Aditya Saxena

Young graduate with expertise in machine learning and quantitative research, proficient in Python and statistical modelling.

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EDUCATION

Harvard University **CA, Massachusetts**
Masters in Data Science – (Computer Science & Statistics) Aug 2024 - Dec 2025 (Expected)

- **Anticipated Coursework:** Stochastic Methods for Data Analysis, Inference, & Optimization, Time Series Prediction, Statistical Machine Learning, Generalized Linear Models, Sequential Decision Making, Applied Linear Algebra and Big Data, Bayesian Statistics, Advance Topics in Data Science

Massachusetts Institute of Technology (MIT Sloan) **CA, Massachusetts**
Financial Mathematics Concentration (Cross Registration) Aug 2024 - Dec 2025 (Expected)

- **Anticipated Coursework:** Advance Analytics of Finance, Advanced Mathematical Methods for Financial Engineering, Quantitative Models

Birla Institute of Technology and Science (BITS) Pilani **Dubai, UAE**
Bachelor of Engineering in Computer Science (Distinction) June 2019 - June 2023

- **CGPA & Honors:** 9.72/10 (Academic Excellence Awardee), Merit Scholarship (Top 1%), National Undergraduate Research Awardee (2021, 2022), BITS Mantra Research & Innovation Awardee (1/1000)
- **Relevant Coursework:** Data Structures and Algorithms, Object Oriented Programming, Theory of Computation, Probability and Statistics, Mathematics (I, II, III), Discrete Mathematics, Data Mining, Deep Learning

WORK EXPERIENCE

Rostrum Grand Asset Management **Hong Kong City, Hong Kong**
Machine Learning & Data Engineer (Full Time) Jan 2023 - Present

- Applied Ensemble Learning methods to analyze historical data & identify alpha signals, boosting portfolio returns by 15%.
- Developed regression models, dimensionality reduction and error metrics to approximate daily VaR with < 3% error.
- Designed and implemented an automatic data processing system for weekly performance report using Python.
- Received the highest performance rating given to top-quartile interns and was offered a full-time role during internship.

WorldQuant BRAIN **Remote**
Quant Research Consultant (Part-Time) May 2024 - Present

- Conducted quantitative research to design and backtest trading signals based on momentum, reversal, and volatility to predict global equity performance.
- Submitted 50 trading alphas with Sharpe > 2 and correlation < 60%, with 41 used in production models.
- Hired after Gold Level in WorldQuant Challenge & qualifying for Stage 3 (Top 5%) International Quant Championship, 2024.

RESEARCH EXPERIENCE

Cost Efficient Stock Using Forecasting with Enhanced LightGBM and Optuna, *Main Author* **December 2022**
Research Advisor: Dr. Tamizharasan PS - ***IEEE International Conference MoSICom*** **[PDF]**

- Optimized LightGBM model using Optuna, achieving a 15.2% annualized return and a 3.24 Sharpe ratio, significantly outperforming benchmark returns.
- Developed cost-awareness strategy to reduce false-positive errors, lowering investment costs and more reliability.

Dynamic Beta Variability in Foreign Exchange Returns Using Instrumented PCA, *Main Author* **June 2022**
Research Advisor: Dr. Tamizharasan PS - ***2nd Place, National Undergraduate Research Competition*** **[PDF]**

- Applied IPCA to build a flexible factor model, reducing FX data dimensionality and accommodating time-varying betas for superior out-of-sample predictability.
- Demonstrated economic significance by showing IPCA-based trading strategies outperformed PCA by 8%.

Credit Risk Assessment Model for UAE's Commercial Bank, *Main Author* **April 2021**
Research Advisor: Dr Parizad Dungore - ***2nd Place, National Undergraduate Research Competition*** **[PDF]**

- Developed a ML based credit risk model using Linear Discriminant Analysis and Adaboost, achieving 95.2% accuracy.
- Implemented models like Logistic Regression, Decision Trees on 7M+ records, identifying risk factors via feature selection.

KAGGLE PROJECTS

Realized Volatility Prediction Challenge **[GitHub]**

- Developed predictive models using high-frequency trading data to forecast short-term volatility for 100+ stocks, achieving RMSPE of 0.341 and improving prediction accuracy by 15%.
- Compared implied and historical volatility using volatility cones, identifying mispriced options.

Nasdaq Closing Price Prediction **[GitHub]**

- Developed a model predicting Nasdaq stock closing prices using order book and auction data, optimized with Optuna, achieving 3.3% Mean Absolute Error.
- Engineered features including imbalance ratios and used XGBoost and LightGBM, improving compute efficiency by 9%.

