

KRUSHI RAJ TULA

Senior Full-Stack Engineer · Backend, Distributed Systems & Applied AI
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SUMMARY

Senior full-stack engineer (7+ years) and sole developer of a 230M+ document platform owned end to end, from React/Next.js front-ends to Node/TypeScript and Python services and the distributed systems behind them. Deep on backend, APIs, and reliability, with real front-end craft and a daily habit of building with and for AI (MCP servers, multi-agent orchestration, agents on real codebases). Active open-source author (78 public repos, including Homebrew taps and a GitHub CLI extension). High agency, extreme ownership, and comfortable shipping complex production features independently.

TECHNICAL SKILLS

Languages: TypeScript, JavaScript (Node.js), expert; Python, strong; Go, Rust, familiar

Frontend: React, Next.js (App Router), Tailwind CSS, shadcn/ui, TanStack Query, Zustand, Vue.js, semantic HTML & WCAG accessibility, Unity (game dev)

Backend & APIs: Microservices, RPC / dynamic-payload pipelines, REST APIs, GraphQL (schema & API design), Express.js, Hono, Nest.js (via OSS), Django, Java / Spring Boot (familiar)

Data & Search: MongoDB, Elasticsearch, PostgreSQL, SQLite, Redis, ClickHouse, vector / semantic search & embeddings, large-scale ingestion, indexing, query optimization

AI & Agentic: MCP (Model Context Protocol) server development, multi-agent orchestration, AI harness & agent-tooling design, NLP (Stanford NLP), LLM integration & prompt engineering, hallucination mitigation; daily AI-assisted development (Cursor, Claude Code, Codex, Devin)

Testing: Jest, Vitest, Playwright, Mocha, test-gated harnesses, test-coverage discipline

DevOps & Cloud: Docker, Kubernetes, CI/CD (Jenkins, PM2), AWS (S3), Vercel, Railway, Firebase, ELK Stack, Sentinel, Linux, Bash; deployments & rollbacks, incident response & observability, code review, Git, Agile

Web3 & Analytics: Solidity smart contracts, NFT / dividend-token mechanics, crypto/DeFi front-end & data; A/B testing & experimentation, funnel / conversion analytics

WORK EXPERIENCE

Full-Stack Engineer, Paperpile, Remote

Jan 2020 – Present

- Sole developer of the internal academic search platform, a continuously growing **230M+** document corpus in MongoDB, owned end to end from ingestion to query.
- Reduced p99 search latency from **~10s** to under **1s** by redesigning indexing and query paths across Elasticsearch, MongoDB, and SQLite.
- Designed and maintained **10+** microservices, improving RPC communication to reliably handle millions of dynamic-payload messages, with strict retries, ordering, and idempotency.
- Built ingestion pipelines processing **300GB+** of text monthly, and raised corpus abstract coverage from **27%** to **51%** via crawler/scrapper engines (Apify, Firecrawl, custom) and an improved parser.
- Built the author-name parser, a Stanford NLP model plus a custom trie-based data structure to split raw author strings into titles, first, and last names, reaching **87%** accuracy on a manually annotated test set vs **45-58%** for the best contemporary open-source parsers, the most accurate name parser available at the time.
- Owned PDF parsing and import parsers (XMP metadata, BibTeX, RIS, Zotero) normalizing external formats into a unified schema for reliable cross-source data migration.
- Built an MCP (Model Context Protocol) server over the search/match APIs so LLM tools verify citations against the **230M+** corpus (and external academic sources) before emitting them, a hallucination-mitigation guardrail.
- Built AI plugins and a test-gated harness for the parser/crawler stack, codifying debugging patterns the AI executes against, cutting a crawler update-and-release cycle from **~2 weeks** to **~2 days**.
- Own the shared middlewares and core utilities reused across the codebase (high-blast-radius work held to a strict testing and review bar), and refactored and ported legacy code to modern TypeScript.

- Cut production error rate from **10% to 2%** and deploy time by **50%** via CI/CD (Docker, Kubernetes, Jenkins, PM2); run ELK-based observability and Sentinel alerting, and own deployments, rollbacks, hotfixes, and incident response.
- Built and own an internal data-management dashboard in React, plus Google Drive and OneDrive integrations and S3-backed storage.

