

ANUJITH MURALEEDHARAN

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EDUCATION

Rajiv Gandhi Institute of Technology

Bachelor of Technology in Electronics and Communication Engineering GPA: 8.16/10 [\[Transcript\]](#)

August 2018 – August 2022

Kottayam, India

Amrita Vidyalayam

Class XII AISSCE, CBSE; 85% ; Class X AISSE, CBSE; 9.8/10.0

April 2014 – March 2017

Pandalam, India

RESEARCH EXPERIENCE

Indian Institute of Technology, Delhi

Pre-Doctoral Researcher Advised by **Prof. M. Hanmandlu** [\[Website\]](#)

June 2024 – Present

New Delhi, India

- Enhanced the eye-gaze-controlled robotic system for individuals with Severe Speech and Motor Impairments by incorporating safety protocols inspired by Asimov's Laws, utilizing a monocular camera for hand detection and path planning algorithms (MDP, BFS) to ensure safe operation.
- Developing an autostereoscopic display system with enhanced 2D-to-3D video conversion using depth-based segmentation for improved depth perception and immersive viewing

Indian Institute of Science

I3D LAB, Research Associate Advised by **Prof. Pradipta Biswas** [\[Website\]](#)

August 2023 – May 2024

Bangalore, India

- Developed and analyzed controllers (LQR, PD, Stanley, SMC), performed sensor fusion, and contributed to the robotic system development for an autonomous aircraft taxiing system [AVIATION Journal Vol 27 No 4 (2023)].
- Developed a comprehensive Eye-gaze-controlled assistive robotic system, including user interface design, control algorithm development, and hardware integration for a stamp printing application for individuals with Severe Speech and Motor Impairment [ACM IUI 2024].
- Worked on an ISRO-funded project focused on developing a Mixed Reality (MR) environment using Unity customized for the astronaut cockpit, aligning with preparations for the upcoming Gaganyaan mission.

Rajiv Gandhi Institute of Technology

CASP LAB, Undergraduate Research Assistant Guided by **Prof. Manju Manuel** [\[Website\]](#) [\[Certificate\]](#)

Jan 2021 – June 2022

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.
- Developed a functional prototype of a 3D holographic projection system using the Pepper's Ghost technique and a Raspberry Pi controller for interactive hand gesture controls, and optimized the Pepper's Ghost phenomenon by varying acrylic sheet tilt angle and thickness to enhance image quality.

PUBLICATIONS

*Denotes Equal Contribution

- Advancing Rehabilitation: Adaptive Robotic Arm for Safe Block Printing with Gaze Control**
Anujith Muraleedharan*, Anamika J H*
Springer International Journal of Intelligent Robotics and Applications (Under-review)
[\[Project Page\]](#)
- 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 [\[Paper\]](#)
- 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
[\[Paper\]](#)

4. 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

Human AV Interaction [\[Website\]](#)

Feb 2024 - May 2024

Associated with I3D Lab

Anujith Muraleedharan, Anamika J H, Naveen R Talawar

- Developed a system to extract lane coordinates, apply curve fitting, and calculate the middle lane, generating control inputs for autonomous UGV navigation.
- Implemented real-time fusion of proximity sensor data with person detection models to autonomously halt the UGV at safe distances.
- Mapped the detected person crossing the road and real-time wheel odometry data to a virtual simulation for accurate interaction with the pedestrian crossing with head-mounted displays.

Interactive 3D Holographic Display [\[Website\]](#)

Dec 2021 - Jun 2022

Undergraduate Thesis

Anujith Muraleedharan, Anamika J H, Manju Manuel

- Developed a 3D holographic projection system using the Pepper's Ghost technique to create illusionary 3D images by reflecting light on a semi-reflective surface, with interactive hand gesture control managed by a Raspberry Pi controller.
- Converted 2D frames to 3D by segmenting foreground objects from the background and integrated interactive 3D objects controlled by Leap Motion and OMNI Haptic, allowing for advanced interactions such as spawning, picking up, and coloring 3D objects.
- Explored optimization techniques for the Pepper's Ghost phenomenon to enhance image quality.

Autonomous Racing: MPC vs. LQR [\[Website\]](#)

Dec 2020

Undergraduate Minor Project

Anujith Muraleedharan, Anamika J H, Karthik Suresh

- Developed a Model Predictive Control (MPC) algorithm for vehicle trajectory tracking, integrating linear model approximations and optimizing state and control variables for real-time applications.
- Designed and implemented a reference trajectory generation system using waypoints interpolation and nearest neighbor indexing for accurate vehicle path following.
- Conducted simulations with PyBullet, showcasing the MPC algorithm's effectiveness in real-time vehicle control and trajectory tracking, including visualizing results and analyzing performance metrics.

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 10 out of 28 teams.
- Secured 4th position after the final round presentation.

Technoxian World Robotics Championship [\[Certificate\]](#)

July 2023

AICRA

- Participated in innovation contest in which around 150 teams participated.
- Selected for finals presentation (top 10) at Noida NCR, India.

Graduate Aptitude Test in Engineering (GATE) [\[Scorecard\]](#)

February 2023

IIT Kanpur

- Achieved an overall rank within the top 1.58 percentile among 70,361 candidates registered in the Electronics and Communication Engineering stream.
- 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

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. The objective of the robot is to efficiently navigate through a predefined course by detecting and tracking a black line.
- Conducted a seminar on Solar Electric Propulsion.
- Organized a workshop on Advanced Driver Assistance Systems (ADAS).