

Parminder Singh

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Education

Rajiv Gandhi Institute of Petroleum Technology

Integrated Dual Degree in Computer Science Engineering & Artificial Intelligence (CPI: 8.31 / 10.00)

2022-27

Jais, UP, India

MGM Public School

Higher Secondary Education (Score: 95%)

2021

Ludhiana, Punjab, India

Shri Harkrishan Sahib Public High School

Matriculation (Score: 95.07%)

2019

Ludhiana, Punjab, India

Experience

Hypertangent Technologies – IIT Delhi

May 2025 – Jul 2025

Machine Learning Intern

Delhi, India

Trained and evaluated a 15-tree **Random Forest** activity classifier (**71.15% accuracy**, 5-class recognition) and an **Isolation Forest** anomaly detector on windowed IMU/barometer sensor data, then engineered a custom **Python transpiler** converting the scikit-learn ensembles into embedded C++ for real-time **20 Hz on-device inference** on ESP32 hardware.

sktime (Open Source)

Apr 2026

Open Source Contributor

Remote

- Contributed **3 merged pull requests** to **sktime-mcp**, fixing pipeline composition validation logic to reject invalid forecaster-to-forecaster chains while preserving valid transformer-to-forecaster compositions, with added **regression test coverage**.
- Resolved MCP tool-discovery/documentation inconsistencies by migrating deprecated interfaces to `list_estimators(query=...)` and eliminated OS-specific path assumptions in examples using `tempfile.gettempdir()` for **cross-platform compatibility**.

Projects

PaymentFlow | 🐙 | 🔗

- Python, FastAPI, Google Gemini, Model Context Protocol (MCP), PostgreSQL, SQLAlchemy, Docker
- Engineered an **event-driven payment recovery system** ingesting Razorpay failure webhooks with **HMAC-SHA256 verification**, classifying failures into **5 root-cause categories**, triaging via **Google Gemini** over the **Model Context Protocol** (5 tools, zero direct DB access), and authorizing actions through a **10-invariant deterministic guardrail engine** with row-level locks, achieving **90.84% recovery** on a controlled benchmark.
- Validated with **343 automated tests** and a **3,750-simulation Monte Carlo evaluation** (+30pp recovery uplift over baseline); built **6 Alembic migrations**, multi-tenant merchant isolation, and **GitHub Actions CI**; deployed on Railway and Vercel.

Atlas | 🐙 | 🔗

- Python, FastAPI, scikit-learn, LightGBM, PostgreSQL, Redis, Docker, Kubernetes (AKS)
- Engineered a **two-stage recommendation pipeline** – candidate recall via item-similarity/popularity baselines followed by a **LightGBM LambdaRank reranker** over **16 engineered behavioral features** – trained and evaluated on **2.75M real-world user interaction events** across 235K products, achieving **0.9992 NDCG@10** offline.
- Architected **5 FastAPI microservices** with async PostgreSQL/Redis data pipelines and real-time session/long-term preference re-ranking, containerized with Docker and deployed via **Kubernetes (AKS)** and Render.

SpectralReader | 🐙 | 🔗

- Python, FastAPI, FAISS, Sentence-Transformers, CrossEncoder, Google Gemini API, Tesseract OCR, Docker
- Built and deployed a **document intelligence API** with two-stage retrieval – **FAISS** dense vector search reranked by a **CrossEncoder** – auto-routing PDFs through native extraction or **Tesseract OCR**, and generating grounded answers via the **Gemini API** with a 3-tier rate-limit fallback chain.
- Containerized the service with a multi-stage Docker build and validated it with a **47-test automated suite (73% coverage)** plus a **113-call end-to-end benchmark** measuring per-endpoint latency across 7 documents.

Achievements

- NASA Space Apps Challenge 2025 – Global Nominee**: Built **WeatherScope**, selected among 1,290+ Global Nominees from 11,500+ submissions worldwide. 🐙
- GATE 2026 – DA**: Secured **AIR 348**; **JEE Advanced 2022**: Qualified India's premier undergraduate engineering entrance exam.

Technical Skills

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

Backend Engineering & APIs: FastAPI, REST APIs, Microservices Architecture, AsyncIO, Redis, Concurrency, Pydantic

AI, LLMs & RAG: Model Context Protocol (MCP), Two-Stage RAG, FAISS, Vector Search, Prompt Engineering, Gemini API

ML, Data & Evaluation: PyTorch, Hugging Face Transformers, PEFT/LoRA, scikit-learn, LightGBM, PySpark, Monte Carlo Simulation

Databases, Infrastructure & Tools: PostgreSQL, SQLAlchemy, Docker, Kubernetes (AKS), Linux, Git, GitHub Actions, Pytest