Anujith Muraleedharan

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EDUCATION

Rajiv Gandhi Institute of Technology   Aug '18 – Aug '22
Bachelor of Technology in Electronics and Communication Engineering GPA: 8.16/10   *Kottayam, India*
- **Qualified GATE 2023 (ECE)** with top 1.58 percentile ranking among 70,000+ registered candidates.

RESEARCH EXPERIENCE

Indian Institute of Technology, Delhi   June '24 – June '25
*Research Associate Advised by **Prof. M. Hanmandlu***   *New Delhi, India*

- Built a goal-retargeting framework that allows robots to re-aim grasp goals in real time under sensing delays and perturbations, maintaining task success through uncertainty-aware adaptation.
- Designed a progress-aware human-in-the-loop reinforcement learning framework that maintained full task success while halving feedback requirements through selective querying based on learning progress.

Indian Institute of Science   Aug '23 – May '24
*I3D LAB, Research Associate Advised by **Prof. Pradipta Biswas***   *Bangalore, India*

- Designed and evaluated multiple control strategies (LQR, PD, Stanley, SMC), performed sensor fusion, and contributed to the robotic system development for an autonomous aircraft taxiing system.
- Developed an eye-gaze-controlled assistive robotic system integrating safety protocols, hand detection, and dynamic path planning to enable safe and autonomous stamp printing for individuals with SSMI.
- Worked on the design and assembly of a six-wheel rover with a rocker-bogie suspension mechanism capable of traversing 15% slopes while carrying a 25 kg payload.

Rajiv Gandhi Institute of Technology   Jan '21 – June '22
*CASP LAB, Undergraduate Research Assistant Guided by **Prof. Manju Manuel***   *Kottayam, India*

- Tested and validated the Processing Element (PE) unit design within the Unified Winograd-GEMM (UniWiG) architecture, ensuring functionality through simulations in Vivado.
- Verified Modified Booth Encoding (MBE) multipliers and Wallace tree adders while analyzing power consumption and resource utilization to optimize performance metrics.

WORK EXPERIENCE

RobotX Workshops [Website]   Oct '22 – Feb '23
Simulation Developer   *Remote*

- Built a modular simulation framework for the DJI Tello drone using Ursina engine, supporting realistic flight dynamics, real-time camera streaming, and command execution via both API and socket communication.
- Developed an interactive learning platform adopted by 200+ students, integrating GUI controls and visual feedback for immersive drone programming.

PUBLICATIONS

*Denotes Equal Contribution

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.
   [Paper]

2. **SPARQ: Selective Progress-Aware Resource Querying**
   Anujith Muraleedharan, Anamika J H
   CoRL 2025 Workshop on Resource-Rational Robot Learning [Paper]

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 [Paper]

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
ACM Conference on Intelligent User Interfaces (ACM IUI) 2024
[Project Page] [Paper]

5. **Developing a Computer Vision based system for Autonomous taxiing of Aircraft**
Prashant Gaikwad, Abhishek Mukhopadhyay, **Anujith Muraleedharan**, Mukund Mitra, Pradipta Biswas
AVIATION Journal Vol 27 No 4 (2023)
[Project Page] [Paper]

PROJECTS

Vision-Enabled and Natural Language Control for Mobile Robots [Website]   January 2025

- Built the language-to-action pipeline for interpreting natural-language commands into structured robot actions, enabling real-time control over motion and navigation tasks.
- Implemented fuzzy and semantic destination mapping with sentence-transformer embeddings, integrating LLM-driven instructions with ROS for simulation and real-world execution.

Get-3D [Website]   October 2024

- 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 [Website]   June 2022
Undergraduate Thesis

- 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 [Website]   December 2020
Undergraduate Minor Project

- 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 [Certificate]   May 2024
IISc Bangalore
- Participated in the 3-minute Research Video Contest and got shortlisted among the top 5 out of 28 teams.

Technoxian World Robotics Championship [Certificate]   July 2023
AICRA
- Participated in innovation contest in which around 150 teams participated.

Graduate Aptitude Test in Engineering (GATE) [Scorecard]   February 2023
IIT Kanpur
- Secured admissions to M.Tech. Programme in IISc Bangalore, IIT Madras, IIT Bombay and IIT Kharagpur.

PROGRAMMING SKILLS

Subjects of Interest: Reinforcement Learning, Control, Robotic Vision, Machine Learning
Languages: Python, C/C++, C#, JavaScript, SQL
Tools: MATLAB, Fusion 360, GIT, Unity, Motive
Frameworks: ROS, TensorFlow, PyTorch, PyBullet

SERVICE

Prominence   January 2021
Chief Organizer   *Department TechFest*

- Organized a competition on fastest line follower robot with a total participation of 10 teams.
- Conducted a seminar on Solar Electric Propulsion.
- Organized a workshop on Advanced Driver Assistance Systems (ADAS).

Intelligent User Interfaces (ACM IUI)   December 2024
Reviewer   *Conference*
- Reviewer for the Posters and Demos track of ACM IUI 2025.