

# RAHUL VENKATESH

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## EDUCATION

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### National University of Singapore (NUS)

*Master of Science in Data Science and Machine Learning (GPA: 4.8/5)*

Singapore

*Aug 2023 - Present*

### Indian Institute of Technology (IIT), Delhi

*Bachelor of Technology in Computer Science and Engineering (GPA: 7.37/10)*

New Delhi, India

*Jul 2016 - Jun 2020*

## TECHNICAL SKILLS

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

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

## WORK EXPERIENCE

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### Squarepoint Capital

*Software Engineer*

Paris, France

*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**.

## PROJECTS

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### 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 option price w.r.t parameters  $r$ ,  $\tau$ , and  $\sigma$ .
- Applied 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.
- Employed **Moving Average** and **Exponential Smoothing** to approximate prices and remove noise.
- Used diverse forecasting methods, including **ARIMA** and **LSTM** (Recurrent Neural Network).
- Tested models against historical data to assess predictive performance and validate effectiveness.

### Numerical Solution to System of PDEs: Radiative Transfer (RT)

- Solved system of PDEs modelling scattering in RT in 3D space in 6 directions for a range of  $\sigma$  (scattering coefficient).
- Designed stable numerical schemes for **Fixed-point** and **Symmetric Gauss-Seidel** (SGS) method with relaxation.
- Optimized SGS algorithm using matrix manipulation techniques for a 15x speed boost resulting in faster runtime.

## RELEVANT COURSEWORK

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Probability and Stochastic Processes, Differential Equations, Optimization Algorithms for Data Modelling, Machine Learning, Applied Regression Analysis (In Progress), Modelling and Numerical Simulations (In Progress), Numerical Methods in Quantitative Finance (In Progress)