

PRATIK D. KALE

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Open to Quantitative Analyst / Research / Strategy / Developer roles - U.S. Work Authorization (F-1 CPT/OPT)

Quantitative Researcher | Financial Modeling | Signal Engineering

Graduate student in Financial Technology with 3+ years in financial analytics and cloud infrastructure. AWS Cloud Engineer with strong competencies in Execution Strategy, Quantitative Computation, and Cloud Infrastructure. Passionate about applying DevOps, Gen-AI, and automation to drive scalability and performance in asset management and capital markets environments.

Key Achievements: Acted as Subject Matter Expert (SME) in Data & Quant Analytics within Fidelity's Asset Management unit, developing cloud-native solutions for portfolio optimization, P&L forecasting, and risk modeling. Drove \$1M+ in cloud cost savings by optimizing compute-heavy pipelines for financial modeling. Proven track record of building production-ready quant pipelines and cost-optimized trading infrastructure at scale.

EDUCATION

Stevens Institute of Technology, Hoboken, NJ

Jan 2025 – Dec 2026

Master of Science in Financial Technology and Analytics | GPA: 3.84/4.00

Concentration: Financial Data Science | Merit Scholarship Recipient

Relevant Coursework: Applied Statistics with application in Finance, Probability Theory, Financial Technology, Big Data Technology, Financial Risk Management, Financial Data Science, Introduction to Bloomberg and Thomson-Reuters

SGB Amravati University, Amravati, MH

Aug 2016- May 2020

Bachelor of Engineering in Information Technology | CGPA: 8.74/10.0

Relevant Coursework: Database Management Systems, Artificial Intelligence, Web Technology, Computer Architecture, Operating System, Web Commerce

CERTIFICATIONS AND PUBLICATIONS

- Amazon Web Services (AWS) certified Solutions Architect Associate C-03. (2023)
- Big Data for Surveillance in Mobility Sector: Applications and Opportunities - in International Journal of Innovative Technology and Exploring Engineering (IJITEE), 2020.
- Bloomberg Finance Fundamentals Certification, 2025
- Bloomberg Market Concepts (BMC) Certification, 2025

TECHNICAL SKILLS

Programming Language:	Python, R, Groovy, SQL, Java, Bash/Shell Scripting, C++, HTML, CSS
Database & Visualization:	PostgreSQL, MongoDB, Oracle DB, AWS DynamoDB, Delphix, Redis, Tableau, Snowflake
Framework:	Apache PySpark, Hadoop, Java Spring Boot, RShiny, Django, Flask, Fast API
ML Tools and Libraries:	Pandas, NumPy, Scikit-learn, OpenCV, TensorFlow, Scrapy, NLP, Plotly, Beautiful Soup, Matplotlib
Enablement Tools/Platforms:	AWS, Jenkins, Insomnia, Git, Autosys, SonarQube, Datadog, Kafka, Kubernetes, Helm
New Gen Interests:	Generative AI, Blockchain, Big Data Computing, FinTech
Quant Research Methods:	Time-Series Analysis, Kalman Filter, Monte Carlo Simulation, Greeks Estimation, Backtesting, Reinforcement Learning, Factor Model, Signal Generation, statistical arbitrage, liquidity modeling

EXPERIENCE

SCHOOL OF BUSINESS (SIT) - Quantitative Research Assistant | Hoboken, NJ

May 2025 - Aug 2025

- Replicated four asset allocation strategies from DeMiguel et al. (**Equal-Weight, Mean-Variance, Minimum-Variance, Value-Weighted**) using real market cap and returns data.
- Cleaned and merged multi-source datasets (**Fama-French factors**, 25-portfolio returns, market caps), aligning timeframes and reducing to 20 usable portfolios.
- Computed **Sharpe Ratios, Certainty-Equivalent Returns, and p-values** using 60-month rolling windows to compare in-sample and out-of-sample performance.
- Designed a **reinforcement learning-based trading agent (85%+ signal accuracy)** and **evaluated 1000+ simulations** to analyze execution cost, turnover, and robustness.

FIDELITY INVESTMENTS – Cloud Engineer (Financial Services - Asset Management) | Bangalore, IN

Dec 2021- Jan 2025

- **Delivered blockchain-enabled financial infrastructure** by tokenizing retail investment transactions using Ethereum-compatible networks (Polygon, ERC-20), enabling secure, on-chain representation of over **\$250M** in client assets across fixed income and equity segments.
- **Designed and implemented 2 custom Groovy libraries** supporting **fully automated CI/CD pipelines** for Node and Java-based fintech applications and Ethereum smart contracts; improved deployment efficiency by **60%**, accelerating time-to-market for investment tools.

