

Ashish Goyal

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PROFESSIONAL SUMMARY

Final-year CS student with hands-on experience building and deploying full-stack web applications. Projects include real-time collaboration using CRDTs, AI-based face verification, and a custom debt settlement algorithm. Comfortable owning features from idea to deployment.

EDUCATION

Rajiv Gandhi Institute of Petroleum Technology
Bachelor of Technology in Computer Science (Final Year)

Jais, UP
2022 – 2026

PROJECT EXPERIENCE

SyncCode – Real-Time Collaborative IDE | *React, Node.js, Yjs CRDT, Socket.io*  Live |  GitHub

- Architected a **dual-channel WebSocket system**, separating binary CRDT sync (Yjs) from JSON room events (Socket.io) to optimize for different message patterns.
- Implemented **conflict-free real-time collaboration** using Yjs CRDTs (same technology as Figma/VS Code Live Share), enabling concurrent edits without data loss.
- Validated system performance via load-testing scripts simulating **50+ concurrent users**, achieving **~22ms round-trip latency** with 100% sync success rate.
- Mitigated RCE vulnerabilities by **delegating untrusted code to Piston API** (sandboxed containers), supporting 8 languages while eliminating execution risks on the application server.

Sentinel – AI-Powered Exam Platform | *React, Node.js, PostgreSQL, Prisma, face-api.js*  Live |  GitHub

- Built an **AI-proctored exam platform** with **14+ anti-cheating measures** including real-time face verification using face-api.js (128-dimensional embeddings, sub-0.6 Euclidean distance threshold).
- Designed PostgreSQL schema with **Prisma ORM** and **6 strategic indexes**; wrote raw SQL analytics dashboards with risk-level classification for suspicious student detection.
- Implemented **Google OAuth 2.0** with Role-Based Access Control (RBAC) for teachers vs students, and tiered rate limiting with secure password reset flows.
- Integrated client-side proctoring signals (tab switches, fullscreen exits, face detection events) into backend workflows for **reliable storage and auditability**.

SplitBill – Expense Settlement Platform | *MERN Stack, Socket.io, Chart.js*  Live |  GitHub

- Developed a **hybrid O(N log N) debt simplification algorithm** combining hash-based exact matching with sorted two-pointer greedy, reducing settlement transactions by **40-60%** compared to naive approaches.
- Designed **25+ RESTful APIs** with JWT dual-token authentication (access + refresh with rotation) and **ACID transactions** ensuring financial data integrity.
- Implemented **real-time expense sync via Socket.io** with room-based broadcasting, and MongoDB aggregation pipelines powering analytics dashboards.
- Built a **PWA-enabled React frontend** with 50+ components, Chart.js visualizations, dark/light theming, and **Gzip compression** reducing API response sizes by **~70%**.

TECHNICAL SKILLS

Languages: JavaScript (ES6+), SQL, C++, Python (familiar)

Backend: Node.js, Express.js, REST API Design, WebSocket, Socket.io, Prisma ORM, Mongoose

Frontend: React.js, Context API, Tailwind CSS, Material-UI

Databases: PostgreSQL, MongoDB, MySQL

Tools & Infra: Git, GitHub, Docker (basics), Postman, Render, Vercel, Linux (basics)

Concepts: System Design, Real-Time Collaboration, CRDT, API Security, Database Indexing, ACID Transactions

ACHIEVEMENTS

Solved **250+ Data Structures and Algorithms problems** across competitive programming platforms.

JEE Advanced 2022 – Rank 14,954 (Top 1 percentile out of 1.5M+ candidates).