

# Anujith Muraleedharan

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## CONTACT INFORMATION

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## RESEARCH INTERESTS

Currently, my research focuses on developing learning-driven robotic systems that can perceive, reason, and adapt over time through continual interaction with their environment. I am broadly interested in robot learning, control, and world-model-based approaches for lifelong and generalizable intelligence.

## EDUCATION

**Rajiv Gandhi Institute of Technology** Kottayam, India  
B.Tech in Electronics and Communication Engineering 2018 – 2022  
Advisor: *Prof. Manju Manuel*

## RESEARCH EXPERIENCE

**Indian Institute of Technology, Delhi**— Research Associate 2024 – 2025

Advisor: *Prof. M. Hanmandlu*

Worked on dependable robot learning and control under sensing delay, perturbations, and uncertain perception, involving:

1. *Uncertainty-aware goal retargeting in real time to re-aim objectives under lag and disturbances while preserving task success.*
2. *Progress-aware human-in-the-loop learning that sustains performance while substantially reducing supervision through selective querying.*

Collectively, this work advances dependable robot learning and control for time-critical settings by unifying uncertainty calibration, selective supervision, and online goal adaptation to keep performance reliable under delay and disturbance.

**Indian Institute of Science, Bangalore**— Research Associate 2023 – 2024

Advisor: *Prof. Pradipta Biswas*

Research in control and assistive robotics at **I3D Lab**, including autonomous aircraft taxiing with comparative design and evaluation of LQR, PD, Stanley, and SMC controllers, multi-sensor fusion, and full-stack system integration, and an eye-gaze-controlled assistive manipulator that implements safety interlocks, robust hand detection, and dynamic path planning to enable autonomous stamp printing for individuals with severe speech and motor impairment (SSMI).

**Rajiv Gandhi Institute of Technology**— Undergraduate Research Assistant 2021 – 2022

Advisor: *Prof. Manju Manuel*

At the **CASP Lab**, the processing element for the UniWiG accelerator was validated in Vivado, the MBE multipliers and Wallace-tree adders were verified, and power and resource usage were profiled to align with throughput-efficiency goals.

## INDUSTRY EXPERIENCE

**RobotX Workshops** Oct '22 – Feb '23  
*Simulation Developer*

Developed a modular DJI Tello simulation framework in the Ursina engine with realistic flight dynamics, real time camera streaming, and two command pathways via the native API and socket transport. This framework now underpins an interactive learning platform with GUI controls and live visual feedback that serves more than 200 students for hands on drone programming.

## PUBLICATIONS

1. **U-LAG: Uncertainty-Aware, Lag-Adaptive Goal Retargeting for Robotic Manipulation**

Anamika J H\*, Anujith Muraleedharan\*

*IROS 2025 Workshop on Perception and Planning for Mobile Manipulation in Changing Environments (Spotlight)* [\[arXiv\]](#)

2. **SPARQ: Selective Progress-Aware Resource Querying**

Anujith Muraleedharan, Anamika J H

*CoRL 2025 Workshop on Resource-Rational Robot Learning* [\[arXiv\]](#)

3. **Accessibility Analysis of Educational Websites using WCAG 2.0**  
Utkarsha Singh, Jeevithashree Divya Venkatesh, Anujith Muraleedharan, Anamika J H, KamalPreet Singh Saluja, Pradipta Biswas  
*ACM Digital Government: Research and Practice* [Journal]
4. **Eye-Gaze-Enabled Assistive Robotic Stamp Printing System for Individuals with Severe Speech and Motor Impairment**  
Anujith Muraleedharan, Anamika J H, Himanshu Vishwakarma, Kudrat Kashyap, Pradipta Biswas  
*Proceedings of the 29th International Conference on Intelligent User Interfaces* [Proc.]
5. **Developing a Computer Vision based system for Autonomous Taxiing of Aircraft**  
Prashant Gaikwad, Abhishek Mukhopadhyay, Anujith Muraleedharan, Mukund Mitra, Pradipta Biswas  
*AVIATION, Vol. 27, No. 4 (2023)* [Journal]

## PROJECTS

- Vision-Enabled and Natural Language Control for Mobile Robots** Jan 2025  
*Independent Project* [Repo]  
Developed a language to action pipeline that maps natural language commands into structured robot actions for real time motion and navigation control, and implemented fuzzy and semantic destination mapping with sentence transformer embeddings to connect LLM instructions to ROS for both simulation and real world execution.
- Get-3D** Oct 2024  
*Independent Project* [Website]  
Implemented a real-time 2D-to-3D video conversion system with depth-based object segmentation and adaptive thresholding to enhance rendering accuracy and dynamic visual effects.
- Interactive 3D Holographic Display** June 2022  
*Undergraduate Thesis* [Website]  
Designed a 3D holographic projection system using the Pepper's Ghost technique with gesture-based interaction, integrating Raspberry Pi, Leap Motion, and OMNI Haptic for advanced 3D object manipulation.
- Autonomous Racing: MPC vs. LQR** Dec 2020  
*Undergraduate Minor Project* [Website]  
Developed and simulated a Model Predictive Control (MPC) algorithm for real-time vehicle trajectory tracking using linear model approximations, optimizing state and control variables within PyBullet.

## AWARDS

- Division of Mechanical Sciences Research Symposium (IISc Bangalore)** 2024  
Runner-up, Research Presentation Contest.
- Technoxian World Robotics Championship** 2023  
Innovation contest; finalist out of ~150 teams.
- Graduate Aptitude Test in Engineering (GATE), IIT Kanpur** 2023  
Ranked in the top 1.58% among 70,000+ registered candidates.

## SERVICE

- Chief Organizer, Department TechFest (Prominence)** 2021  
Organized a fastest line-follower robot competition (10 teams), a seminar on Solar Electric Propulsion, and a workshop on Advanced Driver Assistance Systems (ADAS).
- Reviewer, ACM Intelligent User Interfaces (IUI)** 2024

## SKILLS AND INTERESTS

**Programming:** Python, C/C++, C#, JavaScript, SQL.  
**Tools:** MATLAB, Fusion 360, Git, Unity, Motive.  
**Frameworks:** ROS, TensorFlow, PyTorch, PyBullet.  
**Sports/Hobbies:** Football, Cricket, and Competitive PC Gaming