Hrishikesh Jedhe Deshmukh   210050073

Computer Science & Engineering   **B.Tech.**

Indian Institute of Technology Bombay   **Gender: Male**

DOB: 06/01/2004

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	9.15
Intermediate	HSC	Chaitanya's International School	2021	96.00%
Matriculation	SSC	VP's Someshwar English Medium School	2019	92.40%

Pursuing **Minor** in Statistics and Informatics

SCHOLASTIC ACHIEVEMENTS

- Secured **All India Rank 212** in **IIT JEE-Advanced** out of 1,50,000+ candidates   *(2021)*
- Achieved **All India Rank 190** and **99.99 percentile** in **JEE-Main** out of 9,00,000+ candidates   *(2021)*
- Acquired **All India Rank 342** among 50,000 students in **KVPY SX Stream**, held by **IISC, Bangalore**   *(2021)*

KEY PROJECTS

Educational Text Translation   *(Spring 2022 - Ongoing)*
Guide: Prof. Syaamantak Das | in-Semester Undergraduate Research Programme   *IIT Bombay*

- Developing **Natural Language Processing** model to facilitate translation of educational texts
- Creating a framework to assess the amount of **Cognitive Informativity** of educational texts
- Analysing educational texts using various metrics like **Bloom's Taxonomy** to improve the quality of education

Rail Planner | Course Project   *(Autumn 2022)*
Guide: Prof. Supratik Chakraborty | Data Structures & Algorithms Lab CS293   *IIT Bombay*

- Implemented **graph algorithms** like DFS and BFS to find optimal train routes according to time or cost
- Implemented a **Hash Table** in C++ to store station names and used a **Trie** to facilitate **auto-completion**
- Designed **AVL Trees** to store journey information sorted by their price to facilitate faster journey retrieval
- Used **KMP String-matching algorithm** to search and display user reviews filtered by specific keywords

Pictionary | Course Project   *(Autumn 2022)*
Guide: Prof. Kavi Arya | Software Systems Lab CS251   *IIT Bombay*

- Created a multiplayer game using **Socket Programming** concepts in ReactJS with **socket.io** library
- Implemented sophisticated **GUI** to enhance user experience and made a scoreboard for multiple players
- Created **Secure Login** with a username and a password for each player using **MongoDB** database

Monte Carlo Analysis of Distribution Functions | Course Project   *(Autumn 2022)*
Guide: Prof. Suyash Awate | Data Analysis and Interpretation CS215   *IIT Bombay*

- Implemented **Monte Carlo simulations** of various Probability distributions in **MATLAB**
- Empirically verified various statistical theorems such as **The Law of Large Numbers**, **The Poisson Thinning Effect** and the **Central Limit Theorem** using the Monte Carlo simulations
- Analysed properties such as the mean and variance of various statistical distributions such as the **Poisson**, **Laplace**. **Gumbel** and **Cauchy Distributions** and plotted them in **MATLAB** for varying parameters

Data Structures and Algorithms   *(Summer 2022)*
Maths and Physics Club | Summer of Science   *IIT Bombay*

- Evaluated time complexity of recursive algorithms using **Master Theorem**
- Designed **Vector**, **Stack** and **Queue** using Standard Template Library in C++
- Studied sorting algorithms like **Insertion Sort**, **Quick Sort** and **Merge Sort** and implemented them
- Analysed insertion and deletion in **Binary Search Trees**, **AVL Trees** and **Multi-Way Search Trees**

Flood-It Game | Course Project   *(Spring 2021)*
Guide: Prof. Rushikesh Joshi | Programming Paradigms Laboratory CS154   *IIT Bombay*

- Created a graphics-based color filling game using **FLTK** (Fast Light ToolKit) widget Library and **C++**
- Implemented a **flood-fill** algorithm in a 2-D array to determine connected grid-blocks and alter colored area
- Used **Event Handling** and concepts of **OOP** like **Inheritance** in FLTK library to make game interactive

