

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

- Secured AIR **34** in JEE Advanced among 1,50,000 | Secured AIR **261** in JEE Mains among 1.1million
- 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)

INTERNSHIP EXPERIENCE

Language Modeling Intern | *International Workplace* (May '22 - July '22)

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

- Analysed **1300+** content titles mapped to multiple objectives using **Pandas** library in **Python**
- Implemented **prefix match** and found probabilities using a **probability function** with **3 variables**
- Deployed **language model** mapping newsfeed to learning outcomes using **Microsoft Azure ML**

Software Development Intern | *Greatfour Systems* (December '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
- Introduced multiple enhancements to improve source template to destination matching speed by **60%**

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

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

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

- Designed strategies in **Python** using some trading styles such as **momentum** and **paired switching**
- Executed the strategies on **SENSEX 30** data of 2009-2020 and achieved profit upto **160%** and **500%**

P2P Network Simulator | *Course Project - Computer Networks Laboratory* (March '22 - April '22)

Guide: Prof. Kameswari Chebrolu, Dept. of Computer Science, IIT Bombay

- Developed a network simulator with multiple clients and servers using **socket programming** in **C++**
- Analysed performance in **5** phases to interpret the functioning and applications of **TCP** connections

Interface for GitHub Profiles | *Course Project - Software Systems Laboratory* (September '21)

Guide: Prof. Amitabha Sanyal, Dept. of Computer Science, IIT Bombay

- Created an **HTML-based** webpage for user profiles using GitHub REST API with **authentication**
- Implemented the backend using **Django** along with **PostgreSQL** database managed by PgAdmin
- Deployed the project on **Heroku** Cloud Application Platform using GitLab **CI/CD** integration and CLI

Image Segmentation via s-t Cuts | *Course Project - Medical Image Computing* (April '22)

Guide: Prof. Suyash P. Awate, Dept. of Computer Science, IIT Bombay

- Performed image segmentation by implementing **s-t cuts** on a generated **graph of superpixels**
- Utilised manual **scribbles** to identify source and target sets for **Boykov-Kolmogorov** algorithm

Unblock Car Puzzle Solver | *Course Project - Logic for Computer Science* (February '22)

Guide: Prof. Ashutosh K. Gupta, Dept. of Computer Science, IIT Bombay

- Used a **SAT Solver** for checking satisfiability of solving an unblock car puzzle with **limited moves**
- Converted movement and overlap constraints into several **logical conditions** using **Z3 Python API**

OTHER PROJECTS

Introduction to App Development | Web & Coding Club, IIT Bombay (July '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
- Built **3 Android applications** including a calculator, a quiz app and a location-based weather app

SNAP Moodle | Course Project - Software Systems Laboratory (October '21 - November '21)

Guide: Prof. Amitabha Sanyal, Dept. of Computer Science, IIT Bombay

- 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

Scotland Yard on a Grid | Course Project - Software Systems Laboratory (October '21)

Guide: Prof. Amitabha Sanyal, Dept. of Computer Science, IIT Bombay

- Completed a partially implemented **Java** code for 8×8 grid Scotland Yard using **concurrency**
- Simulated **client-server model** with socket connections and **upto 10** player threads listening on ports

RISC Processor | Course Project - Digital Logic Design & Computer Architecture (May '22)

Guide: Prof. Virendra Singh, Dept. of Electrical Engineering, IIT Bombay

- 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

Mandelbrot Zoom Sequence | Course Project - Data Structures & Algorithms (November '21)

Guide: Prof. Bhaskaran Raman, Dept. of Computer Science, IIT Bombay

- Rendered 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

POSITIONS OF RESPONSIBILITY

Class Representative | Dept. of Computer Science, IIT Bombay (August '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 (December '21 - June '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 a team of **40** from among **60+** applicants after extensive interviews & peer reviews
- Mentoring **6** sophomores to assist them with academic difficulties and their **holistic development**

TECHNICAL SKILLS

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

MAJOR COURSES UNDERTAKEN

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

(* 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^AT_EX Bootcamp** at WnCC Learner's Space, IIT Bombay ('21)
- Awarded '**A**' grade in Elementary drawing examination held by Directorate of Art, Maharashtra (2014)