

# Abhay Soni

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## Profile

Full-stack software engineer who ships production systems and publishes novel research — from leading a **5-engineer team** on a Government of India / Ministry of Finance marketplace to designing a **post-quantum signature scheme** commended by DRDO. Backed by **7+ Scopus-indexed papers**, seeking a **Software Engineer** role to architect secure, high-scale systems end-to-end.

## Technical & Soft Skills

**Languages:** JavaScript, C, Python

**Frontend:** React.js, HTML5, CSS3, Bootstrap, shadcn/ui, Vite

**Backend:** Node.js, Express.js, FastAPI, REST APIs, WebSockets, JWT Auth

**Databases:** PostgreSQL, MongoDB, SQL

**Cloud & DevOps:** GitHub, Vercel, Render, Docker

**Data, AI & Automation:** Machine Learning, Data Science, Data Analytics, OpenAI API, Prompt Engineering, n8n, Reporting & Dashboards

**Cryptography:** Multivariate & Post-Quantum Cryptography (UOV, Rainbow, HFE), Digital Signatures, AES-256-GCM, Ed25519, HKDF

**Leadership & Soft Skills:** Team Leadership, Cross-functional Coordination, Ownership, Mentoring, Communication

## Work Experience

### BellCorp Studio

Kanpur, India (Remote)

*Associate Software Engineer Intern*

*Apr 2026 – Present*

- Led **5 engineers** across frontend and backend to ship the **Admin Console** for a **Government of India / Ministry of Finance** B2B marketplace to production in **under one month**.
- Engineered **zero-trust auth (RBAC + JWT refresh-rotation)** and **3 KYC pipelines** (GSTIN, PAN, bank) in **React.js**, securing vendor access across the platform.
- Automated vendor onboarding via a **state-machine approval pipeline** with bulk approve/reject and an **O(1)** lazy-loaded category tree, eliminating manual review through server-side search in **Express.js**.
- Optimized the real-time **Community feed** by virtualizing infinite scroll (**TanStack Virtual**) and reference-counting shared **Pusher** channels, holding the DOM **flat and constant-size** to eliminate re-renders and resubscribe storms.

### Centre for Artificial Intelligence and Robotics (CAIR) / DRDO

Bangalore, India

*Research Intern – CMSS-PPR Post-Quantum Signature Scheme*

*Oct 2025 – Apr 2026*

- Designed **CMSS-PPR**, a novel **post-quantum signature scheme** whose **Non-Affine Ring-Permutation Layers (NARPL)** eliminate **MinRank** and **Gröbner-basis** attacks — earning a **Scopus-indexed** journal submission commended by DRDO scientists.
- Implemented the scheme end-to-end in **Python** (keygen, signing, verification across **all five NIST levels**) and integrated it into a **Node.js/Express** API, cutting handshake latency **~30%** vs conventional TLS under load.
- Proved **UF-CMA security** reduces to **MQ hardness**, with NARPL composition raising regularity degree beyond **Rainbow**, **UOV**, and **HFE**.

## Projects

### CodeSyncAI – Real-time Collaborative IDE

*React.js, Redux, Node.js, Express.js, MongoDB (Mongoose), WebSockets, REST APIs, Vercel*

[Live Demo](#)

- Architected a **WebSocket** sync layer over MongoDB/Mongoose enabling conflict-free collaboration for **10+ concurrent users** with **zero data-loss** under stress tests.
- Cut cold-start load time via **lazy-loaded** React.js modules and Redux-managed state, lifting the **Lighthouse score 35%**.
- Built an in-browser code runner on **Node.js child processes** over Express.js REST endpoints, hitting **sub-500ms** round-trip latency.

### PHANTOM – Hybrid File-Encryption Protocol

*Python, FastAPI, AES-256-GCM, X25519, Ed25519, Kyber-768, SHA-3-256, HKDF, pytest*

[GitHub](#)

- Designed a novel **Prime Biography Commitment** binding RNG entropy quality into **HKDF-SHA256** key derivation via a **SHA-3-256** attestation — making **Dual\_EC\_DRBG**-class backdoors self-detectable as decryption failures, a property absent in **GPG**, **age**, and **Signal**.
- Built a hybrid protocol over an 11-endpoint **FastAPI** backend — ephemeral **X25519 ECDH** (per-file forward secrecy), **AES-256-GCM**, **Ed25519** signatures, and an optional **Kyber-768** PQC layer.
- Validated forgery, nonce-reuse, replay, and tamper resistance across a **207-test suite at 92% coverage**, backed by a 5-layer **Baillie-PSW** primality stack (Miller-Rabin + Strong Lucas).

### AI Business Automation System – Local SME Platform

*Node.js, Express.js, OpenAI API, n8n, Telegram Bot API, Google Sheets API*

[Demo](#)

- Built a dual **Telegram bot** system (customer + vendor) on **n8n** workflows and a Node.js/Express.js backend, cutting response time **60% across 25+ shops**.
- Drove **70% autonomous query resolution (3+ staff hours saved/day)** via **GPT-4** intent detection, Hinglish sentiment analysis, and real-time **Google Sheets** inventory sync.

## Education

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Allenhouse Institute of Technology</b><br><i>B.Tech, Computer Science Engineering (Final Year; working full-time with institute NOC) – CGPA 8.2/10</i> | Kanpur, India<br>2023 – 2027 |
| <b>NxtWave Disruptive Technologies</b><br><i>Industry-Ready Certification in Full-Stack Development</i>                                                   | India<br>Dec 2023 – Ongoing  |

## Achievements & Leadership

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- **Smart India Hackathon 2024 Finalist**; participated in **5+ hackathons** across AI/ML and full-stack tracks.
- Authored **7+ Scopus-indexed papers** (1 first author) in **IEEE & Springer**; presented at **international AI/ML conferences**.
- **President, Logic League** — organized **ICMLCS 2025 & 2026** (DRDO scientists, IIT faculty) and hackathons with **200+ participants**.