

ROHAN KUMAR

AI/ML Engineer · Full-Stack Developer

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PROFESSIONAL SUMMARY

Third-year B.S. Data Science & Applications student at IIT Madras building AI/ML and full-stack systems end to end — problem framing, architecture, implementation, evaluation, public deployment. Two web applications live on Vercel and one ML demo on Hugging Face Spaces. Experience spans autonomous LLM agent platforms (FastAPI, LangChain, NVIDIA NIM), transformer ensembles (PyTorch), and full-stack products (Next.js, Flask, Prisma, PostgreSQL).

EDUCATION

B.S. Data Science & Applications — Indian Institute of Technology Madras

Third year. Deep Learning & Generative AI project: Smart MCQ Solver — ensemble scored 0.7602 MAP@3.

TECHNICAL SKILLS

Languages: Python, TypeScript, JavaScript, SQL, Java

AI / ML: PyTorch, scikit-learn, Hugging Face Transformers, LangChain, NVIDIA NIM, Weights & Biases, Gradio

Backend: Flask, FastAPI, SQLAlchemy, REST APIs, JWT authentication, Redis, Celery

Frontend: Next.js, React, Vue.js, Tailwind CSS, shadcn/ui, Bootstrap 5

Data: PostgreSQL (Neon), SQLite (WAL), Prisma

Tools & Platforms: Git, GitHub, Vercel, Vercel Blob, Hugging Face Spaces

SELECTED PROJECTS

Cortex Agent — Autonomous Multi-Model AI Agent Studio

FastAPI, LangChain, NVIDIA NIM, SQLite (WAL), SSE · Live: [cortex-agent-tawny.vercel.app](#) · [github.com/23f2003236/cortex-agent](#)

- Built an autonomous agent studio on NVIDIA NIM frontier models (1M-token context, 128K output): a LangChain ReAct loop running real tools — web search, SSRF-guarded page fetching, Wikipedia (EN/HI), weather, calculator — with persistent cross-session memory.
- Engineered multi-tab real-time sync via SSE heartbeat over SQLite WAL, a split-view artifacts canvas with KaTeX rendering, PBKDF2 password hashing with HMAC-signed sessions, daily token quotas, and automated test suites covering auth, tools, and sync.

NostalgiaNet++ — Digital Time Capsule & Memory Vault

Next.js (App Router), TypeScript, Prisma, PostgreSQL (Neon), NextAuth · Live: [nostalgia-net-silk.vercel.app](#) · [github.com/23f2003236/NostalgiaNet](#)

- Shipped a full product solo: sealed TimeVaults with future unlock dates, pre-seal group invites, public discovery pages, unlock-day cron notifications, albums, journals, and an admin moderation panel.
- Enforced the lock server-side — sealed-content redaction across public and authenticated routes; secured uploads with extension + byte-signature validation and size caps; bcrypt (12 rounds) with Google OAuth; runs entirely on free tiers.

Smart MCQ Solver — Deep Learning & GenAI Project (IIT Madras)

PyTorch, Hugging Face Transformers, scikit-learn, W&B · Demo: [huggingface.co/spaces/Rohan014/smart-mcq-solver-roberta](#)

- Built a 5-option multiple-choice solver scored by MAP@3: TF-IDF + Logistic Regression (0.7511), BiLSTM from scratch (0.7540), fine-tuned DeBERTa-v3-small and RoBERTa-base (0.7544 each), fused by weighted rank voting into a 0.7602 ensemble — above every individual model.
- Audited data leakage during EDA (242 duplicate train rows; 267 train/test overlaps), anchored all model selection to leaderboard MAP@3, tracked runs in Weights & Biases, and deployed RoBERTa as a public Gradio demo on Hugging Face Spaces.

Examination Management Portal

Flask 3.1, SQLAlchemy 2.0, SQLite, Bootstrap 5, Jinja2 · [github.com/23f2003236/examination-management-portal](#)

- Implemented the full institutional exam lifecycle: 3-role RBAC with examiner approval gating, dynamic rubric grading, and concurrency-safe slot booking (atomic seat decrement, anti-overbooking, single-booking guarantee, seat recovery, audit log).
- Kept core workflows 100% server-rendered (Post/Redirect/Get, zero client-side JavaScript) with a programmatic constraint-enforced schema, REST /api/v1 endpoints, and 11/11 automated tests passing.

ADDITIONAL PROJECTS

Hospital Management System — Flask, Vue.js, Redis, Celery, JWT: stateless JWT API with three roles (admin / doctor / patient), Redis-cached dashboards, and Celery beat tasks for daily reminders and monthly reports.

ParkIt — Flask, Flask-SQLAlchemy, Chart.js: parking management with admin lots and auto-generated spots, first-available booking and release, occupancy history, and utilization dashboards.

TrekVault — Flask, SQLAlchemy, WTForms: trekking platform with 3-role RBAC, CSRF protection, trek lifecycle transitions, admin reports, and global search.

Also: Python-DSA — structured DSA coverage in Python with cheatsheets · Deep Learning Crash Course — interactive PyTorch concept resource.