Pursuing **Minor** in **Machine Intelligence and Data Science**

Scholastic Achievements

- Secured **All India Rank 50** in **Joint Entrance Examination (Advanced)** amongst 150,000+ students *(2022)*
- Achieved **All India Rank 224** in JEE Mains with **99.98 percentile** out of over 900,000 candidates *(2022)*
- Conferred with the prestigious **Kishore Vaigyanik Protsahan Yojana (KVPY)** scholarship and fellowship **twice** by the Department of Science and Technology, Govt. of India amongst 50,000+ candidates *(2020, 2021)*
- Recipient of **National Talent Search Examination (NTSE)** scholarship, by NCERT, Govt. of India *(2020)*
- Achieved **AIR 2** amongst 1,40,000+ students in *Vidyarthi Vigyan Manthan* conducted by Govt. of India *(2018)*
- Received **Certificate of Proficiency in English** by Cambridge Assessment English in *ESOL* International *(2021)*
- Secured **All India Ranks 13, 12 and 35** in *National Level Science Talent Search Examination (NSTSE)* conducted by Unified Council over three successive years with 1,00,000+ participants each year *(2018, 2019, 2020)*
- Obtained **High Distinction** in the Junior Division of **Australian National Chemistry Quiz (ANCQ)** *(2019)*

Olympiad Experience

- Qualified for **Indian National Mathematics Olympiad (INMO)** conducted by HBCSE **twice** *(2020, 2021)*
- Achieved **First Place** and included in the **Honor Roll** of **American Mathematics Contest 10** *(2020)*
- Ranked amongst the top 1% in **IOQP** (Indian Olympiad Qualifier in Physics) Stage-1 conducted by IAPT *(2022)*
- Bagged the **Bronze medal** at **(SEAMO)** (Southeast Asian Maths Olympiad) in Intermediate Category *(2018)*
- Secured **All India Rank 54** in the **Unified International Mathematics Olympiad** *(2020)*

Key Projects

Text Processing and Compression | *Course Project* *(Autumn '23)*
Prof. Ashutosh Gupta - Data Structures and Algorithms Lab

- Designed a **dynamic context-based auto completion system** in C++ using **Prefix Trie** data structure
- Applied the **KMP Algorithm** to enhance efficiency in recommendation generation based on **user text history**
- Studied the **Lempel-Ziv'77 (1Z77)** algorithm to perform **lossless compression** using **back-referencing**
- Implemented **DEFLATE** algorithm using **Huffman Coding** achieving **3.4:1** compression ratio on large text files

Game Theory | *Learning Project – Summer of Science* *(Summer '23)*
Maths and Physics Club, IIT Bombay

- Studied Pure and Mixed Strategy Nash Equilibrium, **Pareto dominance**, Normal and Extensive form games, **Risk Attitudes**, Incomplete and Imperfect Information Games, **Signaling Games** and **Equilibrium Concepts**
- Reviewed papers on Opponent Modeling in Large Imperfect-Information Games using **Deviation-Based Best Response** and Approach for Dynamically and Effectively Screening for Threats using **Marginal Guided Algorithm**
- Analysed **coalition games**, **Shapley value** for dividing payoff and the theory of social choice including **Sen's Theorem** and **Arrow's Theorem** and made a 10-minute presentation explaining **Fair Division Algorithms**

sMART Optimization | *Course Project* *(Autumn '23)*
Prof. Avinash Bhardwaj - Optimization Models

- Formulated the problem of finding the **Optimum Placement of InstaMart** in a city as a linear program, modelling various demographic and logistical factors as linear constraints on an **Edge and Vertex weighted Graph**
- Translated and solved linear formulations to linear integer programs using the Python **MIP** library and **CBC** solver
- Formulated the problem of identifying the **Maximum Sum Eulerian Circuit** within an edge-weighted graph as a linear program, applying it to discover the longest feasible closed path within the IIT-Bombay Campus

CNN-lytical - Convolutional Neural Networks | *Sesons of Code* *(Summer '23)*
Web and Coding Club, IIT Bombay

- Developed **image prediction model** for **MNIST** dataset from seratch using NumPy with accuracy of **95.06%**
- Implemented classification model for **CIFAR-10** using convolutional neural network and got an accuracy of **66.24%**
- Designed an **image segmentation model** for the **Caravana dataset** using **U-Net** with an accuracy of **89.71%**

Other Projects

Data Analysis *Autumn '23*

Course Project | Prof. Ajit Rajwade - Data Analysis And Interpretation

- Verified the Central Limit Theorem, Markov's and Chebyshev's Inequality using **Monte Carlo** analysis in MATLAB
- Performed cross-validation and observed result of **Kernel Density Estimation** carried out on known distributions

Quantum Computing *Summer '23*

Learners' Space | Maths and Physics Club, IIT Bombay

- Studied the concept of **Quantum Entanglement** and solved the **Greenberger-Horne-Zeilinger** (GHZ) Game
- Implemented solution to the **Bernstein-Vazirani Problem** and algorithms such as Deutsch-Jozsa, Quantum Fourier Transform, Phase Estimation, Shor's Algorithm for prime factorization and Grover's search algorithm

