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KARTHIK KUMAR

Full Stack Developer · Embedded Systems · AI & Robotics

✉ karthik31012007@gmail.com

☎ +91 95999 74690

📍 Noida, India

📄 github.com/Maskedhelp2

🌐 linkedin.com/in/karthik-kumar-7319b6332

EDUCATION

B.Tech — Artificial Intelligence

Amity University, Noida

2024 – 2028

Specialisation: AI, ML, Intelligent Systems

IEEE Student Council — Active Member

LANGUAGES

JavaScript / TypeScript

Python

Rust

C / C++

SQL

FRONTEND

React

Next.js

Tailwind CSS

HTML / CSS

BACKEND

Node.js

Express

FastAPI

REST APIs

PostgreSQL

MongoDB

EMBEDDED & ROBOTICS

ROS2

RP2040

Arduino

QMK Firmware

SLAM

LiDAR / PCL

PROFESSIONAL EXPERIENCE

Research Intern

2026 — Present

Ameya Sonic Opteo Systems

India (On-Site)

- Contributing to R&D in advanced systems engineering within a specialised engineering environment.
- Working on applied technical projects spanning embedded hardware and intelligent systems.

Intern

2025 — 2026

IndCasting.com

India (Remote)

- Gained hands-on exposure to industrial workflows on a casting and manufacturing platform.
- Contributed to technical development and tooling work across the platform.

Technology Intern

Dec 2025 — Apr 2026

Karvy InnoTech Ltd (KIT)

Hyderabad (Hybrid)

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

Research Intern

2024 — Present

Amity University — Research Division

Noida, India

- Conducting applied research at the intersection of robotics, embedded systems, and AI.
- Contributing to autonomous systems initiatives and experimental prototype development under faculty supervision.

KEY PROJECTS

Desk Helper — Programmable Macro Pad

2024 – 2025

Stack: QMK Firmware · Rust · Tauri 2 · React · TypeScript · RP2040

- Engineered a fully programmable RP2040 macro pad with 5 onboard profiles and EEPROM storage — no reflashing needed.
- Built a cross-platform Tauri + React desktop configurator with live keymap editing and UF2 firmware flashing.
- Implemented a custom Raw HID protocol over USB between QMK firmware and Rust/HIDAPI backend.

Autonomous SLAM Navigation System

2025

Stack: ROS2 · Python · C++ · Point Cloud Library · SLAM Toolbox · RPLiDAR

- Designed a real-time SLAM pipeline using 2D LiDAR enabling autonomous mapping in unknown environments.
- Extended with a custom 3D LiDAR module achieving full volumetric point-cloud via mechanical rotation and sensor fusion.
- Achieved sub-centimetre mapping accuracy using pose-graph optimisation in dynamic indoor environments.

ARIA — AI-Powered Autonomous Waste Segregation Robot

2025

Stack: Python · PyTorch · OpenCV · ROS2 · Arduino · Custom Gripper

- Developed end-to-end autonomous waste segregation combining a 6-DOF manipulator with real-time CV pipeline.
- Trained a YOLO-based model achieving >90% classification accuracy across 4 waste categories under varied lighting.
- Implemented inverse kinematics for precise pick-and-place of irregularly shaped objects.