- Developed a quantitative platform enabling ML-driven **portfolio optimization**, **Sharpe ratio enhancement**, and **factor-based alpha signal generation** for Strategic Investments; integrated time-series models and supported live execution strategies; integrated boto3 for automation, resulting in **80% reduction in manual tasks** and faster alpha generation from models.
- Represented the firm as a **Quantitative Analytics SME** at **Fidvantage 2023**, showcasing advancements in financial data engineering, accounting for **40% of tech innovation coverage** across data warehousing, trade analytics, and factor modeling.
- Built a **custom Python library** atop Spring Boot services to support **cloud-native deployment of ML models** used in **asset pricing**, **risk forecasting**, and back testing strategies; reduced spin-up time by **70%** and ensured **95% CI/CD reliability**.
- Spearheaded **Cloud FinOps cost-optimization** for real-time financial data pipelines used in risk reporting and trade reconciliation; achieved **\$1.4M+ in annualized cost savings**, aligning with compliance and operational efficiency KPIs.

TATA CONSULTANCY SERVICES - Full Stack Engineer | Bangalore, IN

Nov 2020- Nov 2021

- Served as Python Backend Developer for client **Morrisons UK PLC**, building AWS serverless microservices for order estimation and inventory automation, enhancing the **order processing speed** by **42%** and reducing **inventory reporting latency** by **35%**.
- Devised and developed REST APIs using Flask REST Framework. Leveraged AWS Services (Lambda, ECS, S3, SNS, Eventbridge, CloudWatch, RDS) and Terraform for project deliverables, completing **5+ production releases** with **zero critical errors** and **100% SLA adherence**.

KPMG - Data Analyst Intern | Virtual

Apr 2020 - Jun 2020

- Analyzed large bicycle company datasets using Excel, SQL and Python to derive actionable insights for financial reporting.
- Built automated dashboards using Tableau to streamline weekly KPIs, improving reporting efficiency by 30%.

PROJECTS

Dynamic Yield Curve Modeling and Macro Signal Forecasting (Nelson-Siegel, Kalman Filter)

- Modeled U.S. Treasury yield curve via Dynamic Nelson-Siegel with Kalman filtering to extract daily β_0 , β_1 , β_2 factors.
- Forecasted 2s10s spread using lagged β_1 as a predictive signal, achieving $R^2 = 0.61$ and correlation = 0.78.
- Developed and backtested threshold-based β_1 trading strategies, improving PnL consistency and reducing false signals.
- Built a Python pipeline for filtering, regression, signal generation, and visualization using NumPy, pandas, and matplotlib.

Delta-Gamma Hedging Strategy (Options Greeks, Dynamic Hedging)

- Simulated and compared a Long Straddle and a Delta-Gamma Hedged Portfolio using real SPY options data.
- Calculated Delta and Gamma via Black-Scholes to construct Delta-neutral, Gamma-positive hedges.
- Analyzed strategy performance across spot prices, visualizing PnL convexity and volatility sensitivity.
- Demonstrated relative risk profiles and effectiveness in different market regimes. Demonstrated **20–35% higher PnL stability** and **lower downside risk** under high-volatility simulations compared to Long Straddle.

Optimal Trade Execution via Reinforcement Learning (Optimal Execution, Algorithmic Trading)

- Built a Gym-compatible environment using SPY 1-min data to simulate execution with market impact.
- Trained a PPO agent to minimize costs compared to the benchmarks. PPO agent reduced average **implementation shortfall by 18%** and **execution cost vs VWAP by 12%**, outperforming TWAP baseline in 75% of test cases.
- Evaluated using implementation shortfall, slippage, and execution efficiency metrics.
- Visualized Reinforcement Learning based agent behavior and benchmark comparisons using execution plots.

Detecting Rare Events in Low Frequency Financial Data (Anomaly Detection, Liquidity Analytics)

- Detected liquidity-driven anomalies in stock-level data using Isolation Forest and LOF algorithms.
- Designed a custom hyperplane-based classifier to label and separate high- and low-liquidity events.
- Incorporated LSEG news sentiment to contextualize outliers and improve interpretability. Achieved **92% precision** in identifying low-liquidity anomalies; improved analyst recall of rare events by **40%** through sentiment overlays.
- Built an interactive R Shiny dashboard for dynamic visualization of anomalies and sentiment overlays.

AWARDS AND RECOGNITIONS

Awards:

- 2018 – Winner – All India Innovative Idea Pitching Competition, NIT Nagpur, IN
- 2017 – Winner – Engineering India Hackathon, Nagpur
- 2018 – Runner-up – Division Level Quiz Competition, Maharashtra, IN
- 2019 and 2021 – Finalist – TCS Smart Industry Hackathon and TCS Kickoff Hackathon

Recognitions

- 2024 - Fidelity Eureka Award (at Fidelity Investments) for achievement in Financial Operations by optimizing workflow.
- 2022 – Recognized by Customer/Consumer for “Customer Obsessed” Behavior. (Fidelity Investments)
- 2019 – Special Achievement Award from Sipna College of Engineering for representing at inter-university competitions.
- 2019 and 2020 – Co-Convener and Convener of a National Level Technical Festival “VIDYOTAN”.