

Sarthak Mittal

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

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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 μ 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** consisting 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**: 8×8 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 μ 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 **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)