Pursuing **Minor** in **Data Science and Artificial Intelligence** from C-MInDS, IIT Bombay

Scholastic Achievements

- Secured **All India Rank 8** in Joint Entrance Examination **Advanced** amongst the 1,50,000 candidates *(2021)*
- Achieved **All India Rank 51** and was awarded the prestigious **KVPY** fellowship by **IISc Bangalore**, India*(2020)*
- Awarded with **Advanced Performer(AP)** grade for extraordinary performance in **Differential Equations** by IITB *(2022)*
- Received the **National Talent Search Examination** scholarship with **State Rank 1** conducted by NCERT*(2019)*
- Secured **All India Rank 62** in Joint Entrance Examination **Main** amongst the 0.9 Million candidates *(2021)*

Olympiads and Scholarships

- One of **Top 30** students of North India to qualify **Regional Mathematics Olympiad** and appear for **INMO**. *(2020)*
- Amongst **6** (out of 1400) students shortlisted for interview stage of the prestigious **Aditya Birla Scholarship***(2022)*
- Scored among the **National Top 10** in **Indian Olympiad Qualifier Astronomy Part II** and selected for and successfully completed the Orientation Camp 2021 for International Olympiad on Astronomy and Astrophysics*(2021)*
- Scored among the National **Top 64** in **Indian Olympiad qualifier in Chemistry Part II** and selected for and successfully completed the Orientation Camp 2021 for **International Chemistry Olympiad** by **TIFR** *(2021)*
- Amongst the **Top 47** to qualify the **Indian National Astronomy Olympiad** conducted by **HBCSE** *(2020)*

Key Projects

FastChat *Autumn 2022*
Guide: Prof. Kavi Arya | Course Project : Software Systems Laboratory *IIT Bombay*

- Developed a messaging platform that allows clients to share text and **images** through direct messaging or **group chat**
- Implemented **end-to-end encryption** of the messages using **Fernet** for group chats and **RSA** for direct messaging
- Used **PostgreSQL**'s Python API to maintain user profiles, online-users, public keys and storing undelivered messages
- Achieved **low latency** (order of 0.1s) and high-throughput by using **multiple servers** and a separate load balancing server

Railway Itinerary - Journey Planner and Review System *Autumn 2022*
Guide: Prof. Supratik Chakraborty | Course Project : Data Structures and Algorithms Lab *IIT Bombay*

- Assembled a Railway Journey Planner which stores and retrieves data on stations, trains, journeys, their reviews and ratings
- Implemented data structures like **Dictionaries, AVL Trees, Binary Heaps** to handle the data and perform quick queries
- Implemented **KMP** to retrieve reviews with desirable words; added **Search-Completion** for stations by using **Tries**
- Used popular algorithms like **Depth First Search, QuickSort, Dijkstras, BFS, MergeSort** and their **modifications** to allow the user to plan efficient journeys based on certain constraints such as **cost** and **time optimization**

Bokeh Generator *Winter 2022*
Winter in Data Science | Deep Learning *Analytics Club, IIT Bombay*

- Implementing a deep learning model to render **Non-Uniform Bokeh Effect** on complex input data with multiple objects
- Using **TensorFlow** to create a **Inverted Pyramid** Convolutional Neural Network (CNN) based on **PyNet CNN**
- The training data for the model consists of 5k+ shallow/wide depth-of-field image pairs captured using **Canon 7D DSLR**

Forecasting Fours *Autumn 2022*
HELLO FOSS | Open Source Github Event *Web and Coding Club, IIT Bombay*

- Created a **Deep Neural Network** to classify the shot played by the batsman; trained the network on **5k+** images
- Desgined the architecture based on **ResNet9**, leveraged the use of **Skip Connections** to address the degradation problem
- The model consisted of **Convolution Layers**, **Max Pool Layers**, utilized **ReLU** activation and **Cross Entropy Loss**
- Utilized **PyTorch** for the project, fine-tuned hyperparameters to improve performance and achieved an accuracy of **90+**%

CodeWars-V3 *Ongoing*

CodeWars | Bot Programming Competition *Web and Coding Club, IIT Bombay*

- Designed a **multi-player strategy** game where players use the Custom API to create strategies to win a 4 player game
- Implemented the **back-end** of the game in **C++** and connecting it to the **Python API** using socket programming
- Incorporated modularity and documentation in code and used the **SFML** library to generate pixelized graphics of game

