

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 and Data Science**

SCHOLASTIC ACHIEVEMENTS

- Received **Quadeye Scholarship** (top **60** nationally) after **3**-stage process focused on quantitative skills
- 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**
- Built **3 Android applications** including a calculator, a quiz app and a location-based weather app

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 8×8 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

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

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 Theory, Introduction to Derivative Pricing, Statistical Inference*
Computer Science	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*

(* 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 ('14)