Sarthak Mittal

B. Tech. • UG Third Year • Computer Science
Indian Institute of Technology Bombay
sarthakmittal0902@gmail.com | sarthakmittal92.github.io | linkedin.com/in/sarthakmittal0902

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 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 1.1Mn

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**
- Designed a **PDF** with **3 factors** and **5 parameters** and used **prefix match** algorithm on paragraphs
- 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
- Implemented **3**+ enhancements to improve speed of source template to destination matching 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

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

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* *(February '22)*

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* *(November '21)*

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** onsisting of **models** for Students, Teachers, Assignments and Courses
- Created an interactive **user interface** using **React JavaScript library** for the frontend

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**
- Implemented the strategies on **SENSEX 30** data of 2009-2020 achieving upto **160%** and **500%** profit

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

- 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**)

Other Projects

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

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

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

Scotland Yard | *Course Project - Software Systems Laboratory* *(October '21)*
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

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

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

- 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 '22 - Present)*

- Selected from among **60**+ applicants after extensive interviews & peer reviews to provide mentorship
- Mentoring **6** sophomores to assist them with academic difficulties and their **holistic development**

Class Representative | *Department of Computer Science & Engineering* *(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

Technical Skills

Languages	Python, C/C++, Java, Dart, VHDL, Assembly, Bash, Sed, Awk, Prolog
Data Science	NumPy, Pandas, Matplotlib, SciPy, OpenCV-Python, Scikit-Learn
Development	Django, JS, HTML, CSS, React, Redux, PostgreSQL, Flutter, Android Studio
Software	MATLAB, LaTeX, Git, Quartus, Keil μVision, 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 **LaTeX Bootcamp** at WnCC Learner's Space, IIT Bombay *('21)*
- Awarded **'A' grade** in Elementary drawing examination held by Directorate of Art, Maharashtra *(2014)*