Sarthak Mittal | **200050129**
Computer Science & Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 09/02/2002

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** onsisting 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** $\times$ **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

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 μVision, NS3, VTune, GDB, Docker

Major Courses Undertaken

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 **LaTeX Bootcamp** at WnCC Learner's Space, IIT Bombay ('21)
- Awarded **'A' grade** in Elementary drawing examination held by Directorate of Art, Maharashtra ('14)