

# Abivishaq Balasubramanian

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## Education

### Georgia Institute of Technology

Aug 2023 - May 2025

Master's in Robotics (GPA: 3.92/4.00)

### Vellore Institute of Technology, India

Jul 2017 - Jun 2021

B.Tech in Electronics and Communication Engineering (GPA: 3.65/4.00)

## Technical Skills

Areas of Expertise: Autonomous Navigation, Perception, Manipulation, System Design  
Programming Languages: Python, C++  
Software Tools: ROS, ROS 2, Gazebo, OpenCV, Pytorch, Git, Linux

## Relevant Experience

### Zebu Intelligent Systems

Hyderabad, India  
Feb 2022 - Jun 2023

#### Robotics Researcher

- Contributed to research and software development of robotic prototypes in a fast-paced startup environment.

#### Counter Drone System:

- Implemented guidance algorithms based on a research thesis to enable interception of adversarial drones.
- Achieved interception of a tangentially moving drone within 8 seconds from an initial distance of 50 meters.
- Added throw-to-launch functionality by modifying PX4-Autopilot, enabling drone launch via manual throw.

#### Heterogeneous Teaming of a Quadruped and Drone for Delivery:

- Deployed a gait controller for an in-house built quadruped, allowing it to reach speeds of 1.5 meters per second.
- Used U-Net segmentation to generate global costmaps for a ground robot using drone camera data.
- Accurately localized the quadruped using ArUco markers by integrating drone camera feeds and GPS data.

### Robotics Research Intern

Nov 2021 - Jan 2022

- Built an autonomous wheeled robot, initially prototyped in Gazebo, and subsequently deployed in the real world.
- Modified the ROS navigation stack for accurate localization from an overhead camera.

### Multimedia University

Cyberjaya, Malaysia  
May 2019 - Jun 2019

#### Research Intern

- Achieved 5% more accuracy than state-of-the-art in image emotion classification utilizing a lightweight neural network.
- Fine-tuned the multi-stream MobileNet-based network for one of the datasets and benchmarked its performance.

## Robotics and Computer Vision Projects

### Explanations for Proactive Household Robots

Spring 2025

- Developed a counterfactual-based explainer for an existing proactive assistance work.
- Integrated ChatGPT API to generate more human-centered explanations.

### Reward Regression from Varying Levels of Human Suboptimal Demonstrations

Spring 2024

- Existing reward regression methods rely on noisy backward extrapolation to outperform demonstrations.
- We generated varying suboptimal demonstrations via distraction tasks of different difficulty levels.
- Achieved improved reward correlation ( $R^2$ : 0.997) compared to previous work which had a value of ( $R^2$ : 0.942).

### Point Cloud Enhancement Using "Depth Anything" Model

Spring 2024

- Used relative depth from "Depth Anything" to enhance noisy depth images from RGB-D cameras.
- Improved point cloud reconstruction, which subsequently increased grasp success rate.

### Multi-Resolution Network for Vulnerable Road User Detection

Spring 2021

- Designed a multi-resolution YOLOv4-based detector for detecting pedestrians and cyclists.
- Reduced computation cost by 50% while maintaining the performance of a YOLOv4 network with 1024×1024 resolution.

### Vision-Based Source Seeking Microphone

Fall 2020

- Built a podium microphone that dynamically adapts to the speaker's movements.
- Implemented a visual servoing algorithm to maintain consistent distance from the speaker.
- Awarded a patent for this work.