Tic-Tac-Toe *Autumn 2022*

Guide: Prof. Kavi Arya | Course Project : Software System Lab *IIT Bombay*

- Developed a multi-client version of the famous two player game tic-tac-toe in **Java** using **Socket Programming**
- Modeled each player as both a client and a server to allow them to listen to each other using **Server Socket** connections
- Implemented the **Peer-to-Peer** Model between players and achieved optimized game performance with **minimal lag**

Introduction to Algorithmic Trading *Summer 2022*

Summer of Science | Learning Project *Maths and Physics Club, IIT Bombay*

- Acquired the skill in **Python**, and relevant **Statistics and Maths** to understand the various strategies of Algo-Trading
- Learnt about **Modern Portfolio Theory** and **Markowitz's hypothesis** and how it is used by traders in practice
- Understood methods to prevent **Data Snooping Bias** and **Survivorship Bias** and how to backtest strategies
- Gained knowledge about trading strategies such as **Momentum Strategy** and **Mean Reversion Strategy**

Other Projects

Image Processing Using PCA *Autumn 2022*

Guide: Prof. Suyash P. Awate | Course Project: Data Analysis and Interpretation *IIT Bombay*

- Worked with **MATLAB** to implement a program generating **Representative** images of fruits from a database of images
- Used **Principal Component Analysis** to analyze 28x28 images of handwritten digits from the **MNIST Dataset**
- Implemented **hyperplane fitting** of random variables in Euclidean Planes according to given multivariate distributions

Bubble Trouble Game *Autumn 2021*

Guide: Prof. Parag Chaudhuri | Course Project: Computer Programming and Utilization *IIT Bombay*

- Developed a multi-level version of the classic bubble shooter game using **SimpleCpp graphics package** of **C++**
- Used **Object Oriented Programming** to simulate the balls, shooter and bullets and interaction between them
- Implemented physical principals like **projectile motion** of balls, elastic collisions and achieved smooth gameplay

Stock Market Prediction using ARIMA *Summer 2022*

Self Project *IIT Bombay*

- Predicted the closing stock price of GOOG by analysing it through Linear Regression and **ARIMA** approach
- Utilized numpy, pandas, matplotlib, sklearn and **pmdarima** to analyze, visualize and interpret the data and results
- Achieved a significant reduction in root mean squared error of **26X** when switching from Linear Regression to ARIMA

Positions of Responsibility

Institute Web and Coding Convener | *Web and Coding Club, IIT Bombay* *Jun'22- Present*

- Working in a team of **8** to organise 40+ events catering to the programming interests of **10K+** Institute students
- Moderated the **Git and Github Workshop** and handled the queries and doubts of 200+ attendees for the assignment
- Introductory Host for the Solana Developers Tour India, Mumbai Edition attended by 250+ from the institute and outside

Technical Skills

Programming Languages	Proficient in: C++, Python | Familiar with: Java, Bash, MATLAB, Sed, AWK, Prolog
Data Science	PyTorch, Keras, TensorFlow, Matplotlib, NumPy, Pandas, Scikit-learn
Miscellaneous	HTML, Bootstrap, Javascript, CSS, Git, LaTeX, Sphinx, Solidity, SFML, PostGreSQL

Relevant Courses

Computer Science	Medical Image Computation*, Decision Analysis and Game Theory*, Data Structures and Algorithms, Design and Analysis of Algorithms*, Logic for Computer Science*, Discrete Structures, Computer Networks*, Data Analysis and Interpretation, Software Systems Lab, Digital Logic Design and Computer Architecture*, Computer Programming and Utilization, Abstractions and Paradigms for Programming, Supervised Machine Learning†,Unsupervised Machine Learning†,Advanced Learning Algorithms †
Mathematics	Calculus , Differential Equations, Linear Algebra, Optimization Models
Others	Quantum Physics and Application, Basics of Electricity and Magnetism, Physical Chemistry

* : *To be completed by April 2023* †: *Coursera*

Extracurricular

- Ideated a Bussiness Model as a participant in **EnB Buzz** to promote adoption of **EVs** in India, and concluded that hatchback EVs are **more profitable** as Cabs than traditional vehicles when driven for more than 0.4 million kms *(2021)*
- Bagged the **Exemplary Design and Innovation** award in the RC Plane Competition by AeroModelling Club *(2022)*
- Performed in Battle of Bands as the **Lead Guitarist** in front of 400+ people conducted by Symphony, IIT Bombay *(2022)*