

Soham Kulkarni

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Education

University of California, Los Angeles (UCLA)
Master of Science (MS) in Computer Science

Sep 2023 – Ongoing

Indian Institute of Technology (IIT) Hyderabad
Bachelor of Technology in Electrical Engineering (Minor in Entrepreneurship)

Jul 2019 – May 2023

Technical Skills

Programming: Python, MATLAB, C · **Software/Tools:** Git, Docker, ROS/ROS2, CUDA, wandb, roboflow, SolidEdge · **Libraries:** PyTorch, OpenCV, Tensorflow · **Simulators used:** MuJoCo, Unity, Gazebo, rViz, PyBullet, AirSim MetaDrive, robosuite, ZED Studio ·

Research Experience

Benchmarking Data Quality in imitation Learning [to be submitted to CoRL 2025] *Los Angeles, CA*
Under Dr. Yuchen Cui, UCLA Robot Intelligence Lab (URIL) *Sep 2024 – Ongoing*

- Evaluated trajectory-level data quality (on Diffusion policy) by exploring measurable metrics for action consistency and state space coverage in Push-T and robomimic tasks, identifying high-quality demonstrations for training.
- Demonstrated expert-level potential in non-expert data, showing that the top 1/3rd of ranked demonstrations included **27 %** non-expert data, and filtering the top 50 % of expert demonstrations improved success by **43 %**.

Stereo Vision and Planning for the ARTEMIS humanoid [RoboCup 2024 winner] *Eindhoven, Netherlands*
Under Dr. Dennis Hong, RoMeLa, UCLA *Jan 2024 – Jul 2024*

- Created a “proximity” package for near-field planning at 60 Hz using connected components analysis on depth maps.
- Deployed adaptive thresholding & fallback HALO mode; integrated with localization and high-level planner.

Motion Planning & Bilateral Teleoperation on a Custom Humanoid
With Netflix & RoMeLa, UCLA

Los Angeles, CA
Mar 2024 – June 2024

- Developed a 3D motion planning interface to record, replay, and refine safe robot motions in Unity and Pybullet.

Reinforcement Learning for Autonomous Navigation on Uncertain Terrain
Under Dr. M. Vidyasagar, FRS (IIT Hyderabad)

Hyderabad, India
Jun 2021 – May 2022

- Implemented A3C for UGV planning on unstructured terrain; integrated user-defined obstacles via heightmaps.
- Optimized static obstacle density scheduling during training, leading to a **14 %** success rate increase in simulation.

Agile Autonomous Quadrotor Flight [For IROS 2022 Robot Learning Competition] *Hyderabad, India*
Under Dr. M. Vidyasagar (IIT Hyderabad) & Dr. Srikanth Saripalli (Texas A&M) *Aug 2022 – May 2023*

- Deployed a PPO-based controller in SE(3) for min-time navigation on a Crazyflie quadrotor (pycrazyswarm).
- Demonstrated improved reliability under gate/obstacle constraints, with **84 %** success in adaptive control setting.

Data-Acquisition Robot for Acoustic Sensing & Localization [Robot Audition]
Under Dr. Sumohana Chhannappayya & Dr. K. Sri Rama Murty (IIT Hyderabad)

Hyderabad, India
Jul 2021 – May 2022

- Developed an all-terrain robot (1.7m) with an 8-channel mic array; 4G streaming for robust sound source localization.

Other Projects

- **Creating Persona Chatbots:** Employed in-context & chain-of-thought prompt tuning on Mistral 7B for persona-aligned dialogues · Evaluated fluency (LLMEval), reasoning (MMLU), toxicity (HDS) to refine persona fidelity.
- **CRAG Meta KDD Competition:** Optimized the RAG pipeline, improving retrieval precision, reranking (BAAI/bge-reranker-v2-m3), and mitigating hallucinations with prompt tuning. · Enhanced query-aware retrieval, increasing open-ended query accuracy to **42.16%** with GPT-4o-mini and Chain-of-Thought prompting.
- **SLAM on Victoria Park Dataset:** Implemented EKF-SLAM and non-linear least squares optimization.
- **DDP-based Solver for Optimal Control:** Implemented numerical solvers (DDP) for whole-body manipulation, gait planning, and bipedal walking under contacts.
- **Flipkart Grid 3.0 Robotics Challenge (National Semifinalists):** Led a team to develop overhead-vision swarm robotics for pick-and-place.

Academic Achievements

- All India Rank **2362** amongst 200,000 shortlisted students from **1.1 million** students who appeared for JEE Mains
- **SA Gold Medal for Innovation**, IIT Hyderabad (Apr 2023), and won the BUILD funding grant (2022)
- SPIRSE Award by IEEE RAS, invited to ICRA 2022