

# Anshul Kulkarni

Full-Stack Engineer (MERN) | GenAI & LLM Integrations

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## Professional Summary

Full-Stack Engineer with 2+ years of experience designing, building, and shipping production-grade web applications with the MERN stack, Next.js, and TypeScript. Production experience integrating Large Language Models (Google Gemini) into real products: OCR-to-LLM streaming extraction pipelines, AI-driven reconciliation, conversational assistants, and RAG-style retrieval with strict structured outputs. Built HIPAA-compliant healthcare platforms serving 50+ clinics and processing 150,000+ transactions, including ANSI X12 EDI 837 billing. Strong in RESTful API design, asynchronous background processing (Redis, BullMQ), PostgreSQL/MongoDB schema design, and CI/CD with Docker, AWS, and GitHub Actions.

## Technical Skills

**Languages:** JavaScript (ES6+), TypeScript, Python, HTML5, CSS3, SQL

**Frontend:** React.js, Next.js, Redux, Redux Toolkit, Redux-Saga, TanStack Query, TanStack Table, Tailwind CSS, SCSS, Jotai, Turborepo, Vite, Formik, Bootstrap, Material UI

**Backend:** Node.js, Express.js, NestJS, FastAPI, REST APIs, GraphQL, WebSockets, Server-Sent Events, Background Workers, Zod

**Databases & Queues:** PostgreSQL, MongoDB, Mongoose, Sequelize, Redis, BullMQ, Schema Design, Query Optimization

**AI / GenAI:** Google Gemini API, LLM Integration, Prompt Engineering, Structured Outputs, JSON Schema Validation, RAG Pipelines, Google Cloud Vision OCR

**Cloud & DevOps:** Docker, AWS (S3, EC2, Secrets Manager, KMS), Google Cloud Storage, DigitalOcean, GitHub Actions, PM2, Vercel

**Security & Compliance:** JWT, OAuth 2.0, WebAuthn/FIDO2 Passkeys, TOTP MFA, CSRF Protection, RBAC, HMAC-SHA256, OWASP Top 10, HIPAA 5010, ANSI X12 EDI 837, FHIR APIs

**Testing & Tools:** Jest, Supertest, React Testing Library, Postman, Swagger, Git, GitHub, Jira, Confluence, ESLint, Prettier

**Methodologies:** Agile, Scrum, Sprint Planning, Code Reviews

## Professional Experience

**Tesserin Global**

*Software Engineer - Associate*

Jan 2025 – Present

*Bengaluru, India – Remote*

- Built the 4MostRx healthcare RCM and billing backend from scratch as a modular monolith in Node.js 24, Express 5, and TypeScript. Designed REST APIs and PostgreSQL and MongoDB schemas covering prescription ingestion, claims, reconciliation, and payment posting; containerized with Docker and deployed on DigitalOcean App Platform with secrets managed in AWS Secrets Manager.
- Built an AI drug reconciliation service on Gemini 2.5 Flash Lite that evaluates clinical drug equivalence (ingredient, strength, dosage form, directions); matches above 90% confidence are auto-resolved, while lower-confidence items go to a human review queue assisted by an AI copilot.
- Designed a natural-language query planner that converts user questions into structured PostgreSQL filters over transactional healthcare data, removing the need for manual SQL requests from non-technical staff.
- Designed a normalized four-tier payment ledger (payments, payment encounters, payment allocations, payment transactions) with copay/deductible balance math and check/EFT reference deduplication; automated A/R aging tracking with SQL aggregations across aging buckets and BullMQ cron jobs that transition claims past follow-up deadlines.
- Migrated HIPAA-sensitive file uploads to direct-to-S3 with AWS KMS encryption and 10-minute presigned URLs, removing large file transfers from the Express request path and reducing API server load.
- Hardened authentication with WebAuthn/FIDO2 passkeys, TOTP MFA, trusted-device tracking, rotating CSRF tokens, and step-up re-authentication. Built a BullMQ audit pipeline batching up to 500 events per

insert and archiving records older than 30 days to S3 as gzip-compressed JSONL backups verified with SHA-256 manifests.

## Hestia Dental

MERN Stack Developer Intern

Sep 2024 – Nov 2024  
Albany, New York – Remote

- Built a multi-tenant dental insurance verification platform with React, Node.js, Express, MongoDB, Redis, and Bull, serving 50+ clinics and processing 150,000+ insurance verifications in production.
- Integrated the platform with Open Dental PMS through bidirectional FHIR/API integrations, cutting per-patient data entry from approximately 15 minutes to seconds.
- Moved PDF generation, email dispatch, and eligibility checks into background jobs with Bull, Redis, Puppeteer, and EJS, removing heavy processing from synchronous API requests; cached OAuth2 tokens in Redis with a 59-minute sliding expiration, eliminating repeated authentication calls and reducing rate-limit failures.
- Implemented HIPAA-oriented PII controls for SSN access (OTP approval, time-expiring admin links, audit trails, JWT/RBAC authorization) and containerized the app with Docker and PM2, cutting deployment time by 40%.

## Projects

### PhoenixRx – AI-Driven Pharmaceutical Track & Trace System

- Built shipment validation combining deterministic NDC/reference mappings with Gemini reasoning; AI-generated allocations are validated against live database quantities before being applied.
- Built a conversational order assistant supporting exact NDC, reference NDC, and fuzzy generic-name lookup, returning structured stock statuses, alternatives, and FIFO allocation plans.
- Set up Redis/Bull-based shipment synchronization with concurrency limits, 500-record bulk writes, exponential backoff, and HTTP 429 Retry-After handling.

### Real-Time Streaming OCR & LLM Data Extraction Pipeline

- Built a Python FastAPI OCR-to-LLM pipeline using Google Cloud Vision API, Google Cloud Storage, Gemini 2.5 Flash, asyncio, and Server-Sent Events, streaming structured JSON page-by-page from multi-page PDFs.
- Processed PDF pages concurrently with asyncio semaphores (up to 100 pages at a time) and offloaded blocking Google Cloud Storage calls with `run_in_executor`, keeping the event loop unblocked.
- Added an OCR pre-filter based on character density, alphanumeric ratios, and pattern matching to skip blank and boilerplate pages before LLM inference, reducing unnecessary inference calls.

### EDI Parser & Workflow Automation Suite

- Built a TypeScript ANSI X12 EDI 837 parser and normalization engine mapping provider, subscriber, payer, diagnosis, claim, and service-line data into typed JSON.
- Implemented in-browser PDF operations with pdf-lib (merging, page extraction, deletion, rearrangement), removing the need for server-side document assembly.
- Built a multi-step form wizard populated from HCFA-1500, APTP, and pharmacy appeal data, with persistent field validation across steps.

## Education

### Master of Computer Applications (MCA)

G. H. Raisoni College of Engineering and Management, Pune

Aug 2023 – Jun 2025

### Bachelor of Science in Computer Science (BSc CS)

D. B. Science College, Gondia

Aug 2020 – Jun 2023