Atishay Jain

Computer Science & Engineering
Indian Institute of Technology Bombay

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B.Tech.
Gender: Male
DOB: 25/05/2003

Examination	University	Institute	Year	CPI/%
Graduation	IIT Bombay	IIT Bombay	2025	
Intermediate	CBSE	Hope Academy	2021	
Matriculation	CBSE	Pushpa English Medium School	2019	

Pursuing a **Minor** in **Machine Intelligence and Data Science** from C-MInDS, IIT Bombay

Scholastic Achievements

- Secured **All India Rank 104** in Joint Entrance Examination **Advanced** amongst the **150,000**+ candidates *(2021)*
- Achieved **All India Rank 123** and was awarded the prestigious **KVPY** fellowship by **IISc** Bangalore, India *(2020)*
- Awarded the **Advanced Performer (AP)** grade in **Artificial Intelligence** and **Machine Learning** Lab for exceptional performance, ranking among the **top 1%** of students, and scoring a perfect total of 100/100 *(2023)*
- Achieved **All India Rank 270** in Joint Entrance Examination **Main** among over **1 million** candidates *(2021)*
- Received **MMVY** scholarship from state government of Madhya Pradesh for outstanding academic **merit** *(2021-22)*

Internships and Research Experience

Strats and Quant Intern | *Morgan Stanley* *(May'24 - Jul'24)*

- Researched and developed a **signal** based on price **skew** across various **ECNs** as part of **Electronic-FX Trading** team
- Ideated and **back-tested** a profitable **trading strategy** leveraging **skew-based** signals, resulting in favorable **returns**
- Enhanced trade **signal detection** and **price action** pattern identification through in-depth strategy performance analysis
- Developed a framework to **evaluate** impact of parameters on strategies based on **technical indicators** like **MACD** and **RSI**

Web Development and Technical Intern | *IFP Petro* *(Dec'22 - Jan'23)*

- Developed a web application using **MERN** stack to streamline and **automate** acceptance of order pickup requests of used oil from multiple suppliers, enhancing the **operational efficiency** and optimizing overall oil transportation logistics
- Integrated user login and **registration** functionalities using ExpressJS framework and **MongoDB** backend to the web app

Soft Hand Simulation | *Technical University of Munich* *(May'23 - Jul'23)*
Guide: Dr. Daniele Bernardini *Summer Research Internship*

- Implemented an **under-actuated** soft hand model of a **gripper** using the **MuJoCo** physics simulator, calibrating it to mimic actual robotic hand movements and designed the model's basic structure along with simulation controls in **C++**
- Encoded **constraints** on the sum of angles and torque acting on joints, which accounted for movements of the gripper

Instruction Fine-tuning Architecture Design in Bilingual Setting | *R&D Project* *(Jan'24 - May'24)*
Guide: Prof. Ganesh Ramakrishnan *BharatGPT, IIT Bombay*

- Studied the **EMMA-X** pre-training algorithm and **PolyLM** model, synthesizing useful insights from both approaches
- Evaluated various LLM/Question-Generation models on **bilingual QnA** scenarios, selecting **optimal** models for fine-tuning
- Automated **validation** of machine-translated text and **domain classification** of articles, using **Mixtral** and **Gemini**

Key Projects

Optimizing Speech Recognition Models *Spring 2024*
Prof. Preeti Jyothi | Course Project: Automatic Speech Recognition *IIT Bombay*

- Improved OpenAI's **whisper** model for Hinglish ASR by integrating **greedy** and **beam search** decoding algorithms
- Enhanced Conformer model with **PowerConv** and **inter-layer** CTC, reducing WER on librispeech from **0.74 to 0.66**
- Applied PARP to fine-tune **wave2vec-base**, achieving performance gains by discovering and adjusting **sparse subnetworks**

Image Caption Generation *Winter 2022*
Winter in Data Science | Deep Learning *Analytics Club, IIT Bombay*

- Developed a **univariate** LSTM model forecasting **Stock Prices** of oil over a 30-day horizon, optimizing **RMSE** metric
- Explored **NLP** techniques to conduct **sentimental analysis** on **Stock Market headlines** using NLTK and spaCy
- Utilized pre-trained **VGG19** model to extract features from **Flickr8k** image dataset, integrated these features into **LSTM** network for generating descriptive image captions, and rigorously evaluated the model through **BLEU** scores

Tones2Notes: High Resolution Music Transcription *Autumn 2023*
Prof. Preeti Jyothi | Course Project: Artificial Intelligence and Machine Learning *IIT Bombay*

- Implemented a **CRNN** model to automatically **transcribe** monophonic audio into MIDI, by capturing musical notes
- Improved model performance using **bidirectional GRU** units, optimizing F1-score and MAE on the **MAPS** dataset
- Engineered a comprehensive **pipeline** from input **audio processing** to MIDI output, including **piano-roll** video generation

SCLP: Language Processor for a Small C-like Language *Spring 2024*
Prof. Uday Khedkar | Course Project: Implementation of Programming Languages *IIT Bombay*

- Developed a **compiler** in C++ for C-like languages doing scanning and parsing using **Lex/Yacc**, performing **syntax** and **semantic** analysis, generating **AST**, **TAC**, and **RTL** intermediate representations, and final **x86 Assembly** code
- Constructed the compiler with incremental **5 levels** of language features using **OOP** principles & suitable data structures

Enhancing xv6 Operating System *Autumn 2023*
Prof. Purushottam Kulkarni | Course Project: Operating Systems Lab *IIT Bombay*
- Integrated a **custom scheduler** in xv6 with **priority handling** to optimize process management and CPU utilization
- Implemented **lazy allocation** and **sbrk**, improving heap memory management and process address space handling
- Designed synchronization methods (**sleeplock, semaphores**) and optimized file I/O using **encrypted** read-write modes

