

# VARUN GOYAL

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in varungoyal23

🔗 github.com/govarun

📍 Champaign, USA

Seeking full-time roles starting June 2024

## Education

### University of Illinois Urbana-Champaign

Aug 2022 - May 2024

*Master of Computer Science; GPA: 4/4*

Champaign, USA

Coursework: Statistical Modeling, Statistics and Probability II\*, Advanced Information Retrieval, Independent Study in Data Mining, Advanced Competitive Programming, Advanced Topics in Natural Language Processing, Artificial Intelligence

### Indian Institute of Technology, Kanpur

Aug 2018 - May 2022

*Bachelor of Technology, Computer Science and Engineering; GPA: 9/10*

Kanpur, India

Coursework: Statistical Simulation & Data Analysis, Convex Optimization, Deep Learning, Machine Learning, Probability & Statistics, Time Series Analysis, Numerical Methods, Linear Algebra, Differential Equations, Advanced Data Structures & Algorithms, Randomized Algorithms, Software Development, Operating Systems, Compiler Design, Networks, Database Systems, Computer Architecture, Calculus

## Experience

### Quadeye Securities

May 2022 - Jul 2022

*Quantitative Researcher*

Delhi NCR, India

- Experimented with existing and new signals in arbitrage; understood basics of trading, market making, and quantitative analysis.

### Solana Labs

May 2023 - Aug 2023

*Machine Learning Engineer Intern*

Chicago, USA

- Implemented a chatbot agent to support minting, trading of NFTs on Solana blockchain through natural language instructions.

### Google AI for Social Good, Predicting Deforestation

Nov 2021 - Apr 2022

*Machine Learning Researcher - Intern, Moja Global*

Bengaluru, India

- Researched deep learning models to predict deforestation on multi-dimensional time series geographical data; led a team of 4 students.
- Explored RNN architectures: LSTM and Convolutional LSTM; achieved SOTA 0.83 AUC for deforestation prediction in Uganda.

### Rubrik, Cloud Native Permissions Interface

May 2021 - Jul 2021

*Software Development Engineer - Intern, Cloud Native Team*

Bengaluru, India

- Enhanced Rubrik's version update interface to inform clients precisely of access control requested; added permission-feature mapping.
- Took complete ownership of the project, worked full-stack across Golang, Python in backend, and ReactJS in frontend.
- Deployed solutions for AWS and Azure with different architectures; decreased ambiguity reducing cloud team's feature tickets by 80%.

## Publications

### QuickAns: A Virtual Teaching Assistant

AIML Systems 2023

### AI-based Monitoring and Response System for Hospital Preparedness towards COVID-19

ICML Workshop 2020

## Projects

### Portfolio Optimization Strategies and Risk Assessment

Mar 2023 - May 2023

- Researched and implemented Markowitz strategies, including Minimum-Variance, Maximum Sharpe Ratio, and Tangency portfolios.
- Achieved a 3.8% higher annualized return and increased the portfolio's Sharpe ratio from 1 to 1.21 through targeted asset allocation.
- Improved the allocation by using Bayesian Black-Litterman model to accommodate investor views, resulting in enhanced returns.

### Basket Option Pricing using Physics Informed Neural Networks

Jan 2023 - May 2023

- Designed a Neural Network with learn-able Fourier Layer along with residual connections to solve the Black-Scholes formula.
- Trained using a Physics Informed loss and an initial loss to get Relative Error with an L2 Norm of 0.076

### Quantitative Trading Strategies and Indicators Analysis

Sep 2022 - Dec 2022

- Implemented, backtested strategies including MACD, Pair Trading, Heikin Ashi candlesticks, Awesome Oscillator, and Dual Thrust.
- Enriched the strategies by indicators including Bollinger Bands, and Relative Strength Index achieving Sharpe Ratios from 1.2 to 1.8

### Alexa SocialBot Challenge, Amazon

Sep 2022 - Jul 2023

- Selected amongst the top 9 teams globally for proposing novel improvements in the SOTA chatbot architectures for user engagement.
- Introduced a novel search-based approach enabling the chatbot to talk about recent events without hallucinating or observable latency.

### Virtual Teaching Assistant Bot

Jan 2023 - Apr 2023

- Introduced an LLM-based bot to answer questions on doubt discussion platforms for quick preliminary answers and reduced TA load.
- Utilized embedding similarity to supply the relevant textbook content with the question prompt for subject-aware answers.

## Technical Skills

**Languages:** C++, C, Python(ML & Statistical Libraries), R, MATLAB, SQL, Bash, Java, GoLang, HTML, CSS, Rust

**Libraries & Utilities:** Pandas, NumPy, TensorFlow, PyTorch, Scikit-learn, Git, Excel

## Achievements & Positions of Responsibility

**Physics Olympiad, HBCSE**, awarded Gold Medal for being amongst top 35 students nationwide; trained for internationals. 2018

**Junior Science Olympiad, HBCSE**, awarded Gold Medal for being amongst top 35 students nationwide. 2016

**AQTE, Quant RSO, UIUC**, active member competing in Quant hackathons, taking lectures and assisting in workshops. 2022

**Director's Scholarship & Academic Excellence Award, IIT Kanpur**, amongst top performers academically. 2019

**All India Rank 179, IIT JEE-Main** out of 1.6 million candidates, top 0.01 percentile. 2018

**All India Rank 146, IIT JEE-Advanced** out of 160,000 shortlisted candidates, top 0.09 percentile. 2018