	Dhvanil Gheewala		22B0923
	Computer Science & Engineering		**B.Tech.**
	Indian Institute of Technology Bombay		**Gender: Male**
			DOB: 16/02/2004

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2026	8.37
Intermediate	CBSE	URMI School	2022	94.60%
Matriculation	CBSE	Bright Day School	2020	94.00%

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

SCHOLASTIC ACHIEVEMENTS

- Secured an **All India Rank 335** in **JEE Advanced '22** among **160 thousand** candidates *(2022)*
- Secured an **All India Rank 659** in **JEE Mains '22** among 1 million candidates with **100 percentile** in **Maths** *(2022)*
- Awarded the prestigious **Kishore Vaigyanik Protsahan Yojana Scholarship** (KVPY) scholarship by the Indian Government with **All India rank of 342** in **SA stream** in 2020 and **606** in **SX stream** in 2021 *(2020,2021)*
- Cleared **PRMO 2019** from Gujarat, Daman, Diu, Dadra & Nagar Haveli and advanced to **HBCSE's RMO** *(2019)*

INTERNSHIP EXPERIENCE

Software Development : Automata Tutor v3 | *Masaryk University, Brno* *(Summer 2024)*
Guide: Prof. Jan Křetínský

- Implemented an automated system for generating various problem types, facilitating both course instructors in creating assignments and users in practicing independently in **Flask** using **BeautifulSoup** and **SOAP connection**
- Extended and **created templates** and **blueprints** and implemented a system for **finding derivation of grammar**, **verifying the correctness** of user-provided answer and created proper **feedback mechanism** by utilising the functions from backend and **store** all the necessary **user data** in a **database** for further help of user
- **Dockerised backend** and **frontend** of both upcoming and current version of **Automata tutor** for the ease of deployment regardless of the operating system and environment

KEY PROJECTS

Homomorphic Encryption for k-NN on the Cloud | *Season of Code* *(Summer 2023)*
Web and Coding Club IIT Bombay

- Implemented a **research paper** by **Youwen Zhu**, **Zhiqiu Huang** and **Tsuyoshi Takagi** on **Secure** and **controllable k-NN query** over encrypted cloud data with confidentiality and maintaining **data privacy** and empowering **data owners** with **query control**, ensuring they maintain **control** over **data access** and **queries**
- Innovated the database security with **Homomorphic Encryption**, **Docker**, **sockets**, and **SageMath** for efficiency
- Set up an infrastructure comprising **Cloud Server**, **Query Server**, and **Data Owner** with **secure communication** via socket programming in a containerized environment using Docker

Algorithmic Trader | *Course Project* *(Autumn 2023)*
Guide: Prof. Ashutosh Kumar Gupta

- Executed **algorithmic trading strategies**, including arbitrage and median filter, while managing the order book through advanced **Data Structures and Algorithms (DSA)** to match compatible stocks **optimizing trade execution**
- Developed a **market simulation** featuring various traders and an autotrader that achieves **profitability within asymptotically polynomial time** that provides summary for all the traders and their profit at the end of the day
- Executed **OOPs** in **C++** and created **self-customised data structures** to store and retrieve data efficiently

Neural Networks and Large Language Models | *Learners' Space* *(Summer 2023)*
Web and Coding Club IIT Bombay

- **Fine-tuned a Pre-trained Model for Language Identification**: Fine-tuned **MT5 model**, **utilized pipelines** and **transformers** for language identification, and implemented **Gradio** for streamlined app deployment
- **Skip-gram Word Embeddings**: Analyzed **2-D** and **4-D word vector similarities** through a neural network lens
- **Sentiment Analysis**: Developed a **binary classification** system for **movie reviews**, distinguishing between positive and negative sentiments with an accuracy of 86% using an **LSTM** and **Recurrent Neural Network**

Basics of Operating systems | *Course Project* *(Spring 2024)*
Guide: Prof. Mythili Vutukuru

- Implemented file operations like **reading, opening** and **deleting** in a simple **filesystem** over an emulated disk
- Implemented **multi-threaded programming in C** using **locks and semaphores** available in pthreads API
- Created new functions involving **memory management** and implemented **copy on write fork** and a **weighted round robin scheduler** in xv6 and built a simple shell to execute user commands, much like the bash shell in Linux

Customised Web Crawler | *Course Project* *(Spring 2023)*
Guide: Prof. Kameswari Chebrolu

- Implemented a **Web Crawler** using **BeautifulSoup**, **NumPy,** and **Matplotlib** which can parse websites for links
- Programmed the code to handle different recursion threshold specifications and output categorization demands and also simplified representation of the amount and size of file types consisting of webpages with Bar charts

OTHER PROJECTS

Cryptography in Practice ∣ *Course Project* *(Spring 2024)*
Guide: Prof. Manoj Prabhakaran
- Implemented cryptographic techniques like encoding, hashing, digital signatures, certification and MAC
- Compromised modern cryptographic schemes using various attacks like **timing based side channel attack**, **Length extension attacks** and various faults in implementation like **key repurposing, Nonce Reuse** and statistical methods

