

# Sarthak Mittal

B. Tech. • UG Third Year • Computer Science

Indian Institute of Technology Bombay

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Examination	University	Institute	Year	CPI/%
Graduation	IIT Bombay	IIT Bombay	2024	9.39
Intermediate	Maharashtra HSC	Pace Junior Science College	2020	96.31%
Matriculation	ICSE	Lilavatibai Podar High School	2018	99.00%

Pursuing **Honors** in Computer Science and **Minor** in **Machine Intelligence & Data Science**

## SCHOLASTIC ACHIEVEMENTS

- Awarded **AP** (Advanced Performer) grade for exceptional performance in first-semester course CH105: Organic and Inorganic Chemistry (ranked among the top **7** out of **1400+** students) (2020)
- Secured All India Rank **34** in Joint Entrance Examination Advanced among 1,50,000 candidates (2020)
- Achieved All India Rank **261** in Joint Entrance Examination Mains among 1.1 Mn candidates (2020)

## INTERNSHIP EXPERIENCE

**Language Processing Intern** | *International Workplace* (May 2022 - July 2022)

*International Workplace delivers globally accredited digital training programs for IOSH and NEBOSH*

- Automated **mapping** of newsfeed to learning outcomes using **prefix match** along with other parameters
- Deployed the **language model** using ML services of **Microsoft Azure** - a cloud computing platform

**Software Development Intern** | *Greatfour Systems* (December 2021)

*A team of 60 developing Harmony, a platform to aid pharmaceutical companies in medicine development*

- Utilised **Python API** for **OpenCV** and **MTM** in image resizing and multi-scale template matching
- Implemented **3+** enhancements to improve speed of source template to destination matching by **60%**

**Data Analyst Pre-Intern** | *YoZu - IIT Bombay EdTech startup* (May 2021)

*YoZu is developing an AI assistant for instant redressal of students' (K10) academic doubts*

- Classified **450+** queries into **5** structural categories to optimize fine-tuning of **T5 transformer model**
- Enhanced **query-context** mapping of retrieval pipeline by improving **corpus** raising efficiency by **20%**

## KEY PROJECTS

**P2P Network Simulator** | *Course Project - Computer Networks Laboratory* (Spring 2022)

*Guide: Prof. Kameswari Chebrolu, Department of Computer Science & Engineering*

- Implemented a 'multiple clients and servers' network simulator using **socket programming** in **C++**
- Analysed performance in phases to interpret the functioning and applications of **TCP** connections

**Unblock Car Puzzle Solver** | *Course Project - Logic for Computer Science* (Spring 2022)

*Guide: Prof. Ashutosh K. Gupta, Department of Computer Science & Engineering*

- Designed a **SAT Solver** for checking satisfiability of solving an unblock car puzzle with **limited moves**
- Implemented using **Z3 Python API** by converting movement and overlap into logical constraints

**SNAP Moodle** | *Course Project - Software Systems Laboratory* (Autumn 2021)

*Guide: Prof. Amitabha Sanyal, Department of Computer Science & Engineering*

- Implemented a **dynamic learning environment** with a **Django REST** framework for the **modular object-oriented backend** consisting of **models** for Students, Teachers, Assignments and Courses
- Created an interactive **user interface** using **React JavaScript library** for the frontend

**Introduction to App Development** | *Web & Coding Club, IIT Bombay* (July 2021)

- Utilized **Flutter SDK** (Google's UI Toolkit) integrated with **Android Studio** and **Dart** programming language (developed by Google) as codebase to develop and debug applications on a virtual device
- Successfully built **3 Android applications** (apk packages) from scratch including a calculator, a quiz app and a location-based weather app (by integrating an externally offered weather **API**)

**Algorithmic Trading** | *Self Project - Learner's Space, IIT Bombay* (July 2021)

- Designed strategies in **Python** using some trading styles such as **momentum** and **paired switching**

## OTHER PROJECTS

**Image Segmentation via s-t Cuts** | Course Project - Medical Image Computing (Spring 2022)

Guide: Prof. Suyash P. Awate, Department of Computer Science & Engineering

- Implemented image segmentation by generating **graph of superpixels** and performing **s-t cuts** on it
- Utilized manual **scribbles** to identify source and target sets for **Boykov-Kolmogorov** algorithm

