

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

## SCHOLASTIC ACHIEVEMENTS

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- Achieved **99.81 Percentile** in **JEE-Main** out of over 1 million candidates (2021)
- Secured **All India Rank 1207** in **JEE-Advanced** out of over 0.14 million candidates (2021)
- Secured **AP(Advanced Performer)** grade for excellent performance in **PH 108-Basics of Electricity & Magnetism**, awarded to 27 out of over 1300 students taking the course (2022)
- One of the **17 out of 1400+** students to secure a **Change of Branch** to the department of **Computer Science and Engineering** owing to excellent academic performance in first year at IIT Bombay (2022)
- Secured **All India Rank 275** in the prestigious **KVPY (Kishore Vaigyanik Protsahan Yojna)** SX and awarded fellowship by the Department of Sciences, **Indian Institute of Science(IISC) Bangalore** (2021)

## KEY PROJECTS

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### FastChat

(Autumn 2022)

Guide: Prof. Kavi Arya | Ongoing Course Project : Software Systems Lab

IIT Bombay

- Developing a messaging software by building a network of clients interacting via servers acting as mediators
- Focusing on obtaining **high throughput** while using only **limited resources** dedicated for the servers
- Ensuring **low latency** of individual message deliveries and **end-to-end encryption** between clients
- Using **python socket library** to develop the network, using **open source libraries** for authentication and communication, **PostgreSQL** database to store the data and **bash** for scripting and collecting results
- Adding flair to this web application by implementing an interactive frontend using **HTML, CSS and JavaScript**

### Rail Planner

(Autumn 2022)

Guide: Prof. Supratik Chakraborty | Course Project : Data Structures and Algorithms Lab

IIT Bombay

- Designed a simplified version of a railway planner using various data structures and analyzed the space & time complexity and the efficiency to demonstrate the **properties of different data structures in C++**
- Stored trains as a dictionary using **Hash Tables** and devised algorithms for fastest possible journeys
- Used **BSTs and then AVL trees** for quick searching using the journey codes and used **Tries** to implement the autocomplete feature while searching for station names and added a feature to accept reviews for journeys
- Used **Quicksort** to order trains by day and time, implemented the **KMP-string matching algorithm** for allowing review searches by using keywords and implemented **Heaps** to allow filtering the reviews by their rating

### Generating Representative Images from a Sample

(Autumn 2022)

Guide: Prof. Suyash Awate | Ongoing Course Project : Data Analysis and Interpretation

IIT Bombay

- Used **MATLAB** to use a data set of images of various fruits and sampled random images to generate new representative fruit images using **Principal Component Analysis (PCA)**
- Used PCA to analyse images of handwritten digits from the **MNIST Database** and optimally reduce the dimensionality and reconstruct the image
- Implemented hyperplane fitting of 2 random variables and sampled points in the Euclidean Plane according to a given multivariate distribution

### Multiplayer Tic-Tac-Toe

(Autumn 2022)

Guide: Prof. Kavi Arya | Course Project : Software Systems Lab

IIT Bombay

- Used **Java Socket Programming** for **inter process communication** using the **peer-to-peer model**
- Created the tic tac toe game using this model and handled various network and **IOStream exceptions**

## Monte Carlo Analysis of Statistical Theorems

Guide: Prof. Suyash Awate | Course Project : Data Analysis and Interpretation

(Autumn 2022)

IIT Bombay

- Used **MATLAB** to implement a Monte Carlo simulation of a given Probability distribution
- Plotted the probability and cumulative distribution functions of various distributions and empirically verified various statistical theorems such as the law of large numbers, Poisson thinning and the Gaussian nature of the Random Walk

## Text File Editors

Guide: Prof. Kavi Arya | Course Project : Software Systems Lab

(Autumn 2022)

IIT Bombay

- Developed an analog to the Linux Command Line utility **wc command** using the **awk programming language** that counts the number of characters, words and lines in a text file and also accepts flags similar to wc command
- Developed a program to check for valid email addresses using **sed** with pattern matching using **regular expressions**
- Implemented a **csv file editor** that formats columns based on customisable properties such as date, time and name
- Developed a program which changes the base of the number to a different given base using **bash scripting and awk**
- Developed a program to **encrypt** a piece of text when the words to encrypt and their corresponding cipher is given

## Personal Website

Guide: Prof. Kavi Arya | Course Project : Software Systems Lab

(Autumn 2022)

IIT Bombay

- Made a personal website to be hosted on the CSE department server using **HTML and CSS**
- Added various advanced **CSS** features animations, transitions, static scroll images, modals, checkboxes and slideshows
- Used **JavaScript** to make the website interactive, gauge user-choices and render web-pages accordingly and deployed the website on an SSH server; used **Bootstrap** to implement standard navigation bars, footers and other features

## Bubble Trouble

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

(Autumn 2022)

IIT Bombay

- Designed an interactive single player retro style game which implements a bubble shooter to shoot random floating bubbles on the screen to demonstrate the **Object Oriented Paradigm in C++**
- Implemented event-handling using **XEvent** object extensively used the **C++ STL** and the Simplecpp library that was developed in-house by the institute to add the various features of the game
- Handled various events, assigning multiple responses by the game and designed the game for many levels of difficulty

## TECHNICAL SKILLS

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**Programming Languages:** C++, Python, MATLAB, Java, Bash, Solidity, Sed, AWK

**Software & Tools:** Git, L<sup>A</sup>T<sub>E</sub>X, MySQL, NumPy, Pandas, Matplotlib, Doxygen, Sphinx, gdb

**Web Development:** HTML, CSS, JavaScript, Bootstrap

## COURSES UNDERTAKEN

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**Mathematics** Calculus, Linear Algebra, Differential Equations

**Computer Science** Computer Programming and Utilization, Discrete Structures\*, Data Structures and Algorithms\*#, Data Analysis and Interpretation\*, Software Systems Laboratory\*

**Miscellaneous** Optimization Models\*, Introduction to Electric and Electronic Circuits\*, Quantum Physics and Application, Basics of Electricity and Magnetism, Engineering Graphics and Drawing, Organic and Inorganic Chemistry, Physical Chemistry, Biology

(\* to be completed by November 2021)

(# Theory + Lab)

## EXTRACURRICULAR

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- Successfully completed one year under **National Sports Organization(NSO)** in **Chess** at IIT Bombay (2022)
- Pitched a **Business Model Canvas** for a startup in the health sector for the EnB Buzz competition conducted by the **Entrepreneurship cell of IIT Bombay** (2021)
- Participated in **Google Hashcode 2021** (2021)
- Worked in a team of 4 to make an ESP32 **WiFi-controlled bot** for XLR8 conducted by **ERC, IITB** (2022)