# Rahul Venkatesh

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## Education

**National University of Singapore (NUS)** — Singapore
*Master of Science in Data Science and Machine Learning (GPA: 4.8/5)* — *Aug 2023 - Present*

**Indian Institute of Technology (IIT), Delhi** — New Delhi, India
*Bachelor of Technology in Computer Science and Engineering (GPA: 7.37/10)* — *Jul 2016 - Jun 2020*

## Technical Skills

**Languages**: Python, C++, SQL, Bash

**Tools/Software**: TensorFlow, MongoDB, MySQL, OpenMP, CUDA

## Work Experience

**Squarepoint Capital** — Paris, France
*Software Engineer* — *Aug 2020 - Jun 2023*

- Developed and supported **low-latency** order entry gateways (OEG) for algorithmic trading in production.
- Built new OEGs to $5+$ **exchanges**, including **CME, ICE** and **OSE** over OUCH and FIX protocols.
- Designed frameworks for trading $2$ new asset classes: **bonds** and **non-deliverable forwards (NDF)**.
- **Improved performance** of gateway application by **collecting and analysing** latency-related **data**.
- Coordinated with QA and delivered numerous new projects (gateways) and business requests (features).
- Documented workflows and automations to streamline developing new gateways and production support.

## Projects

**Option Pricing**

- Developed n-step **Binomial Option Pricing Model** as a discrete version of Black-Scholes model.
- Implemented **Least-Square Policy Iteration** (RL) to learn optimal exercise policy for American options.
- Applied LSTDQ to compute expected payoff upon continuation using Laguerre polynomials as **feature maps**.
- Computed **greeks** and conducted sensitivity analysis of the option price w.r.t the parameters $r$, $\tau$, and $\sigma$.
- Used real data to derive risk-free rate and implied volatility, closely matching computed and market prices.

**Stock Price Prediction**

- Conducted time series analysis with **seasonal decomposition** and **stationarity** tests to identify patterns.
- Used **Moving Average** and **Exponential Smoothing** to approximate prices and remove noise.
- Implemented cross-validation and parameter grid search for model selection to reduce bias and overfitting.
- Applied diverse forecasting methods, including **ARIMA** (and VARMAX), and RNN like **LSTM**.

## Relevant Coursework

Linear Algebra, Calculus, Probability and Stochastic Processes, Differential Equations, Optimization Algorithms for Data Modelling, Applied Regression Analysis[1], Modelling and Numerical Simulations[1], Numerical Methods in Quantitative Finance[1]

[1] Currently enrolled