Hrushikesh Reddy M
Computer Science & Engineering
Indian Institute of Technology Bombay

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B.Tech.
Gender: Male
DOB: 21/09/2003

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	
Intermediate	Board Of Intermediate Education ANDHRA PRADESH	Sri Chaitanya Jr College	2021	98.30%
Matriculation	Board Of Secondary Education ANDHRA PRADESH	Dr.K.K.R Gowtham School	2019	10

Pursuing **Minors** in **Machine Learning and Data Science**.

Scholastic Achievements

- Secured **All India Rank 10** in **IIT JEE-Advanced** out of over 1.5 lakh+ candidates *(2021)*
- Secured **All India Rank 106** and **99.994 percentile** in **JEE-Main** out of 1.1 million candidates *(2021)*
- Recipient of the prestigious **KVPY Fellowship** by **IISc Banglore** with an **All India Rank 363** *(2020)*
- Secured **25th rank** in **AP EAMCET** 2021 conducted by **APCHE** out of 1,50,000+ students *(2021)*
- Secured **25th rank** in **TS EAMCET** 2021 conducted by **TSCHE** out of 1,70,000+ students *(2021)*

Olymiads

- Among the **top 8 students** who represented India in **21st Asian Physics Olympiad (APhO)**, organized by Taiwan, and got invited to be part of the **APhO 2022 academic team** *(2021)*
- Secured **All India Rank 13** in **Indian National Physics Olympiad (INPhO)** and qualified for **Physics OCSC** (Orientation Cum Selection Camps) organized by HBCSE *(2021)*
- Secured **All India Rank 50** in **Indian National Chemistry Olympiad (INChO)** and qualified for **Chemistry OCSC** (Orientation Cum Selection Camps) organized by HBCSE *(2021)*
- Cleared the Regional Mathematical Olympiad (**RMO**) conducted by HBCSE and got selected for **INMO** *(2019,2020)*
- Among the **top 1%** students across the nation in **National Standard Examination in Physics (NSEP)** *(2021)*
- Among the **top 1%** students across the nation in **National Standard Examination in Chemistry (NSEC)** *(2021)*

Key Projects

Breakout Genius | *Summer Of Code*
WNCC | Summer 2023

- Designed and implemented an artificial intelligence agent to play the **Atari Breakout game** autonomously using advanced Reinforcement Learning algorithms. This project utilized **Deep Q-Networks (DQN)**, developed with the **PyTorch framework**, incorporating **Convolutional Neural Networks (CNNs)** for visual input processing
- The model incorporated the **epsilon-greedy strategy** for effective exploration-exploitation trade-off and an **experience replay buffer** to enhance the learning process from past transitions
- The project used **OpenAI's Gym toolkit** to simulate the **Atari environment** and provide a high-level interface for **agent-environment interaction**
- Implemented **frame stacking** and **preprocessing techniques** to handle temporal dependencies and simplify the learning process by reducing the state space complexity, leading to a robust and efficient learning agent

Cache Hierarchy Optimization | *Prof. Biswabandan Panda*
Course Project | Spring 2023

- Implemented **cache hierarchies** with varying L1, L2, and LLC sizes and configurations (inc/non-inc/exc)
- Examined the impact of different cache **replacement policies** (LRU, FIFO, LFU, and Random) on the performance of different **Graph Algorithms** by plotting **IPC against inclusivity and cache size** for the different algorithms
- Compared the performance of cache hierarchies with a baseline cache hierarchy leveraging the **Champsim simulator**

Multiplayer Game Development | *Prof. Kavi Arya*
Course Project | Autumn 2022

- Developed a **multiplayer scribble game** using **socket programming** concepts and game development principles
- Enhanced the user experience using sophisticated GUI, creating **public and private lobbies** for players to join and have a scoreboard for the multiple instances of playing, along with the **user authentication**

Image Classification
Self Project | Summer 2023

- Implemented an **image classification project utilizing convolutional neural network layers** on the **CIFAR-10 datasets from the Torch framework**, achieving precise and efficient pattern recognition
- Developed a **robust digit recognition system** leveraging multiple neural network layers, trained and tested on **MNIST dataset from torchvision**, demonstrating exceptional accuracy and performance

P2P Application | *Prof. Bhaskaran Raman*
Course Project | Spring 2023

- Implemented the **Simple FTP with a Client&Server** program in C++ by establishing **two-way TCP connections** for **requesting and downloading files** with custom receiving rates and **simultaneous multiple clients** feature implemented using **select system call**

