Pratyush Ranjan

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Majors: Mechanical Engineering | Minors: Computer Science and Engineering | pratyush | pranjanpr

ACADEMIC QUALIFICATIONS

Year	Degree/Certificate	Institute	CPI/%
2019 - 2023	B.Tech, ME (Majors)	Indian Institute of Technology, Kanpur	8.85/10.0
2018	CBSE (XII)	Kendriya Vidyalaya IFFCO, Bareilly	92.8%
2016	CBSE (X)	Kendriya Vidyalaya IFFCO, Bareilly	10/10

WORK EXPERIENCE

Publicis Sapient | Data Science Internship (***Summer' 22***)

- **Objective:** Automating **Dynamic Pricing** for commodities in E-Commerce Businesses for **Revenue Maximization**
- Explored Multiple public Datasets containing Historical Transactions (Demand data) for **Feature Selection & Extraction**
- Employed **ADF Test** for stationarity & **Granger Causality Test** for associating relevant feature Time Series with Demand
- Forecasted Demand on test duration with **VARMAX Time Series** Model, achieved **20% MAPE** Score
- Formulated Constraints & Objective expression for Price Optimization utilizing demand forecasts, solved with **ipopt** solver
- Delivered an end-to-end pipeline from Pre-Processing data to Optimized Prices of products across the Test Duration

Google Summer of Code' 21 | Openprinting, The Linux Foundation | | (***Summer' 21***)

- Optimized CPU performance by converting **CUPS Filters** (Printer Drivers) from standalone executables to filter funtions
- Implemented the converted filters into a **shared library (libcupsfilters)**, ensured binary compatibility & abstraction
- Tested converted filters for Memory Leaks against valgrind, replaced Command Line options with functional attributes
- Also fixed crucial bugs related to **Multi-threading**, **Memory Swapping** in filters and printer instances

KEY PROJECTS

Minimum Expected Loss (MELO) Portfolio | | | ***24 Stars on Github*** (***Jan'22 - Apr'22***)

Mentor: *Prof. Arnab Hazra, Course Project, Bayesian Analysis (MTH535A)*

- Optimization problem of **allocating weights** to **Portfolio stocks** by minimizing Expectation of Variance based Loss function
- Implemented **Bayesian Architecture** in **R** to evaluate optimal weights, according to **GMV** and **Tangency** Portfolio
- Elucidated Complex Integral equations by approximating with **Markov Chain Monte Carlo** (MCMC) sampling techniques
- Minimized Systematic risks, back-tested long position with **Sharpe Ratio 0.71** (outperformed S&P500 in Test duration)

Binomial Option Pricing Model | | (***Feb'22 - Apr'22***)

Mentor: *Prof. Avijit Khanra, Course Project, Stochastic Processes (IME625A)*

- Conducted a comprehensive study of **Binomial Option Pricing** model from the perspective of Stochastic Process
- Implemented **Pricing** & **Volatility** function in python, Contrasted differences between BOPM and **Black Scholes Model**

Crypto Channel Trendlines | Self Project | (***Jan'22 - Feb'22***)

- Designed a strategy to identify parallel **Support & Resistance** trendlines on **OHLC Candlestick** charts
- Implemented **Convex Hull Algorithm** in C++ to envelope the threshold channel length at least three pivot candlesticks
- Significantly simplified the interpretations for temporary **Breakout Regions** by plotting the trendlines on candlesticks

GAN Portrait Animator | Self Project | (***Jun'21 - Jul'21***)

- Utilized **Generative Adversarial Network (GAN)** for image-to-image translation of portrait to animated image
- Employed **Binary Cross-Entropy** loss function for **GAN Discriminator**, trained GAN model to act as data generator
- Successfully implemented Gradient Descent to converge the **HOG features** of input image with the output of **Generative NN**

RELEVANT COURSES

i: in Progress, A: A grade

Data Structures & Algorithms[A]	Fundamentals of Computing	Bayesian Analysis[A]	Applied Numerical Methods[A]
Stochastic Processes & Applications[A]	Probability and Statistics[A]	Derivatives Contracts[A]	Introduction to Electronics[A]
Introduction to Machine Learning[A]	Probabilistic Machine Learning	Financial Economics	Complex Variables and PDE

TECHNICAL SKILLS

Languages: C, C++, Python, R, SQL, MATLAB | **Libraries & Misc:** Sklearn, Git, Pandas, Numpy, Matplotlib, Ubuntu

SCHOLASTIC ACHIEVEMENTS

- Among **Top 13** out of 1200 in **Maverick Derivatives** Selection Rounds at IITK
- Secured **All India Rank 3395** in **JEE Advanced 2019** among the 1.2 Lakh shortlisted candidates
- Secured **All India Rank 43** in **COMEDK Undergraduate Entrance Test 2019** among 70,000 candidates
- Conferred with **K.N Saluja Scholarship twice** for **Academic Excellence** in freshmen and sophomore year (2020 & 2021)