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Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2026	
Intermediate	CBSE	The Suguna PIP School	2022	99.20%
Matriculation	CBSE	Chandrakanthi Public School	2020	96.60%

Pursuing **Honours** in Computer Science and a **Minor** in **Artificial Intelligence** and **Data Science**.

Scholastic Achievements

- Secured **All India Rank 154** in **JEE Advanced** among 155k+ students; Tamil Nadu girls **State Topper** *('22)*
- Achieved **All India Rank 53** and was **Tamil Nadu State Topper** in **JEE Main** among 900k+ candidates *('22)*
- Obtained **2 AP** (Advanced Performer) grades in the courses *Game Theory and Algorithmic Mechanism Design* and *Computer Programming and Utilization*, awarded to the **top 1%** of the class for exceptional performance *('23, '24)*
- Awarded the **Quadeye Excellence Scholarship** for placing among the **top 10** students of IIT Bombay *('24)*
- Awarded **KVPY fellowship** by the **Government of India** for securing **All India Rank 198** in **SX** stream *('21)*
- Awarded **Certificate of Merit** in **Indian Olympiad Qualifier in Mathematics** (IOQM) *('21)*

Professional Experience

Franklin Templeton Investments | *Data Science & ML Internship* *(Summer '24)*

- Developed a **LightGBM model** for excess return forecasting from **corporate bond** data, achieving an **IR** of **1.64**
- Leveraged several **machine learning** techniques such as **OLS** regression and **PCA** for feature selection, and conducted comprehensive **backtesting** and **out-of-time testing** to validate feature effectiveness and model accuracy
- Created pipelines for fine-tuning **Llama 2-7b** and **DistilBERT** models to analyse the Hawkish/Dovish stance of **Central Banks**, trained on their Monetary Policy Statements, achieving **accuracies** of **76%** and **78%** respectively
- Leveraged the derived Central Banks' stance to predict the **Forex movement** of **G10 Currency Pairs**

Jane Street SEE | *IIT Edition* *(Winter '23)*

Jane Street Capital

- Among the **top 50** students from leading IITs selected for the program at **Jane Street's Hong Kong office**
- Learnt Jane Street's **quantitative approach to trading** through lectures, trading games and research workshops
- Developed a custom version of the classic **snake game** using the **functional programming** language **OCaml**

Key Projects

Operating System Enhancement | *Course Project: Operating Systems* *(Spring '24)*

Instructor: Prof. Mythili Vutukuru

- Implemented custom **system calls** and a weighted round robin **scheduler** in **xv6**, ensuring fair CPU allocation
- Added the `mmap` system call, enabling **on-demand page allocation** for efficient virtual address space expansion
- Enhanced the `fork` system call in xv6 by developing a **copy-on-write** variant, optimizing process memory usage

Process Synchronization | *Course Project: Operating Systems* *(Spring '24)*

Instructor: Prof. Mythili Vutukuru

- Implemented **producer-consumer** shared memory models, synchronized with **IPC** mechanisms (pipes and sockets)
- Developed scalable **Master-Worker** programs using **threads** and **condition variables** to ensure synchronization
- Built custom **locks** in **reader-writer** multi-thread environments for efficient and safe **concurrent** data access

Algorithmic Trader | *Course Project: Data Structures & Algorithms* *(Autumn '23)*

Instructor: Prof. Ashutosh Gupta

- Developed a **multi-threaded real-time** arbitrage detection tool capable of executing **high-frequency trades**
- Implemented **matching algorithms** to simulate the exchange environment and measure **trading efficiency**
- Enabled the autotrader to exploit **statistical arbitrage** opportunities using **stock correlations** across markets

Neural Networks and Natural Language Processing | *Learners' Space* *(Summer '23)*

Web & Coding Club, IIT Bombay

- Built an **image classifier** using **PyTorch**; trained and tested it on a custom dataset, achieving **83%** accuracy
- Implemented a **Skip-Gram Word Embedding** model that uses **NLTK** for preprocessing to embed words by minimizing Cross-Entropy Loss, validated using scatter plots (with singular value decomposition) and cosine similarity
- Developed a 5 part **neural network** using PyTorch and NLTK that performs **sentiment analysis**, trained on the IMDB movie reviews dataset and minimized the binary cross entropy loss, achieving an accuracy of **88%**

Other Projects

Cache Optimizations in ChampSim | *Course Project: Computer Architecture* *(Autumn '23)*
Instructor: Prof. Biswabandan Panda

