Annapragada Vamsy Vrishank

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Education

Stevens Institute of Technology — Jersey City, New Jersey
Masters in Financial Mathematics (Algorithmic Trading Specialization); CGPA: 3.959/4.0 — *Jan 2025 – May 2026*

- *Relevant Courses*: Stochastic Calculus, Algorithmic Trading Strategies, Market Microstructure, Derivatives Pricing, Time Series Analysis,Risk Management, Computational Methods (C++/Python), Portfolio Theory.

National Institute of Technology (NIT), Trichy — Tamil Nadu, India
B.Tech in Metallurgy, Materials Science and Microeconomics; CGPA: 8.01/10.0 — *July 2017 – May 2021*

- *Relevant Courses*: Forecasting in Microeconomics, Numerical Methods, Fluid Dynamics, Transport Phenomena.

Experience

PayPal — Bangalore, Karnataka
Data Engineer II (Enterprise Data Lake/Quantitative Infrastructure) — *Sep 2021 – Dec 2024*

- Engineered near-real-time data pipelines with Google Pub/Sub for risk-flagged payment transactions, reducing latency 80% and throughput 30%, enabling real-time fraud and compliance monitoring and analytics.
- Consolidated fragmented data across Braintree, Venmo, and Hyperwallet using Reltio MDM into unified longitudinal datasets, eliminating silos for risk modeling, fraud detection, customer taxonomy, and ML recommendations.
- Migrated petabyte-scale PayPal infrastructure to GCP (BigQuery/Dataproc) Enterprise Data Lake, enabling consolidated access for reporting, analytics, and risk modeling while reducing infrastructure costs by $4M+$ annually.
- Built high-concurrency microservice with connection pooling to track table refresh states across Oracle ADMC and BigQuery, preventing duplicate refreshes and maintaining 100% data integrity across distributed pipelines.

Projects

- **Adaptive Volatility-Regime Based Execution & Risk Framework** — Built 3-state HMM with HAR-RV-J forecasting decomposing realized variance into diffusion/jump components, integrated Lee-Mykland jump detection and Hawkes flash crash modeling, optimized VWAP/TWAP execution sizing with regime-dependent CVaR constraints, achieving Sortino 2.41 (vs Sharpe 1.57) on 252-day regime-switching synthetic data.
- **Dynamic Beta Hedging & Replication Model** — Developed Mean-Variance Optimization framework with Two-Fund Separation Theorem to construct minimum-variance synthetic hedge baskets, isolating idiosyncratic risk from concentrated equity positions. Implemented closed-form Lagrangian solver for efficient frontier computation and validated via out-of-sample backtesting (Jan–Mar 2025), achieving beta neutrality with 30–40% volatility reduction relative to unhedged position.
- **Derivative Pricing Engine** — Implemented Black-Scholes, Heston, and SABR models in C++ using Monte Carlo, PDE (Crank-Nicolson), and binomial/trinomial tree solvers for equity options. Applied Factory and Strategy design patterns for extensible Greeks computation (Delta, Gamma, Vega) across pricing methods.
- **Indicator-Driven Trading Strategies with Machine Learning** — Engineered MACD-RSI rule-based strategy and Random Forest classifier on technical features (EMA, RSI, PPO, MACD, CMO) to forecast price direction. Optimized entry/exit via out-of-sample Sharpe ratio and momentum thresholds ($\delta = 2$–15%) across 10 large-cap stocks.

Achievements

- **Vanguard ETF Portfolio Challenge**: Ranked 6th (2025);Sharpe ratio 2.74 (12-week);150+ teams.
- **Publication**: Authored "Design and Implementation of Connection Pooling APIs in Distributed Environments" (PayPal, 2023); published internally with peer review.
- **SPOT Award**: Recognized for innovation in distributed data systems and inclusion initiatives (PayPal, 2024).
- **DataByte(Data Science Club NIT Trichy**: Ranked 1st(2021); Multiclass classification problem; used CNN ensemble;

Skills

Programming: C++,Python(NumPy/Pandas/SciPy/cvxpy),SQL,NoSQL,Java,Linux,Unix,Bash,MATLAB,Distributed Systems.
Quantitative: Quantitative Research,Financial Markets,Factor Models,Stochastic Calculus,Time-Series Analysis,Portfolio Optimization(MVO,Efficient Frontier),Volatility Modeling(HMM, HAR,GARCH,Jump Detection),Deep Learning,Risk Management(CVaR),Statistics,Derivatives Pricing,Portfolio Management,Monte Carlo.
Data: ETL/ELT,BigQuery,Dataproc,Pub/Sub,Spark,Kafka,Airflow,Flink,Parquet,Real-Time Pipelines,Redis.
Tools & Libraries: TensorFlow, Scikit-Learn, QuantLib, Bloomberg, KDB/q+, pandas-ta.