

Zain Amjad

Full Stack AI Engineer | Node.js · TypeScript · LLM/RAG Systems · PostgreSQL
zainamjad2511@gmail.com | zains.codes | linkedin.com/in/zainamjad2511 | github.com/zainamjad2511

Summary

Full-stack engineer who builds and ships AI-powered products end to end — LangGraph agent pipelines and RAG systems on the front line, backed by the same backend rigor as everything else I build: multi-tenant platforms with database-level isolation, financial ledgers with reversal semantics, and delivery infrastructure that stays correct when downstream services (or LLMs) fail. Comfortable owning a stack from schema to UI to model integration, reaching for whatever the problem needs — queues, caches, raw SQL, browser automation, or a retrieval pipeline — rather than working from a fixed toolset.

Experience

Rapids AI

May 2026 – Present

Full Stack Engineer

Islamabad, Pakistan

- Own backend architecture for an internal ATS platform (Next.js 16, React 19, MongoDB); introduced an interface-driven repository pattern with DI-wired singletons, so storage backends can be swapped without touching route code.
- Built the applicant-insights analytics layer as one MongoDB aggregation pipeline (\$facet/\$group across university, city, degree and status), returning every dashboard segment in a single round trip rather than one query per widget.
- Implemented Cloudinary-backed resume storage with cascade-safe deletion (asset purged before the DB record, with HTTP 207 partial-failure reporting to prevent orphaned files), and a cron-driven email queue (Vercel Cron + Nodemailer) dispatching individually templated status updates in bulk.
- Built a bulk applicant status-update flow with a custom email compose/preview dialog and a branded HTML wrapper, plus a DOCX-capable in-app resume viewer.

Stipend Management Platform — Independent Project

Jun 2026 – Present

Backend Engineer — multi-tenant SaaS for school stipend administration

Remote

- Gave each school tenant an isolated Postgres database rather than sharing tables behind a `tenant_id` column, making cross-tenant access physically impossible; credentials are AES-256-GCM encrypted at rest, with connections pooled through a Redis-cached service with TTL eviction.
- Built a NestJS/GraphQL API (Apollo Server, DataLoader batching) over a mixed Prisma/Kysely data layer — Prisma for the master registry, Kysely for per-tenant queries — with JWT cookie auth and Redis-backed brute-force lockout (5 attempts / 15 min). Excel report generation (ExcelJS, template-driven style/layout engine) runs off the request path in Node `worker_threads`.
- Shipped a Manifest V3 Chrome extension syncing computed stipends into a third-party government MIS portal with no public API — a background service worker runs a rate-limited scrape/diff/submit/verify cycle, using an offscreen document for DOM parsing and session-expiry detection to recover from silent logouts mid-run.
- Containerized and deployed the stack (Postgres, Redis, NestJS) behind Caddy for automatic HTTPS on a single droplet, with GitHub Actions building images to GHCR and SSH-deploying on every push to main.

Globalist Media

Jul 2025 – Aug 2025

Full Stack Developer

Remote, United States

- Built production Next.js features with Amazon S3 integration for a US-based media company, engineering server-side API routes for content workflows enabling scalable cloud media upload and delivery.
- Collaborated with the product team to translate design requirements into responsive, performant UI components while working fully remote across US time zones.

Freelance — Upwork & Fiverr

Oct 2025 – Present

Full Stack AI Developer — AI SaaS MVPs & production hardening

Remote

- Build production-grade AI SaaS MVPs from scratch for clients — vertical Text-to-SQL bots and document RAG systems with multi-tenant Postgres, secure auth, and Stripe/Lemon Squeezy webhook integrations built to survive retries and duplicate events.
- Rescue and harden AI-generated (Lovable/Bolt.new/v0) apps: restructuring schemas that lack indexes/foreign keys, enforcing multi-tenancy with Postgres row-level security, and rebuilding auth that doesn't survive real users. Rising Talent badge; 5.0-rated on completed engagements.

Projects

Agentic RAG System | Python, FastAPI, LangGraph, ChromaDB, Next.js

2026

- Build a multi-modal RAG backend over PDFs (FastAPI + LangGraph) with hybrid retrieval — ChromaDB dense search fused with a BM25 keyword index via hand-written Reciprocal Rank Fusion, then a BGE cross-encoder rerank — and a bounded self-evaluate/retry loop that re-phrases the query when evidence is insufficient instead of returning an ungrounded answer.
- Put every external dependency (LLM, embedder, vector/keyword store, reranker, vision model, PDF parser) behind an interface with a single config binding point, making the local-model ↔ OpenAI-compatible swap a one-line change.
- Shipped end-to-end token streaming (FastAPI SSE → hand-rolled Next.js stream parser) and request-level observability — per-node timings and every LLM call persisted to SQLite via a contextvar-correlated wrapper, rendered in a trace UI showing the actual path a request took — backed by a ~180-test pytest suite.

Webhook Delivery System | Node.js, Express, MongoDB, Redis, BullMQ

2025 – 2026

- Implemented a Redis-backed circuit breaker (closed/open/half-open per endpoint) so consistently failing destinations stop being hammered, with deliveries on a dedicated BullMQ worker decoupled from the API.
- Designed HMAC-SHA256 payload signing with timing-safe comparison and replay-window checks, plus zero-downtime secret rotation via an overlapping current/previous pair on a MongoDB TTL index.
- Added distributed Redis rate limiting at two layers — a sliding-window limiter on the public API and a per-destination-endpoint throttle inside the delivery worker.

