Nikhil Kottoli

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Education

National Institute of Technology, Karnataka **8.65 CGPA**
Bachelor of Technology in Computer Science *Aug. 2023 – present*

Experience

Microsoft **May 2026 – Jul 2026**
SDE Intern, MAI – Extensions Security | C#, .NET, Azure, MCP

- Designed and deployed a cloud-scale malware-hunting platform, cutting scan time for a **30K+ extension** catalog from 6 hours to 2–5 minutes
- Architected shard-based distributed execution with consistent-hash affinity routing and node-local SSD caching, achieving 90% efficiency across elastic worker pools
- Built MCP-powered tooling to enable **agentic workflows** for security researchers

IRIS, NITK **October 2024 – Present**
Head Of Maintenance

- IRIS is the official student-led ERP system of NITK, with **23K+ active** users.
- Oversee code quality and system upkeep by reviewing developer contributions, managing upgrades (Ruby, Rails, gems), and ensuring the platform remains stable and up to date
- Built an in-house staging platform for on-demand deployments from Git repositories, with automated subdomain routing, async deployments, real-time logs, environment configuration, and interactive container access.

Open Source

ns-3 | *C++*| **September 2025 – February 2026**

- Implemented **RACK-TLP (RFC 8985)** loss detection in ns-3's TCP stack, replacing legacy DUP-ACK/RTO heuristics with time-based inference from transmit timestamps and SACKs.
- Added the Tail Loss Probe mechanism to avoid retransmission timeouts on stalled transfers, with accompanying unit tests and examples validating recovery under loss and reordering.

FreeBSD | *C, TCP/IP* | **April 2026**

- Updated FreeBSD's Proportional Rate Reduction implementation to match **RFC 9937**'s SafeACK heuristic, adaptively switching between the conservative PRR-CRB and more aggressive PRR-SSRB reduction bounds.
- Corrected the RecoverFS calculation to properly account for data already SACKed before entering fast recovery, validated with a custom packetdrill test.

Projects

Lawveo.ai | *Python, LangGraph, Django, Celery,Redis, Qdrant* | **October 2024 – April 2025**

- Engineered a production-grade FastAPI backend with **WebSockets** and Redis Pub/Sub for real-time AI-agent legal research and consultations.
- Streamed **LangGraph/LangChain** agent responses through Nginx with auth validation, backed by Celery translation flows and AsyncPG connection pooling

PrivateRAG | *TypeScript, Next.js, Web3* | **Jan 2026 – Mar 2026**

- Implemented PageIndex **(Vectify AI's vectorless RAG research paper)** in TypeScript, replacing vector embeddings with hierarchical document reasoning.
- Built a client-side encryption layer (AES-256-GCM, wallet-derived keys) so the backend never accesses raw documents or decryption keys.
- Integrated NEAR AI Trusted Execution Environments and Encrypted IPFS for confidential, on-chain verifiable document storage.

Technical Skills

Languages: Ruby, Python, C/C++, SQL, JavaScript, HTML/CSS
Frameworks: Ruby On Rails, React, Node.js, Django,LangChain/Langchain
Databases: MariaDB, Redis, Qdrant
Developer Tools: Git, Docker, Packetdrill, Postman

Achievements

- **ETHGlobal Mumbai – Finalist (Top 8 of 622 projects) -** Built **RupeeRail** , selected as a finalist among **1,402 hackers** and **622 projects** at ETHGlobal Mumbai (Nov 2026), a 36-hour hackathon.
- CodeChef: Achieved a peak rating of **1720**, earning a **3-star** rank.