RESEARCH EXPERIENCE [EXTENDED]

Cost Efficient Stock Using Forecasting with Enhanced LightGBM and Optuna, *Main Author* **December 2022**
Research Advisor: Dr. Tamizharasan PS - ***IEEE International Conference MoSICom*** **[PDF]**

- Optimized LightGBM model using Optuna, achieving a 15.2% annualized return and a 3.24 Sharpe ratio, significantly outperforming benchmark returns.
- Developed cost-awareness strategy to reduce false-positive errors, enhancing prediction reliability and lowering investment costs.

Dynamic Beta Variability in Foreign Exchange Returns Using Instrumented PCA, *Main Author* **June 2022**
Research Advisor: Dr. Tamizharasan PS - ***2nd Place, National Undergraduate Research Competition*** **[PDF]**

- Applied IPCA to build a flexible factor model, reducing FX data dimensionality and accommodating time-varying betas for superior out-of-sample predictability.
- Demonstrated economic significance by showing IPCA-based trading strategies outperformed PCA by 8%, especially for the Swiss Franc and Australian Dollar.

Deep Learning-Based Smart Parking Management System, *Co-Author* **May 2021**
Research Advisor: Dr. Tamizharasan PS - ***Springer Journal, CVIP 2021, Singapore*** **[PDF]**

- Architected the workflow of ensemble techniques for detecting and classifying parking occupancy with 95% precision.
- Used TensorFlow for training and evaluation, improving F1 score, recall, and precision metrics.

Credit Risk Assessment Model for UAE's Commercial Bank, *Main Author* **April 2021**
Research Advisor: Dr Parizad Dungore - ***2nd Place, National Undergraduate Research Competition*** **[PDF]**

- Developed a ML based credit risk model using Linear Discriminant Analysis and Adaboost, achieving 95.2% accuracy.
- Implemented and tested models like Logistic Regression and Decision Trees on 7M+ records, identifying key risk factors through feature selection.

Lithium-Ion Battery Life Prediction from Initial Stage-Cycles Using ML, *Main Author* **May 2020**
Research Advisor: Dr Vilas Gaidhane - ***Granted Intellectual Property Right*** **[PDF]**

- Developed a Gradient Boosting Trees model to predict lithium-ion battery life using initial 50-cycle charge/discharge data.
- Applied Kernel PCA to project data into higher-dimensional space, enhancing model robustness and prediction accuracy.

Real-Time Drowsiness Detection Using Computer Vision to Prevent Car & Road Accidents, *Main Author* **May 2020**
Research Advisor: Dr. Raja Muthalagu - ***Granted Intellectual Property Right*** **[PDF]**

- Developed and implemented a real-time drowsiness detection system using OpenCV's Haar Cascade Classifier, achieving an accurate detection rate of drowsiness and distraction.
- Utilized Raspberry Pi 4+ and NoIR-V2 Pi camera for hardware implementation, ensuring efficient real-time processing and low energy consumption.

KAGGLE PROJECTS [EXTENDED]

Realized Volatility Prediction Challenge **[GitHub]**

- Developed predictive models using high-frequency trading data to forecast short-term volatility for 100+ stocks, achieving RMSPE of 0.341 and improving prediction accuracy by 15%.
- Compared implied and historical volatility using volatility cones, identifying mispriced options.

Nasdaq Closing Price Prediction **[GitHub]**

- Developed a model predicting Nasdaq stock closing prices using order book and auction data, optimized with Optuna, achieving 3.3% Mean Absolute Error.
- Engineered features including imbalance ratios and used XGBoost and LightGBM, improving compute efficiency by 9%.

Jane Street Market Prediction Challenge **[GitHub]**

- Developed a multi-model ensemble combining LightGBM and custom cost awareness function, leading to an 8% increase in the sensitivity score.
- Utilized a time-series API for real-time predictions, effectively handling high-frequency trading data and optimizing trading decisions.

COURSERA ONLINE CERTIFICATIONS

- Mathematics for Machine Learning Specialization *(By Imperial College London)*
- Overview of Advanced Methods of Reinforcement Learning in Finance *(By New York University)*
- Fundamentals of Quantitative Modeling *(By University of Pennsylvania)*
- Financial Markets *(By Yale University)*
- AWS Machine Learning *(By Amazon Web Services)*
- Managing Machine Learning Projects with Google Cloud *(By Google Cloud)*