Alex (Buyi) Cao

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EDUCATION

University of Illinois Urbana-Champaign Champaign, Illinois
Master of Science in Financial Engineering Aug 2023 - Dec 2024
Relevant Coursework**:**

- Statistical Methods, Stochastic Calculus, Financial Risk Management, Machine Learning in Finance, Financial Derivatives

University of Illinois Urbana-Champaign Champaign, Illinois
BSLAS with high distinction in Mathematics Jan 2020 - May 2023

SKILLS and COMPETENCIES

- Python (NumPy, QuantLib, Pandas, Scikit-learn, Statsmodels), C++, SQL, R, Excel (PivotTable, VLOOKUP), Linux, Power BI
- Quantitative Analysis, Risk Modeling, Machine Learning, Statistical Modeling, Time Series, Data Analytics, Database System

PROFESSIONAL EXPERIENCE

J.P. Morgan Chase & Co. Practicum New York, NY
Machine Learning for Options De-Americanization Jan 2024 – June 2024

- Trained a neural network to achieve fast and precise calibration of the local volatility function to price American style options, outperforming the benchmark binomial model with an average valuation error rate of 0.35%.
- Utilized Python to generate a large training dataset (150M rows) characterized by power-law SSVI parameters derived from historical S&P 500 option data, targeting the early exercise premium (EEP) as the response variable.
- Constructed an arbitrage-free local volatility surface using Dupire's equation and SSVI parameterization.
- Obtained EEP by implementing the finite difference method (FDM) to solve partial differential equations (PDE) for American option pricing and improved the model by integrating discrete dividends for single-name stocks.
- Presented findings to the Quantitative Research team at JPM including the Head of Equity Derivatives for NA.

Orient Securities Shanghai, China
Quantitative Analyst Intern June 2023 – Aug 2023

- Utilized Python to design and backtest an ARIMA trading strategy for the SSE Composite Index, achieving a 4.13% higher annual return and a 1.43 greater Sharpe ratio than the benchmark.
- Developed linear regression and random forest models (scikit-learn) for analyzing trends within the SPY ETF, validating findings with statistical indicators such as R^2 and MAPE.
- Monitored portfolio exposures and performance, calculated key risk metrics such as the Greeks and VaR (Historical, Monte Carlo simulations), and facilitated daily trade reviews, asset valuation, and PnL forecasting.
- Improved and validated existing alpha signals via backtesting and evaluating portfolio tail risks with expected shortfall analysis.
- Developed interactive dashboards using Matplotlib and Dash to visualize portfolio performance.

TikTok, ByteDance Beijing, China
Data Analyst Intern Aug 2021 – Dec 2021

- Utilized SQL to track risk exposure in TikTok ads and detect emerging fraud patterns by analyzing measures such as user report volume and enforcement rate.
- Built predictive models (Logistic Regression, XGBoost) using Python (NumPy, scikit-learn) to predict types of ad policy violations based on marketing channels, product categories, and customer types, enhancing the Operations team's enforcement accuracy by 20%.
- Developed ETL data pipelines to consolidate disparate data sources into a unified framework, improving data quality and access for QA and Risk Management team.
- Cooperated closely with XFN stakeholders to launch a risk alerting system which enables regional teams to respond swiftly to incidents.

PROJECT

2023 CME Group University Trading Challenge Champaign, Illinois
Participant Sep 2023

- Achieved top 5% ranking in the competitive CME Trading Challenge among participants worldwide.
- Designed and implemented relational databases using MySQL for energy commodities (natural gas) and financial indices.
- Developed a GARCH model for volatility analysis and market trend forecasting.