

# Akhil Joseph

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## Summary

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Results-oriented Embedded Systems Engineer with over 8 years of experience in developing innovative hardware and software solutions. Skilled in designing IoT-enabled products, home automation systems, and energy-efficient solutions. Proven expertise in leading cross-functional teams, managing complex projects, and delivering high-quality outcomes. Adept at integrating advanced microcontrollers, sensors, and communication protocols (MQTT, RS485, I2C) into robust embedded systems. Passionate about leveraging technology to solve real-world problems and committed to driving excellence in every project.

## Skills

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- **Microcontrollers:** MSP430, XMEGA, PIC, STM32, ESP32, Raspberry pi
- **Embedded Platforms:** FreeRTOS, Quectel OpenCPU
- **Programming Languages:** C, C++, Python
- **Hardware Communication Protocols:** I2C, SPI, UART, RS485
- **Industrial Electronics:** PLC Programming (Delta), HMI (Delta), VFD (Delta)

PCB Design

- **Tools:** Proteus, FAB3000, Autodesk Inventor (3D design Basics) for enclosure design
- **Specialization:** Circuit design, debugging, EMC/EMI compliance, environmental tests

IoT and Automation

- **Protocols:** MQTT, Hikvision ISAPI
- **IoT Systems:** Home automation, smart devices, and sensor integration

Databases and Backend

- **Databases:** Firebase, PostgreSQL
- **Backend Development:** Django, REST API
- **Servers:** NGINX, AWS EC2, Mosquitto MQTT

Development Tools and Frameworks

- **Software Tools:** JIRA, Jenkins
- **Design Tools:** Autodesk Inventor, Adobe Photoshop (Basics)

## Soft Skills

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- Leadership in cross-functional engineering teams
- Strategic planning and technical decision-making
- Mentorship and knowledge sharing
- Strong analytical and troubleshooting skills

## Experience

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**Acex Industries Pvt. Ltd. (Collaborating with Baba Atomic Research Centre) | BARC Mumbai**

**Lead Engineer – Radiation Monitoring Project | 08/2024**

- Led the development of a radiation monitoring system, achieving 96% accuracy in gamma radiation detection.
- Engineered a PLC-controlled furnace specifically for crystal development, achieving a significant 20% reduction in production time while ensuring consistent quality and precision throughout the manufacturing process.
- Mentored a team member in building a PyQt-based GUI for real-time data visualization, increasing usability by 30%.

**Drum Lifter (Hyderabad Nuclear Fuel Complex, Department of Atomic Energy)**

- Developed an electrical control panel for a drum lifter machine used in the Zirconium Plant, capable of lifting and tilting drums up to 500kg.
- Created control system wiring with relay logic, overload protection, and trip indication to ensure safe and efficient operations.

- Supervised and guided workers during the setup, operation, and testing of the drum lifter machine.
- Hydraulic systems for lifting and a 3-phase motor with a gearbox for tilting movements.

### **Triaxia Infotech Pvt Ltd**

<https://www.triaxia.in>

**Head of Engineering** – [Triaxia Infotech Pvt Ltd](#) (2022 – Present)

- Directed hardware and software teams, delivering integrated solutions for Embedded and software projects.
- Optimized database structures, reducing query response times by 20%, and deployed CI/CD pipelines using Jenkins, cutting deployment time by 50%.
- Successfully led the completion of Kerala's first musical stairs for Kochi Metro, generating a 40% increase in public engagement.
- Ensured 99.9% server uptime by implementing robust code reviews and monitoring mechanisms.

**Project Associate** – [Triaxia Infotech Pvt Ltd](#) (2021 – 2022)

- Hardware and backend development for 5+ key projects, including IoT-enabled home automation systems.
- Developed APIs for a gated community shopping platform, boosting operational efficiency by 40%.

**Technical Consultant** - [Triaxia Infotech Pvt Ltd](#) (2020 – 2021)

- Hardware discussions for home automation and advertising platforms, resulting in a 20% cost reduction in design.
- Architected robust database solutions and APIs for Adlanzer, achieving seamless processing capabilities to support over 1,000 concurrent users while enhancing system reliability during peak traffic periods.

### **Technorip Innovations Pvt Ltd**

<https://technorip.com>

**Lead Embedded Engineer** (2018 – 2019)

- Led the development of a low-power GSM/GPRS tracking solution for high-value asset management using Quectel OpenCPU, achieving 30-day battery backup and completing a successful pilot run.
- Architected and fabricated robust PCBs for tracking devices and fingerprint-based HR management systems, meticulously aligned with Design for Manufacturing (DFM) principles to ensure efficiency and reliability.
- Developed I2C and UART drivers for SSD1306 OLED and fingerprint sensors (GT511C3, R305) to enhance usability.
- Implemented TCP socket communication on Quectel OpenCPU (Nucleus RTOS) for seamless data transfer in HR systems.