Neural Networks and Large Language Models *Summer '23*

Learners' Space | Web and Coding Club, IIT Bombay

- Created a **skip-gram word embedding model** using **Adam** as the optimizer to analyze word similarity in a custom corpus to minimise Cross Entropy Loss using **NLTK** and **spaCy** within the PyTorch framework
- Fine-tuned the **DistilBERT model** from the **Hugging Face library** achieving a classification accuracy of **89%**

Web Data Extractor *Spring '23*

Course Project | Prof. Kameswari Chebrolu - Software Systems Lab

- Developed an efficient Python web crawler using the **BeautifulSoup** library, designed to extract specific file types based on **user-defined extensions** with **automatic file organization** based on the URL of the files
- Incorporated a user-friendly interface, enabling users to customize **search parameters** like webpage size and type
- Extended functionality to compile a **list of linked websites**, both external and internal, from a target site

Cryptographic Analysis and Implementation *Summer '23*

Self Project

- Analyzed modern cryptography schemes including **public-key cryptosystems** and **symmetric-key algorithms**
- Wrote a script to print the plaintext and key using frequency analysis for given **Vigenère-encrypted ciphertext**
- Generate the **SHA-256** digital signature from a file using python and further encrypted it using **RSA**

Computer Architecture and Algorithm Implementation *Autumn '23*

Course Project | Prof. Biswabandan Panda - Digital Logic Design and Computer Architecture Lab

- Reverse engineered binary files to infer the logical and syntactical implementation of various algorithms in **x86 ISA**
- Implemented **Mergesort, Heapsort** and **binary search** in **MIPS** instruction set architecture
- Developed a script in **VHDL** to classify musical nodes into 4 possible groupings based on the chord type

Positions of Responsibility

Media Secretary | *Computer Science Engineering Association, IIT Bombay* *(April '23 - Present)*

- Enhanced online engagement and outreach through **strategic content curation** and social media management
- **Co-worked** in a team of 30 members to increase department bonding by ideating various social, sports events
- **Organised large scale events** like Traditional Day, Convocation, Valedictory Function and Department Trek

Technical Skills

Programming Languages	C++, Python, C, Bash, Awk, VHDL, VHDL, MIPS, x86
Development	Javascript, Flutter, Dart, CSS, HTML, Sed
Software	Android Studio, MATLAB, Git, LaTeX, AutoCAD, Doxygen, ModelSim
Libraries	PyTorch, Matplotlib, NumPy, Pandas, SciPy, BeautifulSoup, Tensorflow, Qiskit, MIP

Relevant Courses

Computer Science	*Data Structures and Algorithms*$^{*\#}$, *Discrete Structures**, *Data Analysis and Interpretation**, *AI/ML*$^{\dagger\#}$, *Software Systems Lab**, *Computer Programming and Utilization*, *Operating Systems*$^{\dagger\#}$, *Digital Logic Design and Computer Architecture*†, *Design and Analysis of Algorithms*†, *Logic and Theory for Computer Science*†
Mathematics	*Calculus*, *Differential Equations*, *Linear Algebra*
Others	*Game Theory and Economic Analysis**, *Optimization Models**, *Introduction to Economics**, *Quantum Physics*, *Introduction to Classical Mechanics*, *Design*

$^{\#}$: *Theory & Lab* * : *To be completed by December 2023* † : *To be completed by April 2024*

Extracurricular Activities

- Received the **Silver Medal** at the **State Level Squash Tournament** conducted by the Education Dept *(2018)*
- Secured **Third Place** at the **Street Play General Championship** representing my Hostel *(2023)*
- Bagged **fifth position** in the **Inter-Hostel Scrabble General Championship** among 16 hostels *(2023)*
- Held the position of **Sub-Editor** of my **School Magazine - "The Eyrie"** *(2019 - 2020)*
- Represented the school at the state level in **Rashtriya Bal Vaigyanik Pradarshani** (RBVP) on Experimental display of **Synthesis of Metal-Organic Frameworks** (MOFs) for Gas Storage and Separation *(2019)*
- Engineered an **autonomous bot**, using Ardruino Uno and 3D printing as part of the Makerspace course *(2023)*

- Drafted an Edtech startup's business model for the **EnB Buzz** Business Pitching Competition *(2022)*
- Completed a year-long training course in **Squash** through National Sports Organization (NSO) *(2022 - 2023)*
- Completed introductory courses in **Finance** and **App Development** in Learners' Space *(2023)*

For reviewers

- I can maybe add Finance 101 Learners' Space (its list isnt out yet). Should i do that and which project should it replace or which points should i cut out to make space for it.
- Also just give a general response as to which project is the weakest
- Also have the option to add a 3-D cinematography presentation which I made in CS103 in extra curricular.
- what points should be removed especially on the second page
- and please give ordering recommendations everywhere...in scholastic, Olympiads, projects and extra curricular too.
- Anything else is more than welcome ;)