OTHER PROJECTS

Multiplayer Tic-Tac-Toe | Course Project *(Autumn 2022)*
Guide: Prof. Kavi Arya | Software Systems Lab CS251 IIT Bombay
- Implemented a multi-player Tic-Tac-Toe using **socket programming** in Java with a peer-to-peer model
- Used **ServerSocket** and **Socket variables** in Java to facilitate communication between 2 players

Generation and Reconstruction of Images using PCA | Course Project *(Autumn 2022)*
Guide: Prof. Suyash Awate | Data Analysis and Interpretation CS215 IIT Bombay
- Designed a **MATLAB** program that takes as input a dataset of images of fruits and samples random images from that dataset to create new, representative image of fruits using **Principal Component Analysis**
- Reconstructed 28x28 images of MNIST Dataset using PCA to optimally reduce dimension of images to 84
- Sampled points in the Euclidean Plane according to a given multivariate distribution and plotted them using a scatter plot and performed Hyperplane fitting on 2 random variables in **MATLAB**

Bubble Trouble | Course Project *(Autumn 2021)*
Guide: Prof. Parag Chaudhari | Computer Programming and Utilization CS101 IIT Bombay
- Implemented a single-player Bubble shooter game in **C++** using **SimpleCPP Graphics** package
- Enhanced the game by introducing 3 additional features using concepts of **classes** and **vectors**
- Introduced various levels in game and increased game speed according to each individual level

Basics of Cybersecurity *(Spring 2021)*
Year of Security | Module 1 CyberSecurity Community IIT-Bombay
- Solved various **Capture the Flag** (CTF) styled challenges using **Bash**, **Python**, **C** and **Assembly**
- Used **Pwntools**, **subprocess**, **sys** and **os** modules in Python to solve a variant of Wordle game

Processor Emulator | Self Project *(Autumn 2022)*
- Simulated the working of processors using memory and registers in form of arrays in C
- Used registers to perform basic arithmetic operations according to commands received from the memory

TECHNICAL SKILLS

Programming	C++, C, Python, Java, Bash, Awk, Sed,
Web Development	HTML, CSS, Bootstrap, JavaScript
Software	MATLAB, GitHub, LaTeX, Doxygen, Sphinx
Libraries	Tensorflow, Pytorch, Pandas, Matplotlib

POSITIONS OF RESPONSIBILITY

Teaching Assistant - MA 109 *(IIT Bombay)* *(Nov 2022)*
- Selected as teaching assistant for **Calculus I** based on academic performance and subject proficiency
- Was responsible for conducting weekly tutorial sessions for a batch of 45+ first-year undergraduates

RELEVANT COURSES

Computer Science	Data Structures and Algorithms + Lab, Discrete Structures, Data Analysis and Interpretation, Software Systems Lab, Design and Analysis of Algorithms*, Digital Logic Design and Computer Architecture + Lab*, Computer Networks + Lab*, Logic for Computer Science*, Abstractions and Paradigms in Programming + Lab, Computer Programming and Utilization, Quantum Information and Computing*
Mathematics	Probability-I, Applied Stochastic Processes*, Differential Equations, Calculus, Linear Algebra
Others	Introduction to Electrical and Electronics Circuits, Quantum Physics and Application, Basics of Electricity and Magnetism, Engineering Graphics and Drawing, Physical Chemistry, Organic and Inorganic Chemistry, Biology

*to be completed by April 2023

EXTRACURRICULAR ACTIVITIES

- Participated in **EnB Buzz** organized by EnB club and presented a pitch on **Electric Vehicles** startup idea *(2021)*
- Designed and built a **WiFi controlled bot** for **XLR8** organized by Electronics and Robotics club *(2022)*
- Awarded 'A' grade in Intermediate drawing examination held by Directorate of Art, Maharashtra *(2016)*
- Successfully completed year-long training program in **Badminton** under NSO (IIT Bombay) *(2021)*
- Learning **Tabla** for 9 years and performed in various events organized in school