### **INSPIREIN Technologies**

**Support Embedded Engineer (Part-Time)**

- AIS140 GPS-GPRS tracker development using PIC16F, M95 GSM modem, and Quectel L86 GPS module.
- Crafted features like ignition detection for real-time vehicle monitoring and SOS functionality for emergency alerts.
- Ensured seamless integration of the tracker through cross-functional collaboration.

### **Technorip Innovations Pvt Ltd**

<https://technorip.com>

- **Embedded Engineer** (2015 – 2017) Developed firmware for Quectel M66 modules as part of tracking devices research and development.
- Design and optimization of embedded systems for various tracking applications.

**Intern (Part-Time)** (2014 – 2015)

- Gained hands-on experience in embedded programming, C, Python, and PCB design.
- Participated in various hackathons, enhancing problem-solving and team collaboration skills.
- Joined Technorip Innovations as a part-time intern in my second year of BTech, transitioning to a full-time Embedded Engineer role upon graduation in 2016.

## **Education**

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### **FABLAB, Kochi**

**Diploma in Digital Fabrication | 12/2019**

- Gained expertise in advanced digital fabrication methodologies through the Fab Academy, aligned with MIT's "How To Make (Almost) Anything" course.
- Covered topics like CAD, CNC machining, electronics production, 3D printing, and embedded programming.
- Completed a final project, "Flute Playing Machine," showcasing practical application of skills.

- Certified by the Fab Foundation in digital fabrication technologies.

## B-tech Electronics & Communication

- **Mini Project:** Smart Gas Stove
- **Main Project:** 3D Printer

## Projects

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- **Nautilus Gear Art:** Engineered a motor-operated Nautilus gear system, triggered by a hand crank for activation. Constructed using multi-wood and precision-fabricated through water jet cutting at FABLAB Kochi, the design enables smooth and efficient multiple rotations.
- **Music Visualiser Art Wall :** WS2811-based music art wall with 960 Pixel LEDs on a 6x6 ft board. Customizable colors via mobile app.
- **OT Scrub Sink:** Crafted a custom PCB circuit for a scrub sink that improved user interaction with a foot pedal system, enhancing the overall surgical experience and leading to positive feedback from 50+ medical staff.
- **Pipe Bending Machine:** Custom pipe bending machine for Plantme Agro using Delta PLC, VFD, and HMI, capable of bending pipes at any angle.
- **Home Lift:** Delta PLC program for home lifts, integrating obstacle sensing to prevent collisions.
- **Musical Staircase:** Kerala's first musical staircase for Kochi Metro with custom music notes, Raspberry Pi as the controller.
- **Custom Treadmill:** Provided technical consultation, development for a custom medical treadmill at Karunya Physiotherapy Clinic for stroke patients.
- **Handcuff Tracking:** GSM/BLE/GPS-based tracker for Kerala Police, ensuring live location updates when out of range.
- **Water Pump Control:** GSM IVR/DTMF-based 3-phase water pump controller for Yescollages Infotech.
- **Asset Tracking :** Cellular-based asset tracker for Pikkol with 30-day battery backup and low power consumption.
- **Industrial Grade 3D Printer:** Marlin framework and Arduino Mega.
- **Electronic Voting Machine :** Custom voting machine for SNMIMT elections, utilizing microcontrollers and EPROM for secure data storage.
- **Hikvision ISAPI Smart Light :** Camera motion events based smart lighting using Hikvision ISAPI and HomeAssistant via MQTT
- **Water Level Controller :** With dry-run protection and solar-based motor switching. (BLDC/Induction)
- **Touch Switch with WiFi :** TTP223-based touch switch with WiFi, blended with Alexa and Google Home via MQTT, Apple Home Homeassistant.
- **Gate Automation :** Roller gate automation with a 24V DC motor, PWM controller, and integrated to Hikvision app.
- **Sine-Wave Smart Inverter :** Sine-wave inverter with a custom acrylic cover and K-Board, enabling grid-solar auto switching.

## Mentorship & Public Speaking

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- **Mentor** – TinyMI IOT *Hackathon Thinker space Kochi (2024, 2 days)*
- **Mentor** – *Tink-Her Hack Hackathon*, Christ College (2024, 2 days)
- **Speaker** – *Entrepreneurial Talk & Student Dashboard Launch*, S.N.M.I.T (2023, 1 day)
- **Mentor** – *Agri Tech Hackathon*, CPCRI (2022, 2 days)
- **Speaker** – *Pi Jam*, Raspberry Pi, Kochi (2019, 1 day) – Cellular IoT
- **Speaker** – *Arduino Day*, FSDC, FISAT College (2019, 1 day) – IoT & MQTT Protocol
- **Speaker** – *CISCO Thingbator*, Cellular IoT & GSM Firmware Development (2019, 1 day)
- **Mentor** – *Hackathon*, CISCO Thingbator, Amrita Vishwa Vidyapeetham (2019, 3 days)