

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 | 9.22 |
| 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

Machine Learning Intern | *Prodigal SoftTech, Mumbai, India* (Dec '22 - Jan '23)

Prodigal Tech turns consumer finance conversations into outcomes using machine learning techniques

- Compared **ROUGE** scores of several models such as PEGASUS, BART, T5 for **text summarization**
- Analysed **plasticity** of BART-large model by fine-tuning on a **5% tweaked** SAMSum Corpus subset

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

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

- Deployed **language model** mapping newsfeed to learning outcomes as a **web API** using **Azure ML**
- Implemented **prefix matching** and a **probability function** with **3 variables** to predict outcomes

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%**

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%**

MDP Planning & Cricket | *Course Project* | *Reinforcement Learning* (Oct '22)

- Designed MDP planner using **value iteration**, **Howard's policy iteration** and **linear programming**
- Utilised a pipeline of **encoder**, **planner** and **decoder** to predict outcome of a **last-over cricket game**

P2P Network Simulator | *Course Project* | *Computer Networks* (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

Attendance System | *Course Project* | *AI and ML* (Nov '22)

- Built an **automated** attendance system using **deep learning** techniques and **face recognition**
- Trained the **embedding vector** model using **triplet loss** and achieved **75%** accuracy in validation

SNAP Moodle | *Course Project* | *Software Systems* (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

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

- Utilized **Flutter SDK** integrated with **Android Studio** and **Dart** language as codebase to develop and debug **3 Android applications** on a virtual device including a calculator, a quiz app and a weather app

OTHER PROJECTS

Unblock Car Puzzle Solver | *Course Project* | *Logic* (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**

python3ugcs | *Self Project* | *DSA and ML* (Dec '22)

- Deployed a **Python** library on **Test PyPI** for implementation of several **data structure algorithms**
- Included various **machine learning** models related to **clusters**, **regression**, **kernels**, **NNs** and **MTL**

Scotland Yard on a Grid | *Course Project* | *Software Systems* (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

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

- Created an **HTML** webpage with **HTTP authentication** and **Django** backend for user profiles
- Deployed the project on **Heroku** using **GitLab** with a **PostgreSQL** database and **GitHub REST**

RISC Processor | *Course Project* | *Computer Architecture* (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 | *Course Project* | *Data Structures* (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 - Nov '22)

- **CS251 - Software Systems Lab**: Curated programming assignments for a batch of **190+** sophomores
- **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

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|---------------------|---|
| 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

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|-------------------------|--|
| Mathematics | Calculus, Linear Algebra, Probability, Derivative Pricing, Numerical Analysis* |
| Computer Science | Discrete Structures, Data Structures, Data Analysis, Software Systems, Algorithm Design, Networks, Logic, Digital Design and Architecture, Medical Image Computing, Automata Theory, Operating Systems, AI and ML, RL, Compilers*, Databases*, Advanced RL*, Blockchains*, Automatic Speech Recognition* |

(* to be completed by April '23)

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)