

ADYANSH GUPTA

Robotics Engineer — Perception, Navigation & AI

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ABOUT ME

Robotics Engineer currently pursuing an M.Sc. in Robotic Systems Engineering at RWTH Aachen. Specialized in bridging Perception/Computer Vision with Navigation/SLAM for Autonomous Mobile Robots (AMRs). Proven track record in optimizing complex C++ perception pipelines using HPC techniques and designing multi-sensor fusion systems. Passionate about transforming theoretical AI models into robust, real-world hardware deployments. A fast learner, highly adaptable to new deep learning frameworks and novel robotic platforms.

EDUCATION

RWTH Aachen University

Robotic Systems Engineering (M.Sc.)

Oct 2025 – Present

Aachen, Germany

Vishwakarma Institute of Information Technology

Mechanical Engineering (BTech) - CGPA: 9.4/10 (German Grade Equivalent: 1.3)

Jan 2022 – June 2025

Pune, India

EXPERIENCE

Robotics Collective

Robotics Software Developer

May 2026 – Present

Aachen, Germany

- Developed an automated cable insertion pipeline using a robotic arm and RGB cameras for precise, vision-guided manipulation.
- Integrated teleoperation and speech-recognition on a Unitree R1 humanoid to enable real-time human-robot interaction for live demonstrations.

Addverb Technologies

Mobile Robotics Intern

April 2025 – August 2025

Noida, India

- Engineered a C++ fiducial marker system (WhyCode), utilizing HPC (AVX-512 SIMD) to slash CPU utilization from 180-190% to 10-15%.
- Optimized camera drivers utilizing shared memory to ensure a low-latency image data pipeline for perception systems.
- Integrated Lidar-Inertial Odometry (LIO) and IMU correction software, significantly improving robot positioning accuracy.
- Validated software on physical AMRs, ensuring robust sim-to-real deployment and reliable real-world performance.

Sakar Robotics

Robotics Intern

August 2024 – April 2025

Pune, India

- Engineered navigation and perception pipelines for industrial AMRs, improving dynamic obstacle avoidance.
- Deployed real-time object detection models utilizing Isaac ROS and GPU acceleration on NVIDIA Jetson edge devices.
- Integrated an Igus robotic arm with a mobile base, enabling complex mobile manipulation tasks.
- Architected core software framework for an all-terrain rover, ensuring high reliability in unpredictable environments.

Avignon University

Drone Systems Development Internship

June 2024 – July 2024

Avignon, France

- Built autonomous indoor navigation for Crazyflie drones using ROS2, Nav2, and SLAM Toolbox with precise MultiRanger/Flow localization.
- Deployed computer vision algorithms on Tello EDU drones for object tracking, face recognition, and ArUco-based inventory.
- Achieved a perfect 20/20 evaluation score, distinguishing the project's technical rigor among the entire internship cohort.

VIIT Robotics (College Club)

Vice President, Mechatronics Engineer

Aug 2022 – July 2024

Pune, India

- Directed a robotics engineering team, fostering collaboration and ensuring efficient, timeline-driven project execution.
- Designed, prototyped, and tested electro-mechanical robotics components.

PROJECTS

Go2 Autonomous Inspection (Unitree Go2) | ROS2, RTAB-Map, Nav2, MCP, YOLOE

- Engineered a **ROS2 stack** for a Unitree Go2 quadruped, enabling autonomous facility inspection driven entirely by natural language commands via an **MCP-to-Claude server bridge**.
- Implemented **LiDAR graph-SLAM (RTAB-Map)** and autonomous **frontier exploration**, paired with a watershed-based **zone segmentation** algorithm to dynamically map and label rooms.
- Built an **open-vocabulary vision pipeline** utilizing **YOLOE**, performing 360-degree scans with **depth-to-map 3D localization** to detect and log objects into structured per-zone reports.