- Implemented various **cache replacement policies** such as LRU, FIFO, LFU and BIP in the L2C cache of the **ChampSim simulator** and compared them based on the resulting **speedup** and **miss rate** on several traces
- Built a **Stream Prefetcher**, benchmarked it against the IP stride Prefetcher, achieved a **1.28 relative speedup**

Reinforcement Learning from Scratch | *Winter in Data Science Project* *(Winter '23)*
Analytics Club, IIT Bombay

- Modelled the Slippery Walk environments from the **OpenAI Gym** library as **Markov Decision Processes** and used **value and policy iteration** to find optimal policies that maximise the cumulative discounted reward
- Benchmarked the performance of various algorithms including **Thompson Sampling**, **ϵ-greedy**, **softmax** and **Upper Confidence Bound** on **multi-armed bandit** problems against pure exploration and exploitation strategies
- Estimated value functions of environments using **Monte Carlo** prediction and **Temporal Difference** learning

Harvard CS50AI Course Projects | *Self Projects* *(Summer '23)*

- **PageRank Algorithm:** Used two methods - **random sampling** and **Markov chains**, and an **iteration formula**
- **Crossword:** Modelled crosswords as **constraint satisfaction problems**; built a solver with **ac3, backtracking**
- **Tic Tac Toe:** Created an AI agent that plays tic tac toe intelligently against the user using the **minimax** algorithm
- **Minesweeper:** Incorporated knowledge and **logic** into an AI agent, enabling it to play minesweeper intelligently

Image Segmentation with PCU-Net | *Course Project: Medical Image Computing* *(Spring '24)*
Instructor: Prof. Suyash Awate

- Implemented **PCU-Net**, an advanced **deep learning** architecture, benchmarked it against **U-Net** and **CU-Net**
- Integrated **ConvMixer** and **Pyramid Dilated Convolution** modules to enhance global and local context extraction, achieving an improved precision of **97.2%** and accuracy of **96.7%** on the MMOTU ovarian tumor ultrasound dataset

Minesweeper Cricket | *Course Project: Software Systems Lab* *(Autumn '23)*
Instructor: Prof. Kameswari Chebrolu

- Created an **interactive game** from scratch combining minesweeper and cricket with both single and 2 player modes
- Designed the highly detailed UI using **HTML** and **CSS**, and implemented complex game logic using **JavaScript**
- Added **custom features**: sound effects, powerups, settings tab, random runs, variable field size and leaderboard

Competitive Programming | *Seasons of Code Project* *(Summer '23)*
Web & Coding Club, IIT Bombay

- Mentored by **ICPC world finalists**, explored techniques like **dynamic programming** and **greedy algorithms**
- Accomplished problem solving prowess with over **250** successfully solved challenges from prominent platforms

Positions of Responsibility

Convener | *Web & Coding Club, IIT Bombay* *(May '23 - May '24)*

- Organized **AI, ML, web development** and **coding** events, workshops and competitions for the IITB community
- Developed and conducted **CodeWars**, a highly complex, interactive, multiplayer **capture the flag** style strategic **coding game** from scratch using **Python** and **PyGame**, and achieved the highest ever number of submissions

Technical Skills

Programming Languages	C/C++, Python, OCaml, MATLAB, Bash, Sed, Awk, x86 and MIPS Assembly
Libraries & Other Software Development	Sklearn, Statsmodels, NumPy, Pandas, MatPlotLib, Seaborn, PyTorch, GDB HTML, CSS, JavaScript, Bootstrap, Git, LaTeX, MySQL, React, Markdown

Courses Undertaken

Computer Science	DSA†, Discrete Structures, Data Analysis & Interpretation, Computer Architecture†, AI/ML†, Design & Analysis of Algorithms, Operating Systems†, Logic, Automata Theory, Medical Image Computing, Computer Networks†*, Programming Paradigms†*, Implementation of Programming Languages†*
External	**Neural Networks** & **Deep Learning**, Supervised **Machine Learning**: Regression and Classification (**Coursera** courses) by **DeepLearning.AI** & **Stanford University**
Mathematics	Calculus I and II, Linear Algebra, Differential Equations, Optimization Models

†*Course has corresponding lab* **to be completed by April '25*

Extracurricular Activities

- Represented Belgium in the WHO and Ecuador in SOCHUM in **Harvard Model United Nations** India *('19,'20)*
- Mentored groups of students in projects on **Computer Vision** and **Natural Language Processing** *('23, '24)*
- Completed a year-long **volleyball** training course conducted by the **National Sports Organization (NSO)** *('23)*
- Acquired expertise in personal finance through the **Finance 101** course conducted by Finance Club, IITB *('23)*