Horizontally-Scaled Messaging System | *Node.js, WebSocket, Redis, Postgres, Docker, k6* 2026

- Built the Redis pub/sub fan-out keeping three stateless WebSocket replicas consistent behind Nginx, and a ZSET presence store scored by expiry so users of a crashed replica self-expire rather than leaving ghost entries.
- Closed a duplicate-user race under concurrent first connects by rewriting the creation RPC to an atomic `INSERT ... ON CONFLICT`, then validated failover with k6 load tests and chaos scripts killing replicas mid-run. *(3-person course project; the cross-replica and resilience work is mine.)*

Zero Hustle — Social-Commerce Platform | *NestJS, Prisma, Redis, Next.js, Expo, Turborepo* 2026

- Built a full-stack monorepo (NestJS API, Next.js storefront, Expo admin app) sharing typed DTOs across three deployable apps via pnpm/Turborepo workspaces, behind an interface-driven repository pattern letting storage and cache providers swap per environment.
- Implemented a Prisma/Postgres schema with a Redis TTL cache-aside layer for a cursor-paginated public product feed, and an S3+CloudFront image pipeline with Sharp-based on-upload WebP thumbnailing.
- Built a cross-platform Expo admin app with a persisted, offline-first upload queue that retries failed uploads sequentially with backoff and survives app restarts; CI runs unit/integration tests against live Postgres/Redis containers.

Storyboard Editor | *React, Vite, Vercel Serverless, Supabase, Lemon Squeezy, Electron* 2026

- Built a full-stack storyboard editor with paid access gated by HMAC-verified, idempotent Lemon Squeezy webhooks synced into time-limited Postgres entitlements, supporting both pre-signup (email-keyed) and post-signup purchase flows reconciled via a Postgres RPC.
- Wrote versioned Supabase SQL migrations with row-level-security policies scoping every project/page/panel/storage row to its authenticated owner, plus private media via signed URLs with background refresh.
- Built in-browser export pipelines (PDF via jsPDF/html2canvas, Word via docx, WebM via Canvas/MediaRecorder) with no server round-trip, and packaged the SPA as an Electron desktop app with context isolation on and Node integration off.

Retail POS & Commission Ledger | *Electron, React, SQLite* 2026

- Built a ledger-based commission engine handling per-sale accrual, itemized reversal on returns, clawback on voided returns and FIFO payout allocation, on a 13-migration versioned schema supporting table rebuilds and backfills without data loss.
- Built a receipt pipeline that renders a hidden window to dynamically size a generated PDF to its content, then spools it to a thermal printer; added a scheduled dual-destination backup system with 30-day retention pruning.

CityLink — Student Verification Platform | *Next.js, Supabase, Node.js, Baileys* 2025 – 2026

- Built a full-stack student verification platform (Next.js, Supabase) with JWT email-verification links, and a WhatsApp bot service using the Baileys socket API to auto-approve group join requests by cross-checking identity against verified users.
- Migrated the WhatsApp automation from a Puppeteer-driven client to a socket-based client for reliability, and instrumented both the web app and the separately-deployed bot service with Sentry.

NearBuy — Location-Based Discovery Platform | *React, Express, PostgreSQL, PostGIS* 2025

- Built a PERN-stack local-business discovery platform with PostGIS proximity search and full-text search, and hand-wrote a raw-SQL data access layer (no ORM, course constraint) with a transaction helper for dependent multi-step and cascading writes across a 10+ table schema.
- Implemented hybrid Google/Facebook OAuth (Passport.js) and JWT auth with role-based route protection, and a Cloudinary media pipeline with a DB-level trigger enforcing per-restaurant image limits.

Technical Skills

Languages: TypeScript, JavaScript, Python, SQL, C++

AI / LLM Engineering: LangChain, LangGraph agent loops, hybrid retrieval (dense + BM25 + RRF), cross-encoder reranking, RAG pipelines, streaming (SSE), OpenAI/Gemini/Ollama integration

Backend: Node.js, NestJS, Express, FastAPI, GraphQL (Apollo), REST API design, Prisma, Kysely, Mongoose

Frontend: React, Next.js (App Router), Vite, React Native/Expo, TanStack Query, Zustand, Tailwind CSS, shadcn/ui/Radix, Zod

Data: PostgreSQL, MongoDB, MySQL, SQLite, Redis, PostGIS, schema design, versioned migrations, raw SQL/transactions, query optimization

Systems & Resilience: multi-tenant architecture, BullMQ queues, pub/sub fan-out, WebSockets, caching & invalidation (cache-aside, TTL), rate limiting, circuit breaking, worker_threads, k6 load & chaos testing

Security & Infra: JWT auth, HMAC signing, AES-256-GCM at rest, secret rotation, OAuth (Passport.js), Docker, GitHub Actions CI/CD, Nginx, Caddy, AWS S3/CloudFront, Vercel, Linux

Desktop & Automation: Electron, Chrome Extensions (Manifest V3), browser automation (Baileys, Puppeteer-family)

Payments & Integrations: Lemon Squeezy/Stripe-style webhook verification, idempotent event ingestion, Cloudinary, Sentry, transactional email (Nodemailer/Resend)

Education

National University of Sciences and Technology (NUST)
BS, Computer Science

Sep 2023 – Sep 2027
Islamabad, Pakistan