Gautham Anil

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Summary

B.Tech Graduate(2026) in Automation & Robotics Engineering at Amrita Vishwa Vidyapeetham with hands-on experience in **ROS 2**, **Gazebo**, **Python**, and embedded systems. Completed internships at **ISRO–URSC** and two robotics firms, with work resulting in a **published IEEE conference paper (IEEE Xplore & Scopus)**. Designed and built **PAAMB**, a 7-joint bioinspired snake robot for pipeline surveillance, as a final year project — spanning mechanical assembly, multi-gait embedded firmware, and AI-based defect detection. Actively seeking roles in **robotics software engineering**, autonomous navigation, and **ROS 2 development**.

Education

B.Tech in Automation & Robotics Engineering 2022 – 2026
Amrita Vishwa Vidyapeetham, Amritapuri *CGPA: 7.32 / 10*

Higher Secondary (Class XII), Loyola School, Thiruvananthapuram *74%* 2022

High School (Class X), Loyola School, Thiruvananthapuram *74%* 2020

Publication

- **"Design and Implementation of the Platform for Testing a Differential Drive Robot Using ROS2"**
  IEEE International Conference on Robotics & Mechatronics (ICRM 2025), Amrita Vishwa Vidyapeetham, Nov 2025. **Published — IEEE Xplore & Scopus.**
  `ieeexplore.ieee.org/document/11349105`

Work Experience

U R Rao Satellite Centre (URSC), ISRO — *Summer Intern* Jul 2025 – Aug 2025
Department: Mission Planning & Operations | Focus: Autonomous Navigation in Industrial Environments

- Conducted literature review on autonomous robot navigation for **dark factory** environments; proposed and implemented a **multi-robot A* pathfinding simulator** in **Python + Pygame** with 8-directional movement, turn-penalty heuristics, and Euclidean distance optimisation.
- Extended with **BFS** and **Dijkstra** for comparative analysis; added **dynamic obstacle avoidance** with real-time replanning and **multi-agent coordination** via reservation tables; logged performance metrics (path length, turns, runtime) to **CSV** for mentor review.

Hut Labs — *Robotics Simulation Intern* Apr 2025 – May 2025
Focus: ROS 2 Simulation Platform Development

- Built an end-to-end **ROS 2 + Gazebo** simulation platform for a differential-drive robot with a **2-link manipulator** for pick-and-place; designed **three ramp test environments** in **Fusion 360** (STL/URDF pipeline) — results published as an **IEEE conference paper**.
- Created two custom **ROS 2 packages**: `gazebo_models` (URDF, STL meshes, YAML controller configs) and `custom_teleop` (Python velocity command node); configured controllers for differential drive and joint state broadcasting; integrated the **Boeing Gazebo Attachment Plugin** for runtime pick-and-place.

Evolve Robotics LLP — *Embedded Systems Intern* Jan 2025 – Feb 2025
Location: Kozhikode, Kerala | Focus: Embedded Systems & IoT Prototyping

- Developed embedded firmware for **Arduino UNO** and **PIC16F877A** microcontrollers; interfaced ultrasonic, IR, MPU6050 IMU, and Bluetooth sensors; performed hardware debugging and circuit simulation in **Proteus**.

Projects

PAAMB — Bioinspired Robotic Snake for Pipeline Surveillance *2025 – 2026*

- Assembled a 7-joint snake robot in **Autodesk Fusion 360**, integrating all mechanical components into a PETG FDM-printed assembly; validated structural integrity via **static stress analysis** in Fusion 360 Simulation (FoS above 2.6 across all components).
- Developed all embedded firmware — **serpenoid curve** locomotion (lateral undulation, sidewinding, concertina gaits) on **ESP32 + PCA9685**, gas/pressure sensor telemetry with **EMA filtering** and MOSFET safety cutoff, and MJPEG camera streaming on **ESP32-CAM**.
- Built a **Python Flask** control dashboard integrating all hardware nodes with live **FOMO TFLite** inference (**Edge Impulse**, YOLOv8, mAP@50 83%) for real-time pipeline defect detection.

Coco Robot — ROS 2 Full Robot Simulation *Apr – May 2025*

- Built a complete robot in **ROS 2 Humble + Gazebo Classic** with a **4-wheel differential drive base** and **3-DOF arm with gripper**; authored the full **URDF** from scratch using CAD-derived STL meshes; integrated **ros2_control** for arm joint control and Python teleoperation nodes with **QoS configuration**; resolved mesh URI, URDF encoding, and joint axis issues — bringing the simulation to a fully functional state. Basis of **published IEEE paper**.

TurtleBot3 Red Ball Tracker (ROS 2 + OpenCV) *Feb 2026*

- Built a **ROS 2 vision node** that detects a red ball using **OpenCV colour masking** and autonomously steers a TurtleBot3 toward it in Gazebo — a complete perception-to-motion pipeline.

LeRobot 6-DOF Robotic Arm — Teach & Replay Controller *Mar 2026*

- Built a **Python control system** for a 6-DOF 3D-printed robotic arm using Feetech ST3215 serial bus servos; implemented a **teach & replay system** using **3 concurrent threads** — reading joint positions at 50Hz, recording human demonstrations, and replaying them autonomously with thread-safe shared state.

Skills

Robotics & ROS	ROS 2 (Humble), Gazebo Classic, URDF, ros2_control, Nav2, OpenCV
Programming	Python, Embedded C (Arduino, PIC, ESP32), MATLAB
Embedded & Hardware	Arduino UNO, PIC16F877A, ESP32, PCA9685, Raspberry Pi, Serial Bus Servos
Algorithms	A*, Dijkstra, BFS, Path Smoothing, Multi-Robot Planning, Collision Avoidance
AI & ML	TFLite, Edge Impulse, YOLOv8, FOMO, LangGraph, LangChain, GPT-4o, FastAPI
CAD & Simulation	Fusion 360 (Assembly + Simulation), SolidWorks, Proteus, Pygame
Dev Tools	Python Threading, Git & GitHub, VS Code, Linux/Ubuntu
Languages	Malayalam (Native), English (Fluent), Hindi (Intermediate)

Certifications

Programming for Everybody (Getting Started with Python) — University of Michigan 2025
Machine Learning with Python — IBM Skills Network 2025

Leadership & Outreach

- **Workshop Lead & Team Leader**: Organised and led a team of **6 students** to deliver an **Arduino & Electronics Workshop** for 8th–10th grade students at Sree Narayana Public School — covered LED, radar, sensors, and alarm circuits; managed curriculum, task delegation, and distributed participation certificates.