Sai Haneesh Allu

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Education

The University of Texas at Dallas — Texas, USA
Ph.D. in Computer Science — Aug 2022 – Present

Indian Institute of Technology (IIT) Delhi — Delhi, India
Masters in Control and Automation — July 2018 – May 2020

National Institute of Technology (NIT) Warangal — Warangal, India
Bachelors in Electrical and Electronics Engineering — July 2012 – May 2016

Research Experience

Intelligent Robotics and Vision Lab - UT Dallas — Texas, USA
Research Assistant, Advised by Prof. Yu Xiang — Aug 2022 – Present

- Developed a **One-Shot Human-to-Robot Trajectory Transfer** system to mimic object manipulation from human demonstration videos, leveraging **Video Understanding** and joint trajectory optimization for robot base and arm, validated on 15 natural tasks (ongoing research, demo).
- Engineered a greedy and modular **Autonomous Exploration** and revisiting algorithm for vast environments, with a hierarchical semantic-geometric data structure for **Semantic Mapping** and efficient lifelong updates.
- Formulated a point-cloud-based **Trajectory Optimization** framework for simultaneous grasp selection and motion planning, achieving $\sim 66\%$ faster performance compared to conventional OMPL based approach.
- Proposed a marker-free scene alignment technique for **Benchmarking** real-world robot manipulation, evaluated across 11 existing perception, planning and control pipelines over 2000 grasping trials.

Swarm Intelligence Lab - IIT Delhi — Delhi, India
Graduate Student Researcher, Advised by Prof. Shubhendu Bhasin — May 2019 – May 2020

- Setup and calibrated a 12 camera **OptiTrack Motion Capture** test bed by optimizing coverage, creating a reliable 6DoF pose estimation and wired data transfer for multi-robot experiments.
- Researched and implemented **Distributed Formation Control** algorithms on real-world quadcopter swarm and developed a target capture mechanism using a graph-based leader-follower consensus approach.

Industry Experience

VECROS Technologies — Delhi, India
Co-Founder and CTO — Jan 2020 – Nov 2021

- Developed an edge-processed **Visual Inertial Odometry** system and a mapless reactive planner, to operate in **GPS-denied** environments, ensuring safe navigation using Intel T261, D430 modules.
- Led the team in building a web-based **Beyond Visual Line of Sight** (BVLOS) control platform using AWS IoT, for remote aerial surveillance to detect and report construction activities and road anomalies.
- Contributed to raising $**100K** during seed funding round, scaling up the operations and product development.

Sterlite Tech — Maharashtra, India
Operations Engineer — June 2016 – Aug 2017

- Investigated the optical fiber spooling process and implemented a **Grounding Mechanism** to dissipate charge built through virtual capacitance, reducing spool changeover failures from average of 12 to 4 per month.
- Co-authored comprehensive equipment **Maintenance Documentation** for troubleshooting and root-cause analysis of fiber winding machine breakdowns, resulting in reduced downtime.

Publications

1. **A Modular Robotic System for Autonomous Exploration and Semantic Updating in Large-Scale Indoor Environments**
   Sai Haneesh Allu, Itay Kadosh, Tyler Summers, Yu Xiang
   Under submission to ICRA 2026.
   Webpage | Code | arXiv | Video

2. **Grasping Trajectory Optimization with Point Clouds**
   Yu Xiang, **Sai Haneesh Allu**, Rohith Peddi, Tyler Summers, Vibhav Gogate
   In IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024.
   Webpage | Code | arXiv | Video

3. **SceneReplica: Benchmarking Real-World Robot Manipulation by Creating Replicable Scenes**
   Ninad Khargonkar*, **Sai Haneesh Allu***, Yangxiao Lu, Jishnu Jaykumar P, Balakrishnan Prabhakaran, Yu Xiang (** denotes equal contribution*)
   In International Conference on Robotics and Automation (ICRA), 2024.
   Webpage | Code | arXiv | Video

4. **Formation Control of Quadcopters**
   Sai Haneesh Allu Master's Thesis, IIT Delhi, 2020.
   Code | Thesis | Video

Skills

Research Areas: Learning from Human Demonstrations, Mobile Manipulation, Semantic Mapping, Robot Exploration & Navigation.

Languages: Python, C++, C.

Frameworks & Tools: ROS, PyTorch, OpenCV, OpTaS, CasADi, Gazebo.

Leadership & Service

- **Peer Reviewer:** IROS, ICRA.
- **Workshop Organizer:** Co-organizer for the Neural Representation Learning for Robot Manipulation workshop at CoRL 2023.
- **Teaching Assistant:**
  - **UT Dallas**: Computer Graphics, Human-Computer Interaction, and Summer Research Program 2023 for high school students.
  - **IIT Delhi**: Stochastic filtering and system identification, Multi-agent control, Advanced Control Lab.

Awards and Recognitions

- **Prof. A.K. Sinha Award** — IIT Delhi, 2020
  Received for achieving the highest GPA (9.8/10) among 141 graduate students.
- **Best Teaching Assistant Award** — IIT Delhi, 2019
  Recognized for outstanding teaching support and student mentorship, voted by over 70% students.
- **Special Award** — Sterlite Tech, 2017
  Awarded for quick learning and independently handling shift as a new trainee engineer.
- **Sport Performance award** — Sterlite Tech, 2016
  Earned for reducing fiber draw startup time by installing variable-speed capstan in legacy towers.