Aarush Kumar

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Education

Purdue University West Lafayette, IN
B.S. in Computer Engineering (CS Minor) *2026 to Present*
B.S. in Applied Mathematics

Experience

Undergraduate Researcher — Applied Mathematics Sept. 2026 – Present
Department of Mathematics, Purdue University *West Lafayette, IN*

- Currently working with an upperclassman and Professor on a random walk sequence involving Markov Chains

Quantitative Research Analyst Sept. 2026 – Present
Purdue Momentum *West Lafayette, IN*

- Developing a Python simulator to compare fixed-spread, Avellaneda–Stoikov, and adaptive market-making strategies across low and high volatility, regime shifts, price jumps, and transaction costs
- Designing 1,000 Monte Carlo trials per strategy-scenario pair (15,000 total) to measure P&L, probability of loss, inventory exposure, drawdown, and tail risk
- Building an interactive dashboard to compare strategy performance and inventory behavior across stress scenarios

Student Researcher — Trustworthy Machine Learning Aug. 2026 – Present
Vertically Integrated Projects (VIP), Purdue University *West Lafayette, IN*

- Reproduce published machine learning experiments using Python and PyTorch on Purdue RCAC computing resources, adapting research implementations to alternative architectures including ResNet-20
- Clean and preprocess large datasets for training and evaluation, investigating accuracy–fairness trade-offs to support research on trustworthy machine learning under Dr. Zahra Ghodsi

ML/CS Research Assistant Jul. 2025 – Present
Northwestern University *Remote/San Francisco Bay Area*

- Develop predictive machine learning models to study prediction market outcomes and support quantitative research
- Use Python, pandas, and NumPy to organize, process, and analyze prediction market data
- Collaborate with the research team and use Git to manage code and track changes across research work

Software Engineer Intern Nov. 2024 – Dec. 2025
Epoch AI *Remote/San Francisco Bay Area*

- Developed Python backend integrations connecting futures, commodities, and equities data to an AI copilot's multi-agent workflows using LangChain
- Linked market data sources with agent tools to streamline trading algorithm development and support faster generation of trade ideas and market research
- Tested agent behavior and market-research workflows with the engineering team to assess how integrated data supported research tasks

Projects

Wharton Investment Competition | *Team Lead* Aug. 2025 – Dec. 2025

- Led a student team, coordinating fundamental and quantitative research to develop a portfolio strategy
- Analyzed financial statements, SEC filings, and market trends to inform investment selections
- Co-developed the team's "Tush Push" strategy and co-authored the final report outlining investment decisions

Activities

Hack the Future at Purdue | *Full Stack Developer* 2026 – Present

- Full-stack developer in Purdue's most competitive software development club

Technical Skills

Languages: Python, Java, SQL, HTML/CSS
Frameworks & Libraries: React, LangChain, PyTorch, scikit-learn, NumPy, pandas, Matplotlib
Runtime: Node.js
Developer Tools: Git, Vercel, Claude Code, OpenAI Codex, Jupyter Notebook, VS Code, Visual Studio, Onshape/CAD
Productivity Tools: Microsoft 365 (Excel, Word, PowerPoint), Google Workspace (Docs, Sheets, Slides)