

Karan Bansal

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Third-year student at IIT Bombay (B.S. Economics, dual minor in Computer Science and AI & Data Science) and IIT Madras (B.S. Data Science and Applications). Builds machine learning, agentic AI and quantitative finance systems.

EDUCATION

- **B.S. Economics, IIT Bombay** (expected 2028) • CPI 9.19 • Dual Minor in Computer Science and AI & Data Science
- **B.S. Data Science and Applications, IIT Madras** (online, in parallel) • CGPA 9.14
- **Coursework:** Machine Learning Foundations and Practice, Probability and Random Processes, Linear Algebra, Database Management Systems, Data Structures and Algorithms

TECHNICAL SKILLS

- **Languages:** Python, SQL, C++, R, Java, JavaScript
- **ML and AI:** PyTorch, TensorFlow, scikit-learn, XGBoost, LSTM, reinforcement learning (PPO), Hidden Markov Models, LangGraph, RAG, MCP, ChromaDB, Sentence Transformers, cvxpy
- **Data:** Pandas, NumPy, SciPy, Matplotlib, Seaborn, Power BI, Excel
- **Engineering:** Django REST Framework, React.js, Next.js, Tailwind CSS, Git, Jupyter

PROJECTS

Institute Assist Agent: multi-agent RAG system • Learners' Space Jun '26 – Jul '26

- Architected a 4-agent RAG system in LangGraph (Supervisor, Retrieval, Answer, Critic) that returns page-cited answers; a critic agent rule-checks citations and numbers, then reviews each draft for hallucinations
- Built the ingestion pipeline (section-aware chunking, Sentence Transformers embeddings, ChromaDB) with hybrid BM25 + dense retrieval, reaching 100% Hit@4 on a 52-question labelled eval set (88% in v1)

India Market MCP: MCP server for AI assistants Personal project

- Built an MCP server with 13 tools that gives AI assistants live NSE data: quotes, option-chain analytics (OI, max pain, ATM Greeks), financials, shareholding and mutual funds
- Implemented Black-Scholes, Greeks and an implied-volatility solver in pure Python; 118 offline tests replay recorded NSE responses through a real MCP client in CI

Credit Card Fraud Detection • Self project Jun '26 – Jul '26

- Built an EDA, preprocessing and modeling pipeline on data with 0.17% fraud; benchmarked Logistic Regression, Random Forest and XGBoost (best 0.25 PR-AUC)
- Raised precision from 1.3% to 29.6% through threshold tuning, a 23x drop in false positives

Predictive Customer Analytics • Winter in Data Science Dec '25 – Jan '26

- Cleaned and analyzed 541K+ retail transactions and engineered RFM features for customer segmentation
- Estimated Customer Lifetime Value and benchmarked 5 models (Gradient Boosting, 0.77 AUC); built a VIP / Rescue / Regular / Low-Priority retention framework from CLV and churn risk

Regime-Aware Asset Allocation with Hidden Markov Models • Summer of Quant May '26 – Jul '26

- Built a 3-state HMM (Bull, Bear, Crisis) on Nifty 50 and India VIX features that sets risk aversion for a cvxpy mean-variance allocation across stocks, gold and bonds, tested with a lookahead-free walk-forward backtest (2014–2025, net of 7 bps costs)
- Reached 13.0% CAGR and Calmar 0.87 (max drawdown –15.0%) vs 0.59 (–17.5%) for static 60/40; stress-tested with block bootstrap and random-regime-timing nulls

EXPERIENCE

Investment Analyst • Longshanks Capital Oct '25 – Jun '26

- Analyzed 10+ listed companies across sectors, applying a quantamental framework to evaluate growth, leverage and valuation across peer sets
- Compiled peer analysis from annual reports and corporate disclosures; received a Letter of Recommendation from the Founder for analytical rigor and professionalism

Strategy Intern • EcoEdge Fuels May '26 – Jul '26

- Sized India's biomass pellet market (~45MT annual supply-demand gap) and built Excel models forecasting capacity and demand across 3 growth scenarios, plus a unit economics model (pelletizing cost INR 4,473/tonne) for plant-level break-even

LEADERSHIP AND ACHIEVEMENTS

- **Web Developer, Undergraduate Academic Council, IIT Bombay** (Jun '25 – Apr '26): built a Project Allocation Platform for 6K+ undergraduates (React.js, Next.js, Tailwind; Django REST Framework, SQL, OAuth), deployed on Gymkhana servers
- **Mentor, Winter in Data Science, Analytics Club** (Dec '25 – Jan '26): mentored a 20-student team building a pipeline that predicts stock volatility from financial news sentiment (VADER/FinBERT, XGBoost)
- 99.93 percentile and AIR 1160 in JEE Mains among 1.4M+ candidates; AIR 1962 in JEE Advanced ('24)
- HackNation AI Hackathon participant; Codeforces Specialist (1400+); IOQM Certificate of Merit ('22)
- 1st place, Pit Trading Challenge; IMC Trading Simulation Volume winner; top 12 of 200+, Portfolio Management Competition