Avirup Chakraborty

Master of Statistics
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Course	College/University	Year	Performance
Master of Statistics	Indian Statistical Institute	2025-27	On Going
Bachelor of Statistics	Indian Statistical Institute	2022-25	88.61%
Higher Secondary	Ramakrishna Mission Vidyalaya Narendrapur	2022	96.5%
Secondary	Sodepur High School	2020	96.6%

SKILLS & INTERESTS

- **Programming Languages**: Python, R, JavaScript, HTML, CSS
- **Libraries**: Pandas, Numpy, Statsmodels, PyTorch, Matplotlib, Seaborne, Plotly, Scikit-Learn, ggplot2, forecast, VAR
- **Tools**: GitHub, VS Code, Overleaf, MS Word, Powerpoint, Excel, Slack
- **Databases & Big Data:** SQL, Spark, Databricks
- **Interests**: Quant Researcher, Finance

WORK EXPERIENCE

Performance Analysis Intern | Play Games 24×7 [May'25-Oct'25]

- Analyzed skill–chance balance in traditional games like **Rummy** and **Ludo** using real gameplay data on **Databricks**. Employed **SQL** for scalable queries and **Pandas** for detailed analysis and feature engineering.
- Built **self-learning game agents** using **Monte Carlo Tree Search** in custom Python environments. Applied OOP and simulation-based training to boost win rate by **20%** over rule-based strategies. Applied ranking systems like **Elo** and **TrueSkill** to assess player skill. Also developed **custom scoring models** grounded in gameplay data to enhance fairness and predictive accuracy.
- Designed and implemented a self-learning strategy for incomplete-information games, combining Reinforcement Learning with **Convolutional Neural Networks (CNN) and Counterfactual Regret Minimisation (CFR)** to optimise decision-making.

Data Analyst Intern | Calcutta High Court [Jun'24 & Jun'25]

- Prepared detailed **performance reports** for all district courts under the **Calcutta High Court**, leading **data collection, validation**, and integration from diverse administrative sources.
- Performed **EDA** on judicial case data to uncover **bottlenecks**, trends, and metrics. Used **Excel**, **PowerPoint**, and **Python** (*Pandas*, *Plotly*) to deliver **interactive visualizations** and actionable insights in a team setting.

PROJECTS

Overview of EU Emission Trading System [Dec'24-current]

- Worked under Prof. ***Diganta Mukherjee*** to analyze the structure and dynamics of the EU carbon allowance market. Forecasted price trends using **ARMA-GARCH models** to capture volatility and temporal dependencies in the market.
- Evaluated systemic risks by modeling **inter-country transaction networks** over time using a **Vector Auto-regression (VAR) model**. Currently preparing a research paper for submission based on the findings.
- **Tools:** Python, R, Latex.

Trade Pattern Analysis of India [Jan'25]

- Analyzed **India's monthly export-import data** (2018–2025) from the DGCIS portal using **seasonal decomposition** to extract trend, seasonal, and irregular components. Applied time series forecasting techniques to predict trade movements.
- Detected structural shifts in trade using **change point detection** methods. Conducted **inter-country correlation analysis** to examine co-movement of trade flows, revealing aligned or divergent patterns across trade partners.
- **Tools:** Python, Canva.

✦ Applied Theoretical Study in Finance [Summer'24 Summer'25]

- ❖ Analyzed the return structure of popular stocks using tail risk modelling, probability density estimation, Value at Risk (VaR), and Conditional Value at Risk (CVaR), exploring extreme value behaviour and distributional characteristics to assess market risk.
- ❖ Learned different methods of derivative pricing. Worked on yield curve analysis and visualization using API-fetched government bond data, examining changes in curve shapes over time.
- ❖ **Tools:** Python.

✦ Academic Projects [2022-2025]

- ❖ Completed diverse statistical projects including **Car Price Prediction** [Link], **Body Fitness Analysis** [Link], and **Signal Estimation** [Link] using statistical modeling and machine learning techniques.
- ❖ Also delivered presentations on key economic topics, including **Inflation from a macroeconomic perspective** [Link] and a comparative demographic study of **Bihar vs Tamil Nadu** [Link].
- ❖ **Tools:** Python, R, Powerpoint, MS-Word.

✦ Personal Projects [2024-25]

- ❖ Built a learning bot using **Monte Carlo Tree Search**, and benchmarked it against traditional **Minimax** strategies to play **Tic-Tac-Toe**. Demonstrated iterative self-play and decision optimization. [Link]
- ❖ Developed a **Wordle**-solving bot using principles of **Information Theory**. Designed a web interface to visualize game progress and decision metrics. [Link]
- ❖ **Tools:** Python

RELEVANT COURSEWORK

Statistical Methods | Linear Statistical Models | Parametric Inference | Nonparametric Methods | Economic and Official Statistics and Demography | Discrete and Continuous Distributions | Stochastic Processes | Multivariable Calculus | Programming in C and Python | Data Structures | Algorithm Design and Analysis | Microeconomics | Macroeconomics | Advanced Algorithms |

ACHIEVEMENTS & CERTIFICATIONS

- ✦ **World Rank 147 & AIR 25 – Prosperity 3 by IMC Trading (2025):** Achieved top-1% global rank in an international trading simulation organized by IMC Trading. Applied market-making and execution strategies under latency and risk constraints using Python-based backtesting tools.
- ✦ **5th Place in Intra-campus Alphathon Quant Challenge (2023):** Ranked in the top 5 out of 100+ participants in a campus-wide quantitative trading contest. Designed and optimized short-term alpha signals based on rolling statistical indicators and backtested PnL performance.
- ✦ **Academic Distinctions:** Secured **All India Rank 24** in the B.Stat Entrance Exam (ISI, 2022); **Rank 228** in WBJEE among 1+ lakh candidates; placed in the **Top 20** at the state level in both Class 10 and Class 12 board examinations.

PERSONAL DETAILS

- ✦ **Hobbies:** Enjoy solving Rubik's Cube, Playing Tabla, reading Thriller books (Dan Brown), playing chess.
- ✦ **Languages:** Fluent in **English (Professional)**, **Hindi (Professional)**, and **Bengali (Native)**.
- ✦ **Address:** Adarshapally, Khardah, Kolkata – 700116, West Bengal, India.