

Akshit Arora

Indian Institute of Technology Delhi
akshitarora.iitd.ep@gmail.com — github.com/AkshitEP

Education

Indian Institute of Technology, Delhi

2023 – Present

B.Tech, Engineering Physics

Scholastics and Achievements

Nationwide Winner of NK Securities Scholarship: awarded **Rs 125,000** and an internship opportunity

Citadel Invationals Asia 2025: Placed in **top 60** in Asia for Citadel's trading invitational event 2025

Goldman Sachs Hackathon 2025 Finalist: **top 25** nationwide and recieved the Quant Analyst Internship

Competitive Programming: CodeForces with a peak rating of **1979 (Candidate Master)**

Hacktober Fest: Three time Hacktober fest winner hosted by github

JEE ADVANCED 2023: secured an **All India Rank 2563** among 200k+ candidates

JEE Mains 2023: secured an **All India Rank 2696** among 1M+ candidates

KVPY 2021(Issued by IISC): secured an **All India Rank 1197** among 100K+ candidates

Internships

NK Securities (Summer 2026): Incoming Quantitative Researcher Intern

Received Pre-Placement Internship Offer

Goldman Sachs (Summer 2026) Offer: Quantitative Research Intern

Received Pre-Placement Internship Offer by securing Top 25 rank nationwide in Goldman Sachs India Hackathon

Harvard University — Research Intern

Advisor: Prof. Yilun Do — Mentor: PhD Student Zhenting Qi

- Worked on multi-agent LLM systems to study the break-even point where coordination overhead yields net gains over strong single-agent models
- Designed architectures with conditional, disagreement-triggered retrieval to reduce token and latency costs
- Evaluated systems on distributed-context tasks, coordination-heavy planning, and efficiency benchmarks
- Contributing toward a research paper based on this work

tradeInsightAI — Quantitative Researcher Intern

Apr 2025 – Jul 2025

- Developed a modular Bayesian Online Change Point Detection (BOCPD) pipeline in Python to detect regime shifts in 1-second high-frequency stock data using multivariate Student- t distributions and Normal-Inverse-Wishart priors
- Achieved **2–7 ms** inference per tick via pruning-based BOCPD variants; detected **15–20 changepoints/day** on AAPL and ES futures
- Enabled regime diagnostics through interactive Plotly visualizations for price-only and volume-informed segmentation, aiding market shift analysis

Carnegie Mellon University — Research Intern

Jan 2025 – Apr 2025

Advisor: Prof. Prasad Chalasani

- Designed an agentic LLM pipeline using **Langroid + Gemini** to infer user interests from Bluesky likes and follows
- Built tool-enabled multi-agent systems for topic classification and summarization across large social timelines
- Automated daily digests and CLI workflows via **GitHub Actions**, enabling reproducible and modular LLM orchestration

Georgia Institute of Technology: Research Volunteer (ML) — Received LOR

Winters 2024

Shipd by Datacurve (YC W24): Python Problem Solver (Python contributions)

Summer 2024

Research & Quantitative Projects

Fantasy Sports Prediction for Dream11

Inter IIT Tech Meet 13.0, Dec 2024

- Built machine learning models for fantasy cricket score prediction using **KMeans clustering** and **MultiOutputRegressor** to model head-to-head and partnership outcomes.
- Achieved **MSE of 15.2 (H2H)** and **10.7 (Partnership)** on July–Nov 2024 match data, demonstrating strong predictive accuracy on real-world sports data.

- Delivered a **React.js** interface for automated team suggestions, enabling data-driven and user-centric lineup recommendations.

Exotic Option Pricing using Monte Carlo Simulation

Goldman Sachs India Hackathon, May 2025

- Priced exotic European basket options with knock-out barriers by calibrating **local volatility surfaces** via Black-Scholes inversion.
- Generated correlated multi-asset price paths using **Cholesky decomposition** and risk-neutral Monte Carlo simulation.
- Achieved **92.6% pricing accuracy** using **20,000-path** simulations, validating numerical stability and convergence.

Large-Scale Financial Time-Series Forecasting

Tech General Championship, Feb 2025

- Analyzed a **16M-sample, 141-feature** anonymized financial dataset with distribution-aware preprocessing (Normal, GMM, Poisson families).
- Trained and benchmarked **GRU, LSTM, and LightGBM** models under strict temporal validation constraints.
- Achieved **~0.85 weighted R^2** , demonstrating strong generalization despite fully anonymized features.

AI-Driven Hiring Intelligence Platform

INNOV8 2.0, Eightfold AI Hackathon, Sep 2024

- Built an end-to-end resume intelligence system using **LLaMA-70B** to extract structured candidate attributes (skills, roles, education, experience).
- Identified **31 fraudulent resumes** using cycle-detection techniques; computed hiring, fraud, and relevance scores at scale.
- Delivered an **interactive UI** for recruiter review of resumes and LORs with candidate-wise explainable scoring.

NeuroBridge: Assistive Vision-to-Speech AI System

Microsoft Imagine Cup Submission

- Designed an end-to-end assistive communication MVP chaining **computer vision, intent triggering, structured prompting, and neural TTS** into a low-latency pipeline.
- Implemented real-time visual context acquisition, deterministic JSON-based context structuring, and single-sentence intent generation using LLMs.
- Integrated safety controls, confirmation gates, and caregiver visibility to ensure robust and ethical assistive AI behavior.

Computer Systems Stack: From Logic Gates to Networks

Nand2Tetris & Computer Networks

- Built a complete computing stack from scratch: **NAND-gate logic** → CPU → assembler → VM → compiler → OS primitives.
- Implemented instruction decoding, ALU control, stack-based virtual machine, and a high-level language compiler targeting custom hardware.
- Designed and simulated core **computer networking protocols** including reliable transport, congestion control, and packet routing, analyzing throughput-latency tradeoffs.

Technical Skills

- **Programming Languages:** Python, C++, C, JavaScript, Java, React.js, Flask, Plotly, Matplotlib, Streamlit
- **Quantitative & Financial Computing:** Monte Carlo Simulation, Stochastic Processes, Time-Series Analysis, Change Point Detection, Option Pricing (Black-Scholes, Local Volatility), Risk Metrics, Numerical Methods
- **Machine Learning & AI:** NumPy, Pandas, SciPy, Scikit-learn, PyTorch, LightGBM, GRU/LSTM, Bayesian Models, Regularization (L1/L2), Model Evaluation & Validation
- **LLMs & Agentic Systems:** Langroid, Tool-Calling, Multi-Agent Orchestration, N8N, LLM Pipelines
- **Systems & Low-Level:** Hack Assembly, Computer Architecture, Nand2Tetris, Memory Management
- **Financial Markets:** Derivatives, Volatility Modeling, Hedging, Market Microstructure (Foundational)