

NIKHIL NAIR

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Summary

Software engineer with hands-on experience building edge CV pipelines, robotics perception systems, and hardware-software integrations. Currently leading R&D at Super FabLab Kerala (MIT & KSUM), with a published patent, 4 research publications, and a B.Tech in Computer Science & Engineering. Open to embedded, SDE, or AI/ML engineering roles.

Experience

- Super FabLab Kerala – MIT & KSUM** **Nov 2025 – Present**
Software Development Engineer - Technology Fellow *Kochi, India*
 - Reduced CNC flatbed costs and cut overall fabrication time, achieved by eliminating the need for expensive onboard cameras, by developing a lightweight **JavaScript** and **ArUco marker** vision pipeline that translates multicolor sketches into machine commands via smartphone cameras.
 - Cut manual setup overhead by **80%** by implementing a **computer vision pipeline** for automated bed calibration; achieved **0.2mm alignment precision** via real-time object localization on an embedded platform.
 - Reduced unit cost to **INR 2,000** (vs.~ INR 40,000 industrial alternatives) – a **95% cost reduction**, saving **INR 10L+** at scale, by engineering a custom **ESP32 Web-Plotter** with client-side G-code parsing (**60% MCU load reduction**).
- U&I Trust** **Aug 2024 – Apr 2025**
Volunteer Tutor *Mumbai, India*
 - Led academic sessions for underprivileged students; supported a INR 2.13 crore education fundraiser through outreach.
- TATA Elxsi** **Oct 2023 – Dec 2023**
AI and Robotics Intern (Transport Business Unit) *Chennai, India*
 - Improved obstacle detection by fusing 3D LiDAR with 2D vision using **Python**, extending range in tough conditions.
 - Optimized KITTI dataset preprocessing by ~30% using **ROS2** and **OpenCV**, enhancing the perception pipeline.

Education

- Vellore Institute of Technology - Chennai** **Sept 2021 - Sept 2025**
B.Tech in Computer Science and Engineering *CGPA: 8.21/10*
 - Relevant Coursework:** Data Structures and Algorithms, Operating Systems, Computer Networks, Software Development Lifecycle, Socket Programming, Artificial Intelligence, Core Java, Control Systems, UI/UX, LLMs.

Projects

- Urumi V2 — Camera-Assisted 4 Axis CNC Cutter** **MIT Collaboration | Jan 2026 – Present**
 - Leading camera module integration and sensor fusion on an MIT-collaboration CNC project; architecting a **lightweight modular UI** and communication protocols.
 - Developing algorithms for **camera calibration** and automated material alignment; presented project architecture and vision-guided cutting capabilities at **MIT FAB26**.
- NAS-Optimized Deep Learning Model for Concrete Strength Prediction** **Thesis | 2025**
 - Engineered a **Neural Architecture Search**-optimized model in **Python** & **Keras** for concrete strength prediction; improved accuracy by ~10% ($R^2 > 0.90$). Supported design of stronger, cost-effective, and sustainable mixes.

Technical Skills

Languages: Java, Python, C, SQL, PHP, HTML/CSS, JavaScript, React.js, Node.js
Frameworks/Tech: Spring Boot, Docker, Flask, DOM manipulation, TensorFlow, REST API, OpenCV, ROS2, Jenkins
Tools/Platforms: Git, GitHub, Google Cloud Platform, Arduino, Overleaf, Figma, CI/CD, Jenkins, Gemini, Claude
Soft Skills: Communication, Team Collaboration, Problem Solving, Presentation, Analytical Thinking, Creativity

Patent & Publication

- A System to Recognize Number Plate and Allow Entry of a Vehicle** **2024**
Patent Application Number: 202441051527 *Published*
- Comprehensive Review of Blockchain-Oriented Methods in Agricultural SCM** **2026**
Harvesting Data: Blockchain, AI and Advanced Innovations in Agriculture *Accepted*
- Inverter-Integrated ECC w/ Torsion Points as Black Box Alternatives in Aircraft Security** **2025**
Soft Computing Applications in Modern Power and Energy Systems *Accepted*

Certifications & Achievements

Certifications: Quantum Computing (Udemy, 2025) – covered **Python**, **Q#**, **Qiskit**; ML Specialization (Coursera, 2023); **Google Cloud** Career Practitioner & Foundation Programs (2023–24).
Achievements: **Top 25/548** in VITISH (SIH) Hackathon 2024; invited to pitch at VNEST incubator. Awarded **PMSS Scholarship** for academic excellence & leadership; **Open source contributor** - merged PRs in projects with **1K+ stars**.