Jiayang (Steven) Bu

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EDUCATION

Columbia University, the Fu Foundation School of Engineering and Applied Science, New York, NY

Master of Science in Financial Engineering   **Expected Dec. 2024**

Coursework: Statistical Analysis and Time Series, Machine Learning for Financial Engineering, Implied Volatility Smile, Quantitative Asset Allocation, Monte Carlo Simulation, Optimization Models and Methods, Analysis of Algorithm, Data Management

University of California in San Diego, La Jolla, CA

Bachelor of Science in Applied Mathematics, **GPA: 3.96/4.00, Magna Cum Laude**   **Sep. 2018 to July 2022**

Coursework: Computational Statistics, Derivatives Pricing, Machine Learning, Stochastic Calculus, Time Series, Numerical Analysis

Honors: Phi Beta Kappa Honor Society, Mathematics Honors Program (Top 1%), Provost Honors, Outstanding Senior Award

WORK EXPERIENCE

Morgan Stanley, *Quantitative Strategist Summer Associate,* New York, NY   June to Aug. 2024

- Developed an advanced trade matching algorithm using for inquiry portfolios received from clients by analyzing real time FINRA's TRACE data and incorporating techniques like grouping by seconds and minutes, and handling forward strike trades; the algorithm achieved 95+% accuracy for both HY and IG portfolios and enhanced trading efficiency
- Created and backtested a trading predictive model to identify potential portfolios and clients using TRACE's portfolio-flag feature and current bond holdings data; the model merges trades within short intervals, identifies potential portfolios and classifies long-short portfolios, enabling proactive client engagement and increased trade opportunities
- Designed a Python Dash based website that automates the portfolio matching process and delivers portfolios' performance analysis, such as their impacts on the balance sheet, betas of the portfolios, hedging amounts, and post-trade performance

Global Key Advisors, *Quantitative Analyst Intern,* San Francisco, CA   Aug. 2022 to Dec. 2023

- Developed Python code to extend the Black-Merton-Scholes (BMS) model for the cost of delta hedging, incorporating investing and borrowing in transaction, as well as stock dividend payments; Implemented Monte Carlo Simulations to estimate Delta, Gamma, and Vega under the GBM model using various methods
- Developed a dynamic programming algorithm to optimize a trading schedule for maximizing total shares traded under liquidity constraints, using real market data and various parameter tuning to improve effectiveness
- Constructed market neutral and dollar neutral portfolios for 30 Dow Jones stocks, employing techniques like beta estimation, portfolio optimization, and risk management strategies; achieved annual return of 10.8% and Sharpe ratio of 1.25
- Built a Python script to calculate VaR and CVaR of a mutual fund portfolio over user-defined investment horizons; utilized historical return distributions of individual mutual funds to construct the portfolio's combined distribution

Federal Home Loan Bank of Topeka, *Quantitative Analyst Intern,* Topeka, KS   June to Aug. 2023

- Automated reconciliation system for daily market rates and volatility files from Bloomberg using Python and SQL, reducing reporting cycle by three days monthly; developed Power BI self-update reports to optimize file operations and streamlining workflow
- Performed Principal Components Analysis (PCA) on the movements of US Treasury yields; interpreted findings to capture parallel shifts, steepness, and convexity of the yield curve;
- Conducted review of market-to-market collateral reconciliation reports and identified outliers in individual swaps with significant market value differences; validated their market values to ensure the accuracy for counterparties with over $500,000 dispute amount

FINANCIAL MODELING SKILLS

- Machine learning: clustering, PCA, logistic regression, SVM, neural networks
- Statistics: regression (OLS, MLE, Lasso, Ridge), hypothesis testing, goodness of fit, Kolmogorov-Smirnov
- Stochastic calculus: optional stopping theorem, Itô processes, Girsanov theorem, Feynman-Kac theorem
- Portfolio optimization: Mean-Variance model, Black-Litterman model

ACTIVITIES/INTERESTS

- Technical skills: Python (Pandas, NumPy, PyTorch), C++, SQL, Java, R, MATLAB, MS Office
- Interests: Antique Collecting (Historical Badges); Basketball (High School Varsity); Competitive Swimmer; Surfing