Danish Shah

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EDUCATION

Cornell University, Ithaca, NY
MEng – Operations Research, Financial Engineering, **GPA: 3.98,** Cornell University Fall Fellowship (2023)   **Dec 2023**

Indian Institute of Technology (IIT) Madras, Chennai, India
BTech – Mechanical Engineering, **GPA: 3.86,** First Division with Distinction   **July 2020**

Selected Coursework: Advances in Financial ML (TA), Reinforcement Learning, Data Science for Engineers, Big Data Technologies, Monte Carlo Simulations, Time Series Analysis, Data Structures and Algorithms, Computer Programming and Numerical Methods.

SKILLS & ACTIVITIES

Technical: Python, Java, C, C++, Scala, Unix/Linux, Bash, R, MATLAB, SQL, HBase, Hadoop, MapReduce, Spark
Activities: Badminton, Volleyball, Poker, Finance club, Programming club, National Cadet Corps Air Squadron at IIT Madras

EXPERIENCE

Quantitative Trader - Valkyrie Trading, Chicago, Illinois   **May to Aug 2023**
- **Options Market Making:** Employed proprietary pricing models on a systematic trading desk to accurately determine fair value and pricing for crude oil option contracts and combos, to optimize trading decisions and maximize profitability.
- **Quantitative Research:** Designed and programmed a mathematical volatility surface model to quantify event impact on equity ETF prices; developed an algorithm to predict event premium, and back-tested it for past and future events.

Software Engineering Analyst - Goldman Sachs, Bangalore, India   **Aug 2020 to July 2022**
- **Data Science:** Performed statistical analysis on trade data using Python, and trained time-series (ARIMA, GARCH) and machine-learning models to study client activity and market signals, to identify predictable patterns in the firm's transactions.
- **Big Data:** Built distributed computing systems to process global markets data (1.2B+ rows per day) using Hadoop and Spark, and improved data pipeline efficiency by 74% by ensuring optimal distribution of data across parallel MapReduce tasks.
- Collaborated with multiple front and back office teams, developing tools for different upstream/downstream business functions, and helped them with collecting, and analyzing large amounts of data from various sources.
- **Programming:** Developed Java, Scala applications, and APIs to collect, format and write data to hdfs, Hbase, data-lake, etc.
- Wrote and reviewed code written by other developers in the team, and managed the team's production releases, ci/cd, version control, UAT testing, etc., overseeing the completion of tasks through the **software development cycle**.

Data Scientist - Anheuser-Busch InBev, Bangalore, India   **May to July 2019**
- **Data Analytics:** Analyzed and built predictive models (kNN, SVM) on aptitude data to measure cultural fitness of candidates
- Developed & deployed a web-scraper bot that uses Talent Acquisition tools available in the market for proactive recruitment.

RESEARCH & PROJECTS

Creating new Mid-point Order Type, *Capstone Project, Members Exchange (MEMX)*, Jersey City, NJ   **Sep to Dec 2023**
- Created an adjustable order book simulation featuring various order types (limit, mid-point, etc.) to facilitate strategy testing.
- Conducted back-tests utilizing high-frequency trading data to validate enhanced liquidity and favorable pricing outcomes.

Optimal Execution Strategies for Meta-Orders, *Cornell University*   **Jan to May 2023**
- Developed a trading strategy for institutional investors that accounts for various costs during re-balancing and transitions.
- Applied **Dynamic Programming** and Monte Carlo methods to minimize costs, comparing with static liquidation strategies.

Neural-Network based approach to Non-Linear Pairs-Trading, *IAQF Student Competition 2023*   **Dec to Feb 2023**
- Developed an algorithm to detect & quantify non-linear correlations between ETFs, facilitating more effective pairs-trading and **Statistical Arbitrage** strategies.
- Built a neural-network based approach to capture non-linear patterns; achieved superior results compared to linear strategies.

Neural Network-based Heat Transfer Model, *IIT Madras, India*   **Jan to Dec 2019**
- Trained a three-dimensional Convolutional Neural Network (3D-CNN) to predict the outcome of Computational Thermodynamics software by using temperature fields of simple fin cases as a training dataset.
- Reduced run-time for complex cases (from days to a few minutes) when using the model as the initial field in a simulation.

Natural Language Processing and Voice Recognition, *Kaggle Competition*   **May to July 2018**
- Transformed short-audio clips into Mel-frequency cepstrum to reduce the size and dimensionality of input signals.
- Trained CNN and NLP models on Tensorflow, using spectral images to recognize and differentiate words and speakers.