**Sarthak Mittal**  
**Computer Science & Engineering**  
**Indian Institute of Technology Bombay**

**200050129**  
**B.Tech.**  
**Gender: Male**  
**DOB: 09/02/2002**

| Examination | University | Institute | Year | CPI / % |
|---|---|---|---|---|
| Graduation | IIT Bombay | IIT Bombay | 2024 | 9.15 |
| 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** grade (top **7** out of **1400+**) for exceptional performance in **CH105 Chemistry** course
- Secured AIR **34** in JEE Advanced among 1,50,000 | Secured AIR **261** in JEE Mains among 1.1million

## INTERNSHIP EXPERIENCE

**Quantitative Strategist Intern** | *Quadeye Securities, Gurugram, India*  (May '23 - Jul '23)  
*Quadeye identifies, evaluates, analyses and leverages trading and investment opportunities globally*

- Implemented **low-latency** (**700$\mu$s** per snapshot) **Black Scholes Model** for options pricing and greeks
- Developed **2 final strategies** using splines, volatility surfaces, **PCA** and **RND** distributions after creating **5+ alphas** using **combinations** of fitting, interpolation, moving averages and central tendencies

**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%**

**P2P Network Simulator** | *Course Project* | *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

**Mega NetWorks** | *Course Project* | *Databases*  (Apr '23)

- Designed a clone of **LinkedIn** with **10+ database entities** using **PERN** stack along with CSS styling
- Implemented functionality for connections, jobs, profiles, dynamic scroll post feed and chat messaging

**MDP Planning & Cricket** | *Course Project* | *RL*  (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**

**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

**Cryptocurrency Network** | *Course Project* | *Blockchains* (Jan '23 - Apr '23)
- Simulated transactions in a **P2P cryptocurrency network** by modelling latencies and probabilities
- Implemented **selfish** and **stubborn** modes of adversary and analysed percentages of **faulty** blocks
- Developed a **Layer 2 Dapp** using Solidity supporting **joint accounts** balances and transfer network

**Limestone Data Challenge** | *Self Project* | *Finance Club, IIT Bombay* (Mar '23)
- Analyzed stock indices data in a toy dataset using clustering and predicted the composition of indices

**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%**

**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

**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**

**Other Course Projects** | *Dept. of Computer Science, IIT Bombay* (Sep '21 - Apr '23)
- **iplC-compiler:** compiler for **C-like** language using **scanner**, AST, **parser**, semantic code generation
- **risc-processor:** processor with efficient **FSA** using **VHDL** and assembly translation in **Python**
- **db-systems:** made course portal using **PERN** and utilised **Spark/Kafka** for IMDB movies database
- **scotland-yard:** $8 \times 8$ grid game using **semaphores**, concurrency, sockets and **upto 10** player threads
- **speech-models:** evaluated and tuned **CRDNN** on **HVB** and trained **LLMs** using **MFCC** features
- **parking-sim:** parking lot escape using **Python API** of **gym**, base simulator and destination chasing

## 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** | *Dept. of Computer Science, IIT Bombay* (Aug'22 - Present)
- **CS213-CS293 - Data Structures and Algorithms**: Conducting problem solving sessions and labs
- **CS251 & CS104 - Software Systems Lab**: Curated programming assignments for a batch of **190+**

**Department Academic Mentor** | *Dept. of Computer Science, IIT Bombay* (May '22 - Apr '23)
- Selected in team of **30** Juniors from among **60+** applicants after extensive interviews & peer reviews
- Mentored **6** sophomores to assist them with academic difficulties and their **holistic development**

## TECHNICAL SKILLS

| | |
|---|---|
| **Languages** | C/C++, Python, Java, Dart, LaTeX, VHDL, Bash, Sed, Awk, Flex, Bison |
| **Data Science** | NumPy, Pandas, Matplotlib, SciPy, OpenCV-Py, Sklearn, AzureML, SQL |
| **Development** | Django, JS, HTML, CSS, React, Redux, Node, Flutter, Android Studio |
| **Software** | MATLAB, Git, Quartus, Wireshark, Keil $\mu$Vision, 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, Architecture, Image Computing, Automata, OS, AI and ML, RL, Compilers, Databases, Blockchains, Speech Recognition, Game Theory* |

(* to be completed by November '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)