# Arpit Kumar

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## WORKING INTERESTS

**Quantitative Researcher | Optimization Algorithms | Time Series Analysis | Applied Statistics | Deep Learning**

## EDUCATION

**Indian Institute of Technology (IIT) Kharagpur, India**                                    **CGPA: 8.96/10**
**Major**: Integrated B.Tech - M.Tech (Dual Degree) in Chemical Engineering                  2022 - 2027

## TECHNICAL SKILLS

**Programming Languages:** Python ● C ● C++ ● MySQL ● MATLAB ● Html ● CSS ● JavaScript* ● LaTeX*
**Libraries:** NumPy ● Pandas ● PyTorch ● TensorFlow ● Keras ● Scikit-learn ● Matplotlib ● Seaborn ● Plotly* ● Statsmodels*
**Softwares:** VS Code ● Git & GitHub ● Kaggle ● Jupyter Notebooks ● Google Colab ● MySQL ● Hugging Face* ● Tableau*

## PROJECTS

**Deep Learning - Based Text Summarization System | Course Project**                         **IIT Kharagpur, India**
Developed a Deep-learning based end-to-end pipeline to summarize large text                   *Jun 2025 - Jun 2025*
- Developed summarization model processes **100K+** documents, cut average summary length by **75%** & retained **92%** info
- Automated processing and training pipelines, boost throughput **5×** from **5K** to **25K** doc/hr & streamlined model updates
- Improve summary quality **35%** by ROUGE-L, F1 gain in extractive baselines & reduced manual review workload by **60%**

**Unsupervised Momentum Strategy using S&P 500 | Self Project**                               **Kharagpur, India**
Developed a Unsupervised Momentum Strategy using S&P 500 through K-Means & Momentum Clusters  *Jan 2025 - Jan 2025*
- Designed a momentum strategy by clustering **150** S&P 500 stocks monthly using **K-Means** on technical indicators
- Selected stocks from high-momentum clusters, optimized weights via Efficient Frontier with **10%** max allocation cap
- Delivered **19.4%** CAGR and **1.45** Sharpe ratio over **8-year** backtest, outperforming S&P 500 with reduced volatility

**Twitter Sentiment Strategy using Engagement-Based Signal Ranking | Self project**          **Kharagpur, India**
Developed Twitter sentiment strategy for Nasdaq-100 stocks; achieved 11.4% alpha in 3-year backtest.  *Jan 2025 - Jan 2025*
- Engineered an alternative sentiment signal by monthly engagement ratio (comments/likes) to rank NASDAQ-100 stocks
- Formed equally weighted portfolios of **top-5** stocks each month, filtering out bots by activity threshold and heuristics
- Achieved **11.4%** alpha over QQQ ETF in a 3-year backtest (Sharpe ratio **0.95**), demonstrating consistent outperformance

## COMPETITIONS

**Volatility Curve Prediction by NK Securities 2025**                                        **Kharagpur, India**
Optimised predictive models with advanced quantitative techniques & novel geometric ensembling strategy  *May 2025 - May 2025*
- Pioneered novel geometric ensembling strategy leveraging Euclidean geometry and data clustering for enhanced accuracy.
- Developed predictive models using **Parametric Curve** Fitting, **Denoising** Transformers, and **Iterative** Imputation.
- Demonstrated strong analytical thinking, integration of advanced machine learning, statistical, and geometric principles.

**DTL Quant Challenge 2024 by DTL | Top 20 (National Level)**                                **Kharagpur, India**
DTL | Developed a dynamic alpha model integrating RSI, mean reversion, volatility, and trend signals  *Sep 2024 - Sep 2024*
- Designed alpha model by RSI, mean reversion, volatility, trend signals with adaptive weights for shifting market regimes.
- Achieved alpha scores of **2.42** (in-sample), **1.32** (out-of-sample), & **0.48** (live), validating robustness across testing stages.
- Ranked **19th** nationally in a live trading simulation, demonstrating strong predictive accuracy & innovative model design.

**General Championship Data Analytics by Evva Health | Gold**                                **IIT Kharagpur, India**
Technology Students' Gymkhana, IIT Kharagpur | Developed a Social and Healthcare Risk Scorecard  *Mar 2024 - Apr 2024*
- Achieved **82.89%** accuracy by Voting ensemble **BERT**, Naive Bayes on patient-reported health data for risk classification
- Reduce manual data collection time by **60%** by deploying a **Streamlit** web app with real-time scoring & dynamic feedback
- Scraped **1000+** entries by **BeautifulSoup**/**Selenium** and **Bifactor & MIRT** models to optimise healthcare resource in India

**Open IIT Data Analytics Competition | Silver**                                             **IIT Kharagpur, India**
Technology Students' Gymkhana, IIT Kharagpur | Prediction of Footfall on time-series data     *Nov 2023 - Dec 2023*
- Secured **2nd** rank among institute, predicting **city footfall** from prior years time series data using **time-series models**
- Scraped data by **BeautifulSoup** and applied **EDA**, Time series analysis, and clustering techniques by **K-Mean Cluster**.
- Utilized forecasting models **FBProphet**, **Random Forest**, **LSTM**, and ensemble methods & achieved **accuracy** of 86.63%.

## RELEVANT COURSEWORK

**Finance :** Stochastic Processes in Finance, Mathematical Finance, Financial Institutions & Markets, Derivatives and Risk Management, Market Microstructure, Fintech and Algorithmic Trading, Entrepreneurial Essentials
**Data Science :** Machine Learning, Advanced Machine Learning, Neural Network & Deep Learning, Regression and Time Series Model, Programming and Data Structures*, High Performance Computing*, Computer-Aided Process Engineering*
**Mathematics :** Mathematics I, Mathematics II, Probability and Statistics, Introduction to Stochastic Processes, Advanced Calculus, Mathematics for Machine Learning, Transform Calculus, Partial Differential Equations

## ACHIEVEMENTS

- Achieved **Expert** title on Codeforces (highest rating: **1612**) under handle: **_Badassium**, ranked 203 in Div 3 Round **1032**
- Achieved a **Gold** Medal in the General-Championship **Data-Analytics 2024** from Rajendra Prashad Hall of Residence
- Achieved a **Silver** Medal in the Open IIT **Data Analytics 2023** from Rajendra Prashad Hall of Residence in year 2023
- Achieved an outstanding All India Rank of **1478** in **JEE Advanced 2022** among **1,50,000+** candidates in year 2022-2023
- Achieved an outstanding percentile of **99.2%tile** in **JEE Mains - April 2022** among **10,00,000+** candidates in year 2022-2023