KARTHIK KUMAR

Full Stack Developer · Embedded Systems · AI/Robotics

github.com/Maskedhelp2 | linkedin.com/in/karthik-kumar-7319b6332 | IEEE Student Member

EDUCATION

B.Tech in Artificial Intelligence 2024 – 2028

Amity University · 2024 – 2028

- Specialization in AI, Machine Learning, and Intelligent Systems.
- Active member of the IEEE Student Council at Amity University.

EXPERIENCE

Technology Intern 2024

Karvy InnoTech Ltd (KIT) · Hyderabad

- Worked on internal tooling and software systems within a fintech-adjacent technology environment.
- Gained hands-on exposure to production-grade codebases, client data pipelines, and agile workflows.
- Collaborated with senior engineers on debugging, feature implementation, and QA testing.

Research Intern 2025 – Present

Amity University · Research Division

- Conducting applied research at the intersection of robotics, embedded systems, and AI.
- Contributing to academic research initiatives in autonomous systems and intelligent hardware.
- Working under faculty supervision on experimental prototypes and data-driven models.

PROJECTS

Desk Helper — Programmable Macro Pad 2024 – 2025

github.com/Maskedhelp2/desk-helper · Team: Aahana Hajariwala, Rohan Alex Basil, Sparsh Tyagi

- Engineered a fully programmable RP2040-powered macro pad with dynamic key remapping, 5 onboard profiles, and a macro engine — all stored in EEPROM without reflashing.
- Built a cross-platform Tauri + React desktop configurator (Windows / Linux / macOS) for live keymap editing, OLED image uploads, and one-click UF2 firmware flashing.
- Implemented a custom Raw HID communication protocol over USB between QMK firmware and the Rust/HIDAPI backend.
- Stack: QMK Firmware · Rust · Tauri 2 · React · TypeScript · Zustand · RP2040

Autonomous SLAM Navigation System — 2D/3D LiDAR Fusion 2025

Robotics Research Project

- Designed and implemented a real-time SLAM (Simultaneous Localization and Mapping) pipeline using 2D LiDAR sensors, enabling a mobile robot to autonomously map and navigate unknown environments.
- Extended the system with a custom-fabricated 3D LiDAR module — achieved full volumetric point-cloud generation by mechanically rotating a 2D sensor and fusing scan data across axes.
- Integrated ROS2, pose-graph optimization, and sensor-fusion algorithms to achieve sub-centimetre mapping accuracy in dynamic indoor environments.
- Stack: ROS2 · Python · C++ · Point Cloud Library (PCL) · SLAM Toolbox · RPLiDAR

ARIA — AI-Powered Autonomous Waste Segregation Robot 2025

Robotics & AI Project

- Developed an end-to-end autonomous waste segregation system combining a 6-DOF robotic manipulator with a real-time computer vision pipeline for multi-class waste classification.
- Trained a custom object detection model (YOLO-based) to identify and classify waste categories (plastic, metal, organic, paper) with >90% accuracy under varied lighting conditions.

• Implemented inverse kinematics for precise pick-and-place operations, enabling the robotic arm to grip irregularly shaped objects and deposit them into the correct segregation bin.
• Stack: Python · PyTorch · OpenCV · ROS2 · Arduino · Servo Control · Custom Gripper Design

TECHNICAL SKILLS

Languages: JavaScript / TypeScript, Python, Rust, C/C++, SQL
Frontend: React, Next.js, Tailwind CSS, HTML/CSS
Backend: Node.js, Express, FastAPI, REST APIs
Embedded: RP2040, QMK Firmware, Raw HID, EEPROM, Arduino
Robotics: ROS2, SLAM, LiDAR, PCL, OpenCV, PyTorch (YOLO)
DevOps: Docker, AWS, Git, CI/CD, Linux
Tools: Tauri, Figma, PostgreSQL, MongoDB, Prisma

ORGANISATIONS & ACTIVITIES

• **IEEE Student Council** — Amity University Chapter, active member contributing to tech events, workshops, and engineering community initiatives.