Anamika J H

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🏳 India 🌐 Personal Website
🐙 Github

Education

Rajiv Gandhi Institute of Technology *August 2018 – August 2022*
Bachelor of Technology in Electronics and Communication Engineering *Kottayam, India*
GPA: 8.2/10 [Transcript]

Research Experience

Indian Institute of Technology, Delhi *June 2024 – June 2025*
Research Assistant, Advised by **Prof. M. Hanmandlu** *[Website]* *Delhi, India*

- Implemented a human-in-the-loop reinforcement learning framework for robotic manipulation, integrating SAC with resource-rational decision-making.
- Developed custom wrappers for energy-aware policy shaping, implemented a UR5 simulation in PyBullet, and analyzed trade-offs between efficiency, learning performance, and human feedback.
- Integrated path planning algorithms into an eye-gaze-controlled robotic system to ensure safe navigation, with trajectory accuracy evaluated using PyBullet-based simulation engines.

Indian Institute of Science, Bangalore *August 2023 – May 2024*
I3D LAB, Research Assistant Advised by **Prof. Pradipta Biswas** *[Website]* *Bangalore, India*

- Implemented smooth eye-gaze-based control for an assistive robotic arm to enable precise printing for individuals with severe speech and motor impairments.
- Collaborated with a team to develop a rover's sensing system, integrating a 2D LiDAR with a camera for object detection and SLAM, and implemented Cartographer SLAM for navigation.

Rajiv Gandhi Institute of Technology *Jan 2021 – June 2022*
CASP LAB, Undergraduate Research Assistant Guided by **Prof. Manju Manuel** *[Website]* *Kottayam, India*

- Contributed to the development of the Data and Output Transform Units in a CNN accelerator by analyzing convolution algorithms (Direct, FFT-based, Winograd) and verifying functionality through behavioral simulations in Vivado.
- Developed a functional prototype of a 3D holographic projection system using the Pepper's Ghost technique, integrating real-time eye tracking via a pipeline of face detection, landmark detection, head pose estimation, and gaze estimation models to enhance interactive user experiences.

Professional Experience

Blue Bear Contracting Pvt Ltd. *Aug 2022 – Jan 2023*
Intern *Pandalam, India*

- Designed and implemented a pipeline to convert 2D floor plan images into textured 3D architectural models using Mask R-CNN for wall, door, and window detection.
- Achieved over 90% wall detection accuracy, and significantly reduced human intervention (by 80%) in the 3D modeling process.
- Automated the entire workflow using a RESTful API backend and Unity frontend, enabling real-time layout reconstruction and interactive visualization.

Publications

*Denotes Equal Contribution

1. **SPARQ: Selective Progress-Aware Resource Querying**
   Anujith Muraleedharan*, **Anamika J H***
   Resource-Rational Robot Learning Workshop CoRL 2025 (Accepted)

2. **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]

3. **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]

Projects

Vision-Enabled and Natural Language Control for Mobile Robots   *January 2025*
Personal Project

- Developed a 3D perception ROS node integrating YOLOv8 and MiDaS for object detection and depth estimation, publishing temporally smoothed 3D poses using Kalman filters
- Implemented a voice-enabled GUI using Tkinter, integrating real-time speech recognition and text-to-speech output to enable natural-language interaction with the robot.

Interactive 3D Holographic Display   *June 2022*
Undergraduate Thesis

- Contributed to the development and optimization of a 3D holographic projection system using the Pepper's Ghost technique by investigating optimal reflective angles with Fresnel equations and modeled intensity attenuation due to acrylic sheet thickness using the Beer-Lambert Law.
- Developed a Unity application where interactive 3D objects are controlled using Leap Motion and OMNI Haptic, enabling interactions such as spawning, picking up, and coloring 3D objects.

Face Pose Estimation   *October 2021*
Associated with CASP Lab

- Designed and implemented a real-time face pose estimation system using Dlib for facial landmark detection and the Perspective-n-Point (PnP) algorithm for accurate head pose tracking.

Autonomous Racing: MPC vs. LQR   *December 2020*
Undergraduate Minor Project

- Designed and implemented a continuous-time LQR controller in PyBullet to optimize path tracking for an autonomous race car using state-space models and realistic vehicle dynamics.

Achievements

Division of Mechanical Sciences Research Symposium [Certificate]   *May 2024*
IISc Bangalore   *Bangalore, India*
Participated in the 3-minute Research Video Contest and got shortlisted among the top 5 out of 28 teams.

Technoxian World Robotics Championship   *July 2023*
AICRA   *Noida, India*
Participated in innovation contest in which around 150 teams participated.

National Engineering Olympiad [Certificate]   *March 2022*
NEO '22
Secured All India Rank 22 in Electronics and Telecommunication Engineering.

Programming skills

Languages	Python, C/C++, C#, HTML
Tools	MATLAB, Fusion 360, GIT, Unity, Motive
Frameworks	ROS, TensorFlow, PyTorch, PyBullet

Teaching & Mentoring

Workshop Coordinator	Led Arduino and sensor interfacing workshop for first-year ECE students.
Mentor, ROBOFEST-4.0	Guided a BTech team to 1st place in a national robotics competition.
Seminar Speaker	Presented on Light-Induced Valleytronics in Pristine Graphene.