti* [Link]
Under Review at ICML 2024. *Spotlight presentation* at CoRL 2023 Workshop on PRL.

**USCILab3D: A Large-scale, Long-term, Semantically Annotated Outdoor Dataset**: *Kiran Lekkala**, *Henghui Bao**, .., *Laurent Itti* [Webpage][Link][Robot dataset]
In submission to NeurIPS 2024 Datasets and Benchmarks Track.

**Bird's Eye View Based Pretrained World model for Visual Navigation**: Kiran Lekkala*, *Chen Liu**, *Laurent Itti* [Link]
Under Review at IROS 2024. Also *accepted* at NeurIPS 2023 Robot Learning Workshop.

**Ferroelectric FET based Context-Switching FPGA Enabling Dynamic Reconfiguration for Adaptive Deep Learning Machines**: *Co-Authored* [Link]
*Published* at Science Advances.

**Evaluating Pretrained models for Deployable Lifelong Learning**: *Kiran Lekkala**, *Eshan Bharghava**, *Yunhao Ge, Laurent Itti* [Link]
*Presented* at WACV 2024 Workshop on Pretraining.

**Shaped Policy search for Evolutionary strategies using waypoints**: *Kiran Lekkala, Laurent Itti* [Link]
*Published in* ICRA 2021.

**Attentive Feature Reuse for Multi Task Meta learning**: *Kiran Lekkala, Laurent Itti* [Link]
*Presented* at EML Workshop at ICLR 2021.

**Simultaneous Aerial Vehicle Localization and Human Tracking**: *Kiran Lekkala, VK Mittal* [Link]
*Published in* TENCON 2016 .

**Accurate and Augmented Navigation for Quadrocopter based on Multi-Sensor Fusion**: *Kiran Lekkala, VK Mittal* [Link]
*Published in* INDICON 2016 .

### Notable Projects

**RAG for relating videos and text**: Developed a Retrieval Augmented Generation (RAG) system for relating content within a video (transcription using OpenAI Whisper) and books to generate appropriate responses to user queries.

### PrePrints

**Low Cost Autonomous Mapping system for 3D-LLM based Scene Understanding**: *Kiran Lekkala, Laurent Itti* [Patent filing pending]

### Reviewer

ICANN, ICRA, IROS

## Awards and Achievements

**USC Annenberg Fellowship**: Four-year graduate fellowship awarded to 10% of incoming PhD. students.

**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.

## Technical Skills

**ML Frameworks/Environments**: Pytorch, JAX, Hugging Face, Accelerate, DeepSpeed, Ray, RLlib, LlamaIndex, MPI, Tensorflow, Keras, TFLite, AWS Sagemaker, Kubernetes, Azure ML, Caffe, MXNet, Scikit, NLTK

**Programming Languages**: C, C++, C#, Python, UNIX Bash, Java, JavaScript, PHP, Ruby

**Vision and Graphics**: MATLAB, Simulink, OpenCV, Unreal Engine, WebGL, PCL, CUDA, OpenGL

**Robotics**: IsaacSim, IsaacGym, ROS, Gazebo, MRPT, ARM Boards, AutoCAD, Fusion360