Data Compression and Text Processing ∣ *Course Project* *(Autumn 2023)*
Guide: Prof. Ashutosh Kumar Gupta
- Utilized C++ to implement well-known compression algorithms like **Run Length Encoding (RLE)** and **Huffman**, incorporating compression and decompression functionalities using **trie structures**
- Executed the **KMP Pattern Matching Algorithm**, showcasing precise string pattern matching; Designed and implemented fundamental data structures (Heap, Red-Black Tree) in C++ for efficient operations

Into the RLverse ∣ *Winter in Data Science 2023* *(Winter 2023)*
Analytics Club IIT Bombay
- Implemented a range of algorithms, including **Thompson Sampling (TS)** and the **Upper Confidence Bound (UCB)**, for addressing **Multi-Armed Bandits (MAB)** by estimating the anticipated reward for each action
- Understood various concepts like **Monte Carlo algorithms, TD algorithms, eligibility traces** along with their convergence proofs and implementing these to solve environments like Snake, Tic-Tac-Toe, etc
- Implemented RL models such as **Deep Q Networks, Dueling Deep Q Networks** to find **optimal policies** for various RL environments such as *CartPole* and *Atari: Breakout* from the **OpenAI gymnasium**

Topology ∣ *Summer of Science* *(Summer 2023)*
Maths and Physics Club IIT Bombay
- Studied and grasped six chapters of **"Topology without Tears"**, covering topological spaces to metric spaces
- Prepared a **detailed report** and an **explanatory video** on **Topological Spaces** as a part of this reading project

Zero Knowledge Proofs ∣ *Summer of Science* *(Summer 2024-Present)*
Maths and Physics Club IIT Bombay
- Studied and understood eleven chapters from **"Proofs, Arguments, and Zero-Knowledge"** by Justin Thaler.
- Created a comprehensive report on **Zero Knowledge Proofs and Arguments** as part of this reading project.

TECHNICAL SKILLS

Languages	C/C++, Python, HTML, CSS, LaTeX, bash, awk, VHDL, Arduino IDE, MIPS, x86, xml
Software	Docker, Matlab, Ubuntu, Git, Microsoft Excel, Sagemath, Autodesk Fusion 360, Z3, Flask, MySQL
Libraries	PyTorch, sklearn, Tensorflow, pandas, Matplotlib, NumPy, socket, NLTK, spaCy

POSITION OF RESPONSIBILITY

Events Coordinator ∣ *Techfest, IIT Bombay* *(Jun 2023 - Dec 2023)*
Asia's largest Science and Technology Festival ∣ *Footfall: 1,75,000+* ∣ *Events: 280+*
- Successfully **coordinated** and **managed 200+ College Ambassadors** for the execution of **Techfest zonals**
- **Contacted** and **Invited professors** from all over the globe to display their projects and research in an exhibition
- Coordinated significant events like **Cyclothon** and **stem cell donation** in collaboration with a prominent NGO

Mentor - Brain Tumor Detection ∣ *Winter in Data Science 2023* *(Winter 2023)*
Analytics Club IIT Bombay
- Guided students in mastering **Convolutional Neural Networks (CNNs)** and hands-on implementation using **PyTorch** for robust **Brain Tumor Detection** models that can detect tumor upto the accuracy of 89%
- Mentoring on the fundamentals of **Neural Networks**, emphasizing the **Linear algebra** and **Calculus** involved and practical application through **NumPy** implementations, reducing reliance on pre-existing frameworks

RELEVANT COURSES

Computer Science	Computer Programming and Utilisation, System Software Lab, Discrete Structures, [†]Data Structures and Algorithms, Computing and Science, Data Analysis and Interpretation, [†]Computer Architecture and Digital Logic, Logic and Theory of Computation, Design and Analysis of algorithms, [†]Operating Systems, [†]Artificial Intelligence and Machine learning , Automated Reasoning, Cryptography and Network Security
Mathematics	Calculus, Linear Algebra, Differential Equations, Mathematical Structures for Control
Others	Economics, Design, Management, Makerspace, Biology, Organic, Inorganic and Physical Chemistry, Introduction to Classical and Quantum Physics

[†] This course has a corresponding lab

ACHIEVEMENTS & EXTRACURRICULAR ACTIVITIES

- Completed a year-long **National Service Scheme (NSS)** program, mentoring **Class 12 JEE aspirants** *(2022-2023)*
- Conducted a preliminary research on **"Malabar Jewellers"** as a part of Management Course project *(2022)*
- Built a strategy for playing The **Actual War** as a part of **CodeWars** organized by WnCC, IIT Bombay *(2023)*
- Participated in **XLR8** and successfully made a remote-controlled 4-wheeler bot that completed the track *(2022)*
- Audited the **"Neural Networks and Deep Learning"** course on **Coursera**, instructed by **Andrew Ng** *(2023)*
- Attended the **"Vijyoshi Camp"** at **IISc Bangalore** and gained insight about their ongoing research project *(2021)*