Image Processing and Data Analysis | *Prof. Suyash Awate* *Course Project | Autumn 2022*
- Developed an algorithm for **Euclidean Planar uniform sampling** and implemented PCA for **hyperplane fitting** and utilized **Linear Regression** on scatter plots for pattern analysis
- Employed **PCA for character recognition tasks** in handwritten digits. Executed **dimensionality reduction** techniques to visualize high-dimensional data on an 84-D hyperplane
- Pioneered a reverse image processing algorithm to reconstruct original images from reduced dimensions. Grouped similar fruit images using **Frobenius norm** and **generated synthetic fruit images** for classification tasks

Game Theory Project | *Prof. Urban Larsson* *Course Project | Spring 2023*
- Designed an **impartial combinatorial board game** incorporating principles from **Game Theory**
- Implemented a command line game interface in **C++** for an interactive gaming experience. Designed and implemented an efficient dynamic programming algorithm to determine **winning strategies by analyzing the game tree**

Train Journey Planner | *Prof. Supratik Chakraborty* *Course Project | Autumn 2022*
- Designed a highly efficient **Rail Planner** by implementing several effective **Data Structures** including **Dictionaries, Linked List, Binary Search Trees, AVL Trees, Tries, Heaps and Priority Queues**
- Incorporated some highly efficient algorithms like **Quick Sort** on **Linked List** and **KMP** for searching station names and journey reviews and **Heapify on Binary Search Trees & AVL Trees**
- Implemented **Priority Queues** on reviews with a numerical rating at least as large as a user-provided threshold

SAT Solver | *Prof. Ashutosh Gupta* *Course Project | Spring 2023*
- Developed **SAT-based** puzzle solver by implementing rules and constraints and finding optimal moves within limits
- Implemented efficient Python algorithm using **Z3solver** and added clauses for solving, showcasing logical reasoning

App Development | *Prof. Sandip Mondal* *Course Project | Autumn 2022*
- Developed a fully functional **Doctor-Patient app** for IITB Hospital using **Flutter & Firebase**
- Implemented the application using **virtual machines in Android Studio** with the Flutter framework

Other Projects

Digital Logic Design | *Prof. Biswabandan Panda* *Course Project | Spring 2023*
- Used an **FSM**(Finite State Machine) on **VHDL** for **compression of files** based on **RLE**(Run Length Encoding)
- Implemented a **VHDL circuit** to model the **traffic signals** on four lanes using **ModelSim Altera**

Bubble Shooter Game | *Prof. Parag Chaudhuri* *Course Project | Spring 2022*
- Used **C++** & **simplecpp package** provided by the institute to develop an **user interactive bubble shooting game** with multiple levels of toughness and new challenges

FinSearch *Finance Club | Autumn 2022*
- Studied the **performance and volatility** of various **crypto assets** and studied the functioning of **BlockChain system, POW (Proof of Work) and POS (Proof of Stake)**
- Compiled a **case study on Competing Cryptocurrencies** (Bitcoin vs Ethereum)

RC Plane *Aeromodelling Club | Autumn 2022*
- Designed and constructed a **cost-efficient remote control plane** using depron sheets and servo motors for the RC Plane competition conducted by **Aeromodelling Club** partnered with **ideaForge**

Random Walkers | *Prof. Suyash Awate* *Course Project | Autumn 2022*
- Obtained the **Gaussian Distribution plot** of N random walkers using **Pyplotlib**
- Verified the **Law of Large Numbers** by analysing the true and empirically computed mean and variance

Technical Skills

Programming	C++, C, Python, Java, Bash, Awk, Sed, Dart, Prolog, Assembly, VHDL
App & Web Dev	HTML, CSS, Bootstrap, JavaScript, Flutter
Software	Android Studio, GitHub, LaTeX, Docker, Champsim, VTune, Ripes, Wireshark
Packages	NumPy, Matplotlib, Doxygen, Sphinx, FLTK, Z3, Pytorch

Key Courses Undertaken

Computer Science	Computer Programming and Utilisation, Abstractions and Paradigms in Programming, Data Structures and Algorithms, Data Analysis and Interpretation, Software Systems and Lab, Discrete Structures, Design and Analysis of Algorithms, Digital Logic Design and Computer Architecture, Logic for Computer Science, Computer Networks, Operating Systems*, Automata Theory*, Artificial Intelligence and Machine Learning*, Implementation of Programming Languages**, Database and Information Systems**
Mathematics	Calculus, Linear Algebra, Differential Equations
Others	Decision Analysis and Game Theory, Optimization Models

**to be completed by November 2023, **to be completed by April 2024*

Extracurricular

- Participated in **Codewars V1** conducted by **WNCC** *(2021)*
- Participated in **Scicomp Blitz GC** conducted by **Institute Technical Council** *(2022)*
- Successfully completed a year long course under the **National Sports Organization** *(2021-2022)*
- Participated in the **Football tournament** conducted by CSEA, IIT Bombay *(2023)*
- Participated in **Valorant E-Sports tournament** conducted by CSEA, IITB and secured 2nd place in CS dept *(2023)*