**RISC Processor** | Course Project - Digital Logic Design & Computer Architecture (Spring 2022)

Guide: Prof. Virendra Singh, Department of Electrical Engineering

- Devised an efficient **finite-state automaton** for a processor with reduced instruction set architecture
- Implemented in **VHDL**, it is capable of performing basic arithmetic and memory read/write operations

**Interface for GitHub Profiles** | Course Project - Software Systems Laboratory (Autumn 2021)

Guide: Prof. Amitabha Sanyal, Department of Computer Science & Engineering

- Developed an **HTML-based** webpage for user profiles using GitHub REST API with **authentication**
- Implemented backend using **Django** and **PostgreSQL**, and deployed on **Heroku** using Git integration

**Scotland Yard** | Course Project - Software Systems Laboratory (Autumn 2021)

Guide: Prof. Amitabha Sanyal, Department of Computer Science & Engineering

- Completed a partially implemented **Java** code for  $8 \times 8$  grid Scotland Yard using **concurrency**
- Implemented a **client-server model** to simulate a socket connection with threads listening on ports

**Mandelbrot Zoom** | Course Project - Data Structures & Algorithms Lab (Autumn 2021)

Guide: Prof. Bhaskaran Raman, Department of Computer Science & Engineering

- Implemented Mandelbrot Zoom using **Simple DirectMedia Layer** library and Object-Oriented **C++**
- Used Binary Search **Tree**, Bipartite **Graph**, and **Heap** as data structures for parts of the functionality

**Snake Game** | Self Project - Learner's Space, IIT Bombay (July 2021)

- Implemented a **graphics-based** snake game using **Object-Oriented Python** and **PyGame** module

## POSITIONS OF RESPONSIBILITY

**D-AMP Mentor** | Department of Computer Science & Engineering (May 2022 - Present)

- Mentoring **6** sophomores to **assist** them with academic difficulties and help in their **holistic development**
- Working towards the easy availability of past **academic resources** for the reference of junior students

**Class Representative** | Department of Computer Science & Engineering (August 2021 - May 2022)

- Served as a **point of contact** between professors, CSE council, and a batch of **175+** undergraduates
- **Led the creation** of a Telegram group to host polls for collection of data representing batch opinion

**Teaching Assistant** | IIT Bombay (December 2021 - June 2022)

- MA109 - Calculus I, MA106 - Linear Algebra and BB101 - Physical Biology & Bio-Medical Engineering

## TECHNICAL SKILLS

<b>Languages</b>	Python, C/C++, Java, Dart, VHDL, Assembly, Bash, Sed, Awk, Prolog
<b>Data Science</b>	NumPy, Pandas, Matplotlib, SciPy, OpenCV-Python, Scikit-Learn
<b>Development</b>	Django, JS, HTML, CSS, React, Redux, PostgreSQL, Flutter, Android Studio
<b>Software</b>	MATLAB, LaTeX, Git, Quartus, Keil $\mu$ Vision, NS3, VTune, GDB, Docker

## MAJOR COURSES UNDERTAKEN

<b>Mathematics</b>	Calculus, Linear Algebra, Differential Equations, Probability, Derivative Pricing
<b>Computer Science</b>	Discrete Structures, Data Structures and Algorithms, Data Analysis and Interpretation, Software Systems Laboratory, Design and Analysis of Algorithms, Computer Networks, Logic for Computer Science, Digital Logic Design and Computer Architecture, Medical Image Computing, Automata Theory*, Operating Systems*, Artificial Intelligence and Machine Learning*

(\* to be completed by November 2022)

## EXTRACURRICULAR ACTIVITIES

- Received **special mention** for exemplary voluntary work at Green Campus, IIT Bombay (2020 - 2021)
- Completed **3** typesetting assignments in **L<sup>A</sup>T<sub>E</sub>X Bootcamp** at Learner's Space, IIT Bombay (2021)
- Awarded '**A**' grade in Elementary drawing examination held by Directorate of Art, Maharashtra (2014)