

# Dhairya Kantawala Second Year Undergraduate Mathematics Indian Institute of Technology Bombay

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# Pursuing a Minor in Artificial Intelligence and Data Science from C-MInDS, IIT Bombay SCHOLASTIC ACHIEVEMENTS \_\_\_\_\_

- Awarded an AP Scholar Award with perfect scores in Calculus BC, Physics C: Mechanics, and Chemistry ('22)
- Currently **3rd** in the Department of Mathematics at IIT Bombay, showcasing consistent academic excellence ('24)
- Secured All India Rank 1039 in JEE Mains 2023, being in the top 0.1% of 1 million+ candidates nationwide ('23)
- Qualified for Regional Round for International Finance Olympiad (IFO) conducted by IIFM and ET ('19)

### PROFESSIONAL EXPERIENCE

CPI: 9.66

Automating ETL process using NLP | Intern Project: Book My Diamond, Mumbai (Dec '24 - Jan '25) India's only online diamond trading platform, efficiently facilitating seamless connections between buyers and sellers

- Streamlined the extract, transform, and load process for diamond data using NLP and embeddings to automate field and value mapping, enabling conversion of raw data into a standardized company database format
- Developed a system for **duplicate detection** and **field mapping review**, using a **cosine distance function** to identify similar mappings, enabling automation while allowing manual edits to resolve errors and ensure accuracy
- Generated **standardized JSON configurations** for diamond data and developed a **Streamlit UI** to display mappings, allowing users to download the files for integration with external systems and downstream processing

**No-Code Solution for Algorithmic Trading** | Intern Project: BreakoutAI, Germany (Jul '24 - Oct '24) Germany's first AI-driven company specializing in automated algorithmic trading from user's custom strategies

- Designed the **end-to-end** architecture for a no-code algorithmic trading platform, utilizing the **LangChain library** in Python to effectively integrate front-end and back-end components, enhancing functionality and user interaction
- Transformed raw company data into **vector embeddings** using **Pinecone**, effectively enabling the re-training of a **Large Language Model** (**LLM**) to intelligently and swiftly generate trading algorithms from user prompt input

# KEY PROJECTS \_

Music Classification Using MFCC Features | Course Project: Prof. Vinay Kulkarni (May '24 - Jul '24)

- Processed raw audio data, extracted **MFCC features**, and applied various **machine learning algorithms** such as **decision trees**, **SVM**, **and neural networks** to classify singers based on their distinct vocal characteristics
- Focused on improving model accuracy through feature engineering and dimensionality reduction, achieving a perfect score of 30/30 and securing 1st place in a class of 200+ for the classification project with MFCC features

Option Trading Strategies | Summer of Science (SoS), MnP club, IIT Bombay (May '24 - Jul '24)

- Conducted comprehensive research on option trading strategies, leveraging insights from **Option Volatility and Pricing by Sheldon Natenberg** and credible online resources to evaluate strategies and their market effectiveness
- Developed a deep understanding of derivative trading strategies, emphasizing key **technical indicators** and the **Greeks** that influence market behavior and help assess risk and potential profitability in various trading scenarios

Time Series Analysis of Sales Data | Seasons of Code (SoC), WnCC, IIT Bombay (May '24 - Jul '24)

- Developed a robust expertise in advanced **time series analysis** methods, including **S-ARIMA** and **LSTM**, to effectively model, analyze, and accurately predict complex sales trends across various market conditions and scenarios
- Conducted comprehensive **exploratory data analysis** on daily sales data from given stores, uncovering critical insights that significantly enhanced my **modeling strategies** and informed data-driven decision-making processes
- Developed a powerful **XGBoost** forecasting model achieving an impressive **90.53%** accuracy, ranking my project in the **top 500** globally and showcasing its potential impact on business outcomes and strategic decision-making

# Interest Rate Hike Prediction Model | FinSearch, Finance Club, IIT Bombay (Jun '24 - Aug '24)

- Developed an LSTM model to predict interest rate hikes using **sentiment analysis** on keywords from daily news
- Gained expertise in macroeconomic factors and achieved 98% accuracy in forecasting interest rate adjustments

### Equity Research Competition | Research project, Finance Club, IIT Bombay (Sep '24)

- Did comprehensive stock analysis using macroeconomic factors, SWOT analysis, and key quantitative metrics
- Developed an investment thesis through assessments of the industry and company to predict stock price movements

## OTHER PROJECTS .

Introduction to Hyperbolic Geometry | Course Project: Prof. Sudhir Ghorpade (Aug '23 - Nov '23)

