



Sarthak Mittal  
Computer Science & Engineering  
Indian Institute of Technology Bombay

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B.Tech.  
Gender: Male  
DOB: 2/9/2002

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 and Data Science**

## SCHOLASTIC ACHIEVEMENTS

- Awarded **AP** (Advanced Performer) grade for exceptional performance in the first-semester course CH105: Organic and Inorganic Chemistry (ranked among the top **7** out of **1400+** students)
- Secured **AIR 34** in JEE Advanced among 1,50,000 | Secured **AIR 261** in JEE Mains among 1.1million

## INTERNSHIP EXPERIENCE

**Language Modeling Intern** | *International Workplace, Cambridge, UK* (May '22 - Jul '22)

*International Workplace delivers globally accredited digital programs for occupational safety and health*

- Used **pandas** in Python to analyse and group **1300+** content titles mapped to multiple objectives
- Implemented **prefix matching** and a **probability function** with **3 variables** to predict outcomes
- Deployed **language model** mapping newsfeed to learning outcomes as a **web API** using **Azure ML**

**Software Development Intern** | *Greatfour Systems, Hyderabad, India* (Dec '21)

*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**
- Made multiple **algorithmic enhancements** to improve template to destination matching speed by **60%**

**Data Analyst Pre-Intern** | *YoZu - IIT Bombay EdTech startup* (May '21)

*YoZu is developing an AI chatbot 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

**Algorithmic Trading** | *Self Project | Learner's Space, IIT Bombay* (Jul '21)

- Designed trading strategies in **Python** and compared styles like **momentum** and **paired switching**
- Executed the algorithms on **SENSEX 30** data of 2009-2020 and achieved profit upto **160%** and **500%**

**P2P Network Simulator** | *Course Project* (Mar '22 - Apr '22)

- Implemented **socket programming** in **C++** to transfer files between clients using **TCP** connections
- Analysed** the network simulation in **5** phases using configuration files and a **Bash script** to automate

**Interface for GitHub Profiles** | *Course Project* (Sep '21)

- Created an **HTML** webpage for user profiles secured with client-side **HTTP Authentication** tokens
- Implemented the backend using **Django** along with **PostgreSQL** database and GitHub REST API
- Deployed the project on **Heroku** Cloud Application Platform using GitLab **CI/CD** integration and CLI

**Image Segmentation via s-t Cuts** | *Course Project* (Apr '22)

- Performed **s-t cuts** on a generated graph of **superpixels** to implement **binary** image segmentation
- Identified user **scribbles** to initialise **Boykov-Kolmogorov** algorithm and achieved accuracy of **80%**

**Introduction to App Development** | *Web & Coding Club, IIT Bombay* (Jul '21)

- Utilised **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 10-digit calculator, a true/false quiz app and a location-based weather app (by integrating an externally offered **weather API**)

## OTHER PROJECTS

**Unblock Car Puzzle Solver** | *Course Project* (Feb '22)

- Applied Python API of **Z3** to **encode** moves and overlaps of unblock car puzzle into a **SAT** problem
- Solved the puzzle under the **constraint** of limited moves using **conflict-driven clause learning**

**Scotland Yard on a Grid** | *Course Project* (Oct '21)

- Completed a **Java** implementation of  $8 \times 8$  grid Scotland Yard using **semaphores** and **concurrency**
- Simulated **client-server model** with socket connections and **upto 10** player threads listening on ports

**SNAP Moodle** | *Course Project* (Oct '21 - Nov '21)

- Designed 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 **HTML** and **React JavaScript library** for the frontend

**RISC Processor** | *Course Project* (May '22)

- Devised an efficient **finite-state automaton** for a processor with predefined functionality using **VHDL**
- Tested architecture using testbench built in **Quartus** and a **Python wrapper** for assembly translation

**Mandelbrot Zoom Sequence** | *Course Project* (Nov '21)

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

**Graphic Snake Game** | *Self Project* | *Learner's Space, IIT Bombay* (Jul '21)

- Implemented a **graphics-based** snake game using **object-oriented Python** and **PyGame** module

## POSITIONS OF RESPONSIBILITY

**Class Representative** | *Dept. of Computer Science, IIT Bombay* (Aug '21 - May '22)

- 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* (Dec '21 - Jun '22)

- **MA109 - Calculus I**: Selected as a tutor for weekly interactive sessions with **45+** first-year students
- **MA106 - Linear Algebra**: Assisted the professors by **coordinating** exams and arranging sessions
- **BB101 - Biology**: Part of a team of **20** UG TAs and **25** PG TAs for tutoring **600+** first-year students

**Department Academic Mentor** | *Dept. of Computer Science, IIT Bombay* (May '22 - Present)

- Selected in team of **30** Juniors from among **60+** applicants after extensive interviews & peer reviews
- Mentoring **6** sophomores to assist them with academic difficulties and their **holistic development**

## TECHNICAL SKILLS

<b>Languages</b>	Python, C/C++, Java, Dart, LaTeX, VHDL, Assembly, Bash, Sed, Awk, Prolog
<b>Data Science</b>	NumPy, Pandas, Matplotlib, SciPy, OpenCV-Python, Scikit-Learn, AzureML
<b>Development</b>	Django, JS, HTML, CSS, React, Redux, PostgreSQL, Flutter, Android Studio
<b>Software</b>	MATLAB, Git, Quartus, Wireshark, 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 & Algorithms, Data Analysis & Interpretation, Software Systems, Algorithm Design, Computer Networks, Logic, Digital Design & Computer Architecture, Medical Image Computing, Automata Theory*, Operating Systems*, A.I. & M.L.*, Foundations of Intelligent & Learning Agents*, Research & Development*

(\* to be completed by November '22)

## EXTRACURRICULAR ACTIVITIES

- Received **special mention** for exemplary voluntary work at NSS Green Campus, IIT Bombay ('20 - '21)
- Completed **3** typesetting assignments in **L<sup>A</sup>T<sub>E</sub>X Bootcamp** at WnCC Learner's Space, IIT Bombay ('21)
- Awarded '**A**' grade in Elementary drawing examination held by Directorate of Art, Maharashtra ('14)