

# Sarthak Mittal

B. Tech. • Fourth Year • Computer Science  
Indian Institute of Technology Bombay

[sarthakmittal0902@gmail.com](mailto:sarthakmittal0902@gmail.com) | [sarthakmittal92.github.io](https://sarthakmittal92.github.io) | [linkedin.com/in/sarthakmittal0902](https://linkedin.com/in/sarthakmittal0902)

Examination	University	Institute	Year	CPI/%
Graduation	IIT Bombay	IIT Bombay	2024	9.21
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** (2020)
- Secured AIR **34** in JEE Advanced among 1,50,000 | AIR **261** in JEE Mains among 1.1million (2020)

## INTERNSHIP EXPERIENCE

**Quantitative Strategist Intern** | *Quadeye Securities, Gurugram, India* (May '23 - Jul '23)

*Quadeye is India's leading proprietary trading firm (200+ employees) dealing in multiple asset classes*

- Explored option theory to understand the applications of **greeks** in stocks and **derivative markets**
- Implemented the **Black Scholes** model in **C++** with low-latency (**700 $\mu$ s** for **200+** strikes per time snapshot) for computing option premium and **implied volatility (IV)** using Newton-Raphson method
- Designed **2** final strategies based on **cubic splines** with **3-7 knots** and implied volatility **surfaces**

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

*Prodigal is a fast-growing AI software startup (YC W18) and a pioneer of consumer finance intelligence*

- Compared **ROUGE** scores of **8+** models including PEGASUS, BART, T5 for **text summarisation**
- Fine-tuned the **BART-large** model on a **5% tweaked** SAMSum Corpus subset to analyse **plasticity**

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

*International Workplace is a leading provider of training programs for occupational safety and health*

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

**Software Development Intern** | *Greatfour Systems, Hyderabad, India* (Dec '21)

*Greatfour (team of 60+) is developing platform to aid pharmaceutical companies in medicine development*

- Utilised Python API for **OpenCV** and **MTM** in image resizing and multi-scale **template matching**
- Improved template to destination **matching speed** by **60%** by making **4+** algorithmic enhancements

## 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** nets
- Trained the **embedding vector** model using **triplet loss** and achieved **75%** accuracy in validation

**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 obtaining around **10-15%** of **faulty** blocks

**Mega NetWorks** | *Course Project* | *Database Systems* (Apr '23)

- Designed a clone of **LinkedIn** with **10+** **database entities** using **PERN** stack along with CSS styling
- Supported **5** key features, including connections, jobs, profiles, **dynamic** scroll feed and chat messaging

## OTHER PROJECTS

**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
- Obtained an accuracy of **80%** by initialising **Boykov-Kolmogorov** algorithm through user **scribbles**

**Limestone Data Challenge** | *Self Project* | *Finance Club, IIT Bombay* (Mar '23)

- Analysed a toy dataset using **elbow curve** and **k-means** to predict the composition of **15** stock indices

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

- Designed an **MDP** planner using **3** key **RL methods** including **Howard's PI** and linear programming
- Utilised a pipeline of **encoder**, **planner** and **decoder** to predict outcome of a **6-balls cricket game**

**SNAP Moodle** | *Course Project* | *Software Systems* (Oct '21 - Nov '21)

- Developed 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

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

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

**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
- **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

## 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
- **CS104 (Software Systems Lab)**: Awarded **Excellence in Teaching Assistantship** for Spring '23
- **CS251 (Software Systems Lab)**: Curated programming assignments for batch of **190+** sophomores

**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

<b>Languages</b>	C/C++, Python, Java, Dart, LaTeX, VHDL, Bash, Sed, Awk, Flex, Bison
<b>Data Science</b>	NumPy, Pandas, Matplotlib, SciPy, OpenCV-Py, Sklearn, AzureML, SQL
<b>Development</b>	Django, JS, HTML, CSS, React, Redux, Node, Flutter, Android Studio
<b>Software</b>	MATLAB, Git, Quartus, Wireshark, Keil $\mu$ Vision, NS3, VTune, GDB, Docker

## MAJOR COURSES UNDERTAKEN

<b>Mathematics</b>	Calculus, Linear Algebra, Probability, Derivative Pricing, Numerical Analysis
<b>Computer Science</b>	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 **L<sup>A</sup>T<sub>E</sub>X Bootcamp** at WnCC Learner's Space, IIT Bombay ('21)
- Awarded '**A**' grade in Elementary drawing examination held by Directorate of Art, Maharashtra ('14)