Cache Optimization for Graph Analytics *Spring 2023*
Prof. Biswabandan Panda | Course Project: Computer Architecture *IIT Bombay*
- Used **ChampSim** micro-architecture simulator to analyze cache and **memory access** patterns for various Graph Algorithms
- Implemented cache hierarchies: Inclusive, Exclusive, Non-Inclusive, and replacement policies: LRU, LFU, LFRU, and FIFO
- **Improved IPC** for graph workloads by analyzing various architecture combinations on over **30 Million** instructions

Railway Journey Planner and Review System *Autumn 2022*
Prof. Supratik Chakraborty | Course Project: Data Structures and Algorithms Lab *IIT Bombay*
- Designed a railway model with a **user** and **admin** interface as a **graph**, which stores and retrieves journey data with features like keyword-based review search (**KMP**), auto-completion for station names (**Trie**), and rating-based review filtering (**Heap**)
- Programmed a modified **DFS** to find direct and **indirect** journeys between specified stations, subjected to constraints

Other Projects

Algorithmic Trading | *Limestone Data Challenge, Tower Research Capital* *Spring 2023*
- Classified stocks into different sectors based on **price action** patterns using **Silhouette** analysis with **KMeans** clustering
- Developed a **high sharpe ratio** trading strategy to optimize daily **returns**, ranking among **top 50** teams over the institute

Fisherfaces for Face Recognition | *Course Project: Digital Image Processing* *Autumn 2023*
- Reduced **error rates** on YaleB from **19.1 to 4.3** using Fisherfaces, tackling **illumination** & facial-expression challenges
- Adapted the recognition algorithm for **Glass Detection** and evaluated results using **leave-one-out** cross-validation

Autonomous Driving Vehicle | *Seasons of Code, Web and Coding Club* *Summer 2023*
- Encoded a **maze** into **MDP** and employed **Howard Policy Iteration** to determine **optimal path** from start to finish
- Developed a controller to safely **navigate** a car out of parking lot on roadway in a **gym-driving** simulator environment

Python Combat | *Course Project: Software Systems Lab* *Autumn 2022*
- Developed a browser-based game platform for learning **Python** featuring user-interactive **Animations** using **JQuery**
- Utilized **Brython** for in-browser code execution and CodeMirror for code editor with syntax highlighting and **auto-completion**

Sliding Puzzle SAT Solver | *Course Project: Logic for Computer Science* *Spring 2023*
- Implemented a script in **Python** using **Z3Py** library to encode a **Tile Loop** puzzle game as a **SAT** problem and solve it efficiently following a given set of **constraints** along with **verifying** the proposed solution in case of **satisfiability**

Stock Market Analysis | *Summer of Science, Maths and Physics Club* *Summer 2022*
- Studied key stock market terminologies and roles of **financial intermediaries**, including **IPO markets** and indices
- Analyzed **technical** trading techniques, focusing on **charting**, **futures**, **options theory**, and advanced **options strategies**

Positions of Responsibility

Institute Web and Coding Convener | *Web and Coding Club, IIT Bombay* *(May'22 - May'23)*
- Worked in a team of **8** to organize 40+ events catering to the programming interests of **10K+** Institute students
- Framed **competitive programming** problems for **SciComp-Blitz** Technical Inter Hostel General Championship
- Ideated and co-created a Project in **Hello FOSS**, an event to promote **Open Source** development in the institute

Teaching Assistant | *IIT Bombay* *(Oct'22 - Feb'23, Aug'24 - Present)*
- Conducted weekly **tutorial sessions** for a batch of 45+ students for the **Calculus** courses (MA109 and MA111)
- Among the three UG TAs selected for **Digital Image Processing** (CS663), consisting of 240+ students (Ongoing)

Department Academic Mentor | *Student Mentorship Program* *(May'23 - May'24)*
- Among the **32 candidates** selected after extensive **peer reviews**, SoP, and interviews out of **70+ applicants**
- Appointed as **mentor** and contact point of **6 sophomore** students to resolve their academic and personal queries

Technical Skills

Programming	Proficient in: C/C++, Python | Familiar with: Java, Bash, MATLAB, Q, Sed, Prolog
Data Science	PyTorch, TensorFlow, Keras, Scikit-Learn, NumPy, Matplotlib, Pandas, NLTK
Miscellaneous	Git, LaTeX, HTML, JavaScript, CSS, Doxygen, Z3, VHDL, SQL, Wireshark, Sphinx

Relevant Courses

Computer Science	Automatic Speech Recognition, Digital Image Processing, Reinforcement Learning, Computer Architecture, Data Structures and Algorithms, Software Systems Lab, AI & ML, Data Analysis and Interpretation, Computer Networks, Design and Analysis of Algorithms, Operating Systems, Database Information Systems, Compilers, Logic for CS, Automata Theory, Discrete Structures
Mathematics	Calculus, Linear Algebra, Optimization Models, Differential Eq., Numerical Analysis, Game Theory

Extracurriculars

- Secured **1st position** out of **400+** teams in **CodeWars V1**, a Bot programming contest by WnCC *(2021)*
- Built a **Wifi controlled** Bot in **XLR8** competition held by Electronics and Robotics Club, IIT Bombay *(2022)*
- Junior **Diploma** in **Music** (Subject - Synthesizer), received from **Prayag Sangeet Samiti**, Prayagraj *(2019)*
- Performed in a Band as lead **Keyboardist** in front of 1000+ attendees on CSE department's Traditional Day *(2024)*
- Secured **Merit** Prize in 13*th* National **UCMAS** Abacus & Mental Arithmetic Competition, New Delhi *(2014)*