

HARSHAL KOTKAR

Software Engineer | B.E. Information Technology | Pune, India

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Summary

Full-stack Software Engineer with proven experience architecting backend systems, real-time applications, and databases from the ground up. Built the complete backend and dashboard for a time-series IoT monitoring system at IIT Bombay's E-Yantra, and independently shipped two production-grade full-stack products using CRDT-based real-time collaboration and scalable e-learning infrastructure. Strong problem-solving foundation with a 1800+ LeetCode rating and 500+ problems solved.

Technical Skills

Languages: C++, JavaScript (ES6+, event loop, closures, async/await), Python, Java

Frontend: React.js (functional components, hooks, state management), React Native, Tailwind CSS, HTML, CSS

Backend: Node.js, Express.js, REST API Design, Microservices, WebSockets, Socket.IO, Event-Driven Architecture, Message Queues (BullMQ, Redis Pub/Sub)

AI & Search: LangChain, LangGraph, RAG Pipelines, VectorStore (Embeddings), ReAct Agents, LLM APIs, LangSmith, Semantic Search

Databases: PostgreSQL, MongoDB, MySQL, TimescaleDB, Redis – schema design, indexing, query optimization

DevOps & Tooling: Docker, Git, GitHub, CI/CD (GitHub Actions), Azure Pipelines, Postman

Auth & Security: JWT, OAuth 2.0, RBAC, bcrypt, Token Refresh, Secure API Design

Professional Experience

Software Development Engineer Intern – Full-Stack

May 2025 – July 2025

E-Yantra, IIT Bombay

- Built the entire backend – a Node.js/Express.js REST API on a PostgreSQL + TimescaleDB time-series layer with composite indexing and hypertable partitioning – giving the team continuous, queryable visibility into live sensor data at 500+ readings/hour.
- Developed an interactive frontend UI with real-time data visualizations, translating raw sensor readings into live charts and dashboards that made system health readable at a glance.
- Integrated a Socket.IO WebSocket layer in the backend for continuous live data streaming (50+ concurrent connections, sub-second delivery), paired with a simple threshold-based alert system that flagged anomalies automatically.

Key Projects

Collaborative Code Editor | [Link](#)

- Implemented conflict-free real-time editing using **Yjs CRDT** over Socket.IO, tested with 5 concurrent editors, avoiding the overwritten edits that plain last-write-wins syncing would cause.
- Configured Redis-backed room state with 2-hour TTL auto-expiry so inactive sessions released resources automatically; designed a compound-indexed MongoDB schema for users, files, and execution history to keep lookups fast as data grew.
- Engineered an async code execution pipeline with **BullMQ** job queues and Docker-sandboxed runners for C++, Java, Python, and JavaScript, with retry logic and dead-letter queues so a single failed job couldn't stall the queue or crash a runner.
- Secured the platform with JWT + OAuth 2.0 authentication and RBAC middleware, closing off unauthenticated access to the sandboxed code runners.
- **Stack:** Node.js, Express.js, MongoDB, Redis, BullMQ, Socket.IO, Yjs CRDT, Docker, JWT, OAuth 2.0, React.js

StudyMotion – E-Learning Platform | [Link](#)

- Delivered a full-stack e-learning platform end-to-end as the sole engineer – backend architecture, database design, API development, and deployment – covering course management, video delivery, and student progress tracking.
- Indexed and cached frequent MongoDB aggregation queries to keep course and progress lookups responsive as the dataset grew; integrated a payment gateway with idempotent, signature-verified webhooks so retried payment events couldn't double-charge users.
- Structured the API with MVC separation, centralized error handling, and input validation middleware, then layered RBAC on top to separate student and instructor permissions, connecting it to a React.js frontend for a complete student-facing product.
- **Stack:** Node.js, Express.js, MongoDB, JWT, OAuth 2.0, RBAC, REST APIs, React.js

Education

PES Modern College of Engineering, Pune

Nov 2022 – July 2026

Bachelor of Engineering in Information Technology

CGPA: 8.31 / 10

Coursework: Data Structures & Algorithms, OOP, DBMS, Computer Networks, Operating Systems, Distributed Systems

Achievements

- **LeetCode Rating 1800+** | Ranked Top 10, GeeksforGeeks College Rankings | 500+ problems solved across data structures, algorithms, dynamic programming, graphs, and system design.
- Regional Finalist – e-Yantra Innovation Challenge (eYIC), IIT Bombay: designed and built a blockchain-based healthcare supply chain system integrating IoT hardware with a distributed backend.
- Head, NSS – led 50+ volunteers across community outreach programs reaching 1000+ beneficiaries, managing volunteer scheduling and on-ground logistics.