

# 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 – July 2024

- Built OLS-based predictive model with Adjusted R-squared valued >85% using 10+ years of historical and real-time data.
- Increased portfolio returns by 16.7% using automated fund scoring and analysis of 150+ financial metrics.
- Developed Python scripts with pandas for data cleaning, reducing processing time by 33% and rectifying data quality issues.
- 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 - August 2024

- 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 1.24 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]

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**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]

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**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

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- [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)