- Explored hyperbolic geometry, a **non-Euclidean** branch, focusing on its re-imagining of the **space and distance**
- $\bullet\,$  Explored the geometry of geodesics, hyperbolic triangles, and distance calculations using logarithms methods

Origami and Mathematics | Course Project: Prof. Madhusudan Manjunath (Aug '23 - Nov '23)

- Researched origami constructions, focusing on folding techniques for **angle trisection** and **cube root extraction**
- Explored how **origami axioms** and **algebraic geometry** solve polynomials and higher-dimensional constructions

#### ADHD Support and Assistance Chatbot Agent | Self Project

• Designed a system to process PDF textbooks and articles, converting them into vector representations for storage

(Dec '24)

(Mar '24 - Apr '24)

(June '24 - July '24)

(Dec '24 - Present)

- $\bullet \ {\rm Built\ a\ comprehensive\ database\ integrated\ with\ an\ AI\ agent,\ designed\ to\ interact\ with\ the\ stored\ information}$
- Created an chatbot that communicates in a friendly manner, addressing ADHD challenges and providing support

## Geospatial Mapping and Visualization of Tree Data | Self Project (Dec '24)

- Collected tree data from an NGO and visualized it using GeoPandas with age- and type-based color coding
- Enhanced the visualization by adding insights on top tree species, age distribution, and other important attributes

#### Sudoku Solver Algorithm in C++ | Self Project

- Developed a recursive backtracking algorithm to solve Sudoku puzzles, while ensuring valid number placement
- The program validates constraints across rows, columns, and grids, ensuring correct placements before solution
- Implemented logic to handle unsolvable cases, ensuring the program backtracks when no valid solutions exist

#### Handwriting to Unicode Converter | Self Project

- Developed a Handwriting to Unicode Converter using Python, Tkinter, and PIL for 28x28 image processing
- Integrated an SVM with RBF kernel for handwritten digit classification, achieving 89% accuracy on images

#### POSITIONS OF RESPONSIBILITY .

## Teaching Assistant MA105, Calculus | Department of Mathematics (Aug '24 - Nov '24)

- Assisted **30**+ first-year students in weekly **tutorial** sessions through problem solving and **doubt clarification**
- Provided logistical support to the professor-in-charge through invigilation and evaluations of 1400+ students
- Organised and conducted **TSC** (Tutorial Service Centre), providing a recap of the course to over 300+ students

Institute Academic Coordinator | Student Support Services, UGAC (June '24 - Present)

Selected among 4 out of 150+ applicants via rigorous interviews, addressing queries of 5000+ undergraduates

- Spread awareness about **Course Information** and **Mental Health** among undergraduate students by curating and designing series of impactful **social media posts**, recording a significant **36% increase** in online engagement
- Acquainted and assisted over 1,000 undergraduate students with their course registration process in the institute

### Winter in Data Science Mentor | Analytics Club, IIT Bombay

- Led a project on Retrieval-Augmented Generation (RAG) with weekly sessions on techniques and application
- Guided 20+ students through practical implementations, fostering deep understanding and hands-on experience

### TECHNICAL SKILLS \_

Programming	Python, R, C++, LATEX, Azure, Jupyter Notebook, AWS, Pinecone database, SQL, Spark
Libraries	TensorFlow, Keras, PyTorch, scikit-learn, NumPy, Pandas, MatPlotLib, LangChain, streamlit
Data Analysis	BeautifulSoup, Excel, Power BI, Data Cleaning, Statistical Analysis, Data Interpretation

## EXTRACURRICULAR ACTIVITIES \_\_\_\_\_

Origami	$\bullet$ Created and managed online origami ${\bf portfolio}$ for 5 years, showcasing intricate designs
International Exposure	<ul> <li>Attended Summer School at the University of Oxford, where I gained invaluable global exposure in Business and Entrepreneurship, enhancing my understanding of markets</li> <li>Participated in British Origami Society Convention, connecting with over 100 origamists, exchanging techniques, ideas, and fostering deeper appreciation for the art</li> <li>Attended Pacific Coast Origami Convention (PCOC) hosted by OrigamiUSA, enhancing my origami skills while networking with global artists and enthusiasts</li> </ul>
Volunteering	<ul> <li>Volunteered as a Data Visualization Specialist for Data Science for Anand Good (DSAG), delivering insights and visualizations to support data-driven decisions</li> <li>Mentored and guided JEE Aspirants of 2024 and 2025 batches from across the nation</li> <li>Volunteered to teach Mathematics to students under Educational Outreach, NSS</li> </ul>