Environment: TypeScript, Node.js, Python, MongoDB, Elasticsearch, PostgreSQL, SQLite, ClickHouse, React, Next.js, GraphQL, Docker, Kubernetes, CI/CD, ELK, MCP, AI coding tools.

Software Engineer, NCR Corporation, Hyderabad, India

Jul 2019 – Dec 2019

- Built the Content Management and Advertising module for ATM machines; root-caused a production defect blocking a major bank chain's ads, and cut ad initial-load latency from **~2 minutes** to under **30 seconds** by re-engineering resource management on constrained, low-memory hardware.

Software Developer Intern, ServiceNow, Hyderabad, India

Jan 2019 – Jun 2019

- Contributed to a proprietary internal front-end framework; fixed prop-handling issues and designed a reusable user-activity-history component adopted across multiple flows; enhanced chatbot and activity-data collection systems.

PROJECTS & OPEN SOURCE

- **gist-pdf** (github.com/krushiraj/gist-pdf): Open-source (MIT) CLI + web tool (Rust / Go / TypeScript) converting GitHub Gists to styled PDFs, packaged via a self-maintained Homebrew tap, APT, Cargo, Docker, and prebuilt binaries. Plus homebrew-sshmux and gh-contrib, a GitHub CLI extension; 78 public repos (github.com/krushiraj).
- **Multi-agent content harness**: Multi-agent pipeline that autonomously turns a topic into a finished short-form video, planning, tool use, and a sub-agent evaluation gate that scores and refines output until it clears a quality bar, then routes each scene to the right renderer. Cut production time **~10x**.
- **Games & board-game tools**: Two Unity games on the Play Store, Rapid Roll Reloaded (apkpure.com/rapid-roll-reloaded/com.Krushiraj.RapidRoll) and Switch The Ball (apkpure.com/switch-the-ball/com.STUBBORN.Switchtheball); Match 4 Cards, a browser card game in React + Firebase (match-4-cards.web.app); a Catan map generator with an invented face-down "surprise mode" (catan-map-gen.vercel.app); and a Scotland Yard hidden-move tracker (scotland-yard-companion.vercel.app).
- **dSynths** (freelance, crypto/DeFi trading platform; x.com/dsynths): Cut average price-chart render time from **~1s** to **~10ms** via caching, and rebuilt storage and retrieval of historical time-series trade data.
- **Alphaboard** (co-built, crypto): Cron/RSS/webhook pipeline ingesting Twitter, ~10 news APIs, and custom scrapers into PostgreSQL to surface market signal. Next.js + edge API.
- **trade-ml** (independent research): Python ensemble model on news + technical indicators for swing trades; technicals dominate normal regimes, news/sentiment during sudden drops.
- **Pepe NFT** (pepenfts.vercel.app): Independently wrote and deployed a Solidity smart contract (burn + dividend mechanics), created the generative art, and built the web front-end end to end.
- **posix.co.in** (live at posix.co.in): Designed, built, and operate a production full-stack SaaS (Next.js, Tailwind, shadcn/ui, Hono, Postgres on Vercel) for local retail, pharmacy, and wholesale sellers. Live with 4 partner businesses.
- **mini-terminal** (krushiraj.github.io/mini-terminal): Browser-based terminal UI in Vue.js, live on GitHub Pages.
- **Open-source contributions**: Merged PRs to fetch-cookie (widely used npm package) and mislav/gh-contrib (GitHub CLI extension); canvas re-rendering fix and layers implementation in plexbox; proposed fixes to PocketBase and django-forms-builder; led Coderplex's open-source dev team and built for coderplex.org (2019).

TEACHING & MENTORING

Adjunct Faculty / Guest Lecturer, Vasavi College of Engineering (IT Dept.), Hyderabad, India

2022 – Present

- Guest-lecture on full-stack development and DevOps, teaching backend frameworks comparatively (Express.js, Django, Java/Spring Boot); mentor engineers through mock interviews and technical coaching; advise on students' RAG project architecture; judge at Tech Savishkar, a national-level hackathon.

EDUCATION

B.E., Information Technology, Vasavi College of Engineering, Hyderabad, India (CGPA 8.5)

2015 – 2019

LANGUAGES

English (fluent), Telugu (fluent), Hindi (proficient), German (basic).