Shantanu Singh

AI/ML Engineer · Machine Learning · Generative AI · Full-Stack

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Computer Science (AI & ML) student and two-time national hackathon Grand Finalist who ships machine learning end to end, from model training and evaluation to deployed apps people use. Built explainable fraud detection, RAG pipelines, an RL environment for fine-tuning LLMs, and live 3D data platforms with Python, PyTorch, FastAPI and React.

SKILLS

AI and ML	Machine Learning, Deep Learning, NLP, Anomaly Detection, Explainable AI (SHAP), Feature Engineering, PyTorch, TensorFlow, scikit-learn, XGBoost, Pandas, NumPy
Generative AI	LLMs, RAG, vector search (ChromaDB, sentence-transformers), LLM fine-tuning (LoRA, GRPO), reinforcement learning, spaCy, Groq and Gemini APIs
Programming	Python, C++, C, SQL, Java, JavaScript, TypeScript
Software	FastAPI, Flask, REST APIs, React, Next.js, Three.js, PostgreSQL, MongoDB, MySQL, SQLite
Tools and Cloud	Git and GitHub, Docker, Hugging Face Spaces, Vercel, Netlify, Render, Jupyter, VS Code, Tableau

PROJECTS

ML Debug Env — RL Environment for LLM Code Debugging · OpenEnv Grand Finalist *PyTorch, Qwen2.5, LoRA, GRPO*

- Built a partially observable RL environment where an LLM agent diagnoses and fixes broken PyTorch training scripts through diagnostic tool calls.
- Fine-tuned Qwen2.5-1.5B with GRPO and LoRA, rewarding fixes that pass sandboxed subprocess grading, AST validation and an LLM judge of the diagnosis.
- Wrote an adversarial task scheduler that serves harder bugs as the agent improves.

LedgerLens — AI Copilot for GST Reconciliation (GitHub) *scikit-learn, FastAPI, Next.js, NetworkX, Docker*

- Reconciles invoices against the ledger, bank statement and GSTR-2B, pricing every mismatch in rupees.
- Trained gradient-boosted record matchers on 55,000+ candidate pairs, reaching **0.999 pair F1** on a held-out month against 0.98 for the rule baseline.
- Caught PAN-linked supplier rings with graph analysis; deployed on Hugging Face Spaces and Vercel.

SentinelIQ — Real-Time Insider Fraud Detection · iDEA 2.0 Grand Finalist *Isolation Forest, LSTM, XGBoost, SHAP*

- Built per-employee behavioural baselines and an Isolation Forest, LSTM Autoencoder and XGBoost ensemble.
- Explained each alert with SHAP, auto-grouped alerts into fraud cases, and served them via FastAPI for SIEMs.

CourtMitra — AI Legal Judgment Assistant *RAG, ChromaDB, sentence-transformers, spaCy*

- Turns Indian court judgments into plain-language summaries, legal entities, reasoning flowcharts and Hindi.
- Built a RAG pipeline (PyMuPDF, ChromaDB) for grounded Q&A and similar-case search, with hallucination guards.

SAMUDRA — 3D Ocean Data Explorer · Smart India Hackathon 2026 (GitHub) *Next.js, React Three Fiber, xarray*

- Built an interactive 3D platform for INCOIS fusing NOAA WOA23 ocean fields with 463 Argo floats, gliders, 24 BGC floats and real HYCOM currents.
- Wrote plug-in Python ingest adapters into a sub-15 MB offline store, plus bias and RMSE validation views.

Solar System Lab — Planetary Science in the Browser (Live demo) *JavaScript, Three.js, numerical methods*

- 3D orrery driven by NASA JPL orbital elements, solving Kepler's equation every frame with Newton's method.
- Mars EVA route planner (A* with oxygen and radio limits), Monte Carlo rover-survival model, landing-site scorer.

EDUCATION

B.Tech in Computer Science Engineering (AI and ML), JSS University, Noida 2025 – 2029 (expected)

Relevant coursework: Machine Learning, Data Structures and Algorithms, Python, C/C++, Database Systems.

AWARDS

- **Grand Finalist, Meta × PyTorch × Hugging Face OpenEnv Hackathon, 2026.** Top 100 of 31,000 teams with an RL environment for training models to debug code.
- **Grand Finalist, iDEA 2.0, Union Bank of India, 2026.** Top 40 of 1,500 teams with a real-time insider-fraud early-warning system and SHAP-explained alerts.