Sepsis Atlas (Clinical AI Evidence Processing) | RAG, ChromaDB, Claude-3.5, Pydantic

- Developed a **local-first RAG intelligence platform** utilizing **ChromaDB** and **Claude-3.5-Sonnet** to convert unstructured medical PDFs into schema-validated clinical evidence databases.
- Engineered **layout-aware PDF extraction** with **VLM summary hooks** and **Pydantic schema-driven extraction** to parse complex tabular layouts.
- Built **clinical verification pipelines** that strictly trace quotes against local source segments to **prevent generative hallucinations** and ensure factual accuracy.

AI+Robotics Hackathon 2025 (RWTH Aachen) | Isaac Sim, MoveIt, NvBlox, FoundationPose

- Developed a **robust perception pipeline** enabling a robotic arm to perform targeted picking with **dynamic obstacle avoidance**.
- Generated **real-time 3D environment meshes** using **NvBlox** and leveraged **NVIDIA FoundationPose** for precise 6D object pose estimation.
- Interfaced with **MoveIt planning scene** for collision-free path generation, executing successful **sim-to-real transfer** from Isaac Sim to physical hardware.

OLIVE: Optimization of Lidar, Inertial, Vision & Encoders | WIP, ROS2, Sensor Fusion

- Developing a **graph-based multi-sensor fusion backend** for robust robot localization, integrating **IMU, LiDAR, Odometry, and Vision**.
- Implementing the **LiDAR odometry subsystem**, establishing a highly accurate **state estimation pipeline** in ROS2.

R2-ABU Robocon 2024 | ROS2 Humble, Micro-ROS, YOLO, SLAM, Nav2

- Developed a **4-wheel mecanum omnidirectional robot**, integrating hardware actuators and sensors via Micro-ROS.
- Implemented **YOLO-based object detection**, line following, and **autonomous alignment** using TF Luna.

AgroBot Development | ROS2, Micro-ROS, ESP32, Sensor Fusion, CV

- Built an **X-Drive agricultural robot**, developing hardware drivers for locomotion and odometry using **Micro-ROS** and **ESP32**.
- Implemented an **EKF sensor fusion stack** (IMU + encoders) and integrated **LiDAR for autonomous navigation**.
- Created a **computer vision pipeline** to successfully identify and execute **cotton plucking on physical plants**.

HACKATHONS & ACHIEVEMENTS

- **1st Place - Game AI Hackathon** (AI Club Aachen · Jun 2026) — Developed an autonomous pathfinding agent for the Hex game.
- **2nd Place - Bonding x Itestra Hackathon** (Itestra · May 2026) — Built autonomous bots for a multiplayer Snake variant requiring real-time pathfinding and resource management.
- **Best Technical Implementation - AI+Robotics Hackathon 2025** (RWTH Aachen · Nov 2025) — Awarded for executing a flawless sim-to-real robotic manipulation pipeline.

SKILLS

Robotics: Robot Operating System (ROS/ROS2), Micro-ROS, Perception, Computer Vision, Isaac ROS, Nav2, SLAM, MoveIt, Gazebo, Imitation Learning

Programming: C++, Python, HPC, CUDA, Bash, Git, Linux, Docker, CI/CD

Artificial Intelligence: Machine learning, Deep learning, Reinforcement Learning, Predictive modeling, VLA Models

CAD, CAM and CAE: Fusion 360, Catia, Solidworks, 3D Experience, Ansys (FEA and CFD)

PUBLICATIONS AND PATENTS

- **Publication:** Detection and Classification of Bleeding and Non-Bleeding Frames in Wireless Capsule Endoscopy
- **Patent:** Advanced 3D Printed Remote-Controlled All-Terrain Rocker-Bogie Robot
- **Patent:** An Omni Directional Mobile Robot

CERTIFICATIONS

- **IIT Madras, Intellipaat:** Advanced Certification in Data Science and AI
- **Udemy:** ROS2 MoveIt, Gazebo, Navigation and Advanced Concepts
- **Coursera:** Autodesk Fusion 360 CAD/CAM/CAE and Generative Design Specialization