Pranav Chaudhari
Environmental Science & Engineering
Indian Institute of Technology Bombay

20D180023
Dual Degree (B.Tech. + M.Tech.)
Gender: Male
DOB: 17/05/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	8.92
Intermediate	HSC	Chandrabhan Sharma Junior College Of Science and Commerce	2020	87.08%
Matriculation	ICSE	North Point School	2018	94.17%

Pursuing **Minor** from **Centre of Machine Intelligence & Data Science**

Scholastic Achievements

- Currently holding **Department Rank 1** in Environmental Science & Engineering undergraduate program *[Present]*
- **International Rank 2** in **Mental Arithmetics & Morality Competition** held at Bangkok, Thailand *[2010]*
- Secured **99.75** percentile score in **JEE Main Examination** with over **13 lakh** students across the nation *[2020]*

Professional Experience

MITACS GRI'23 | Investigation of Deep Learning Models for Hydrological Forecasting *May '23 - Jul'23*
MITACS Globalink Research Internship based at York University, Toronto under professor Marina Erechtchoukova

- Conducted comprehensive **Time Series, Multivariate and Cross Correlation Analysis** of river flow, rainfall, and water quality data, namely; pH, conductivity and DO from multiple gauge stations along the Grand River, Ontario.
- Leveraged **QGIS** software to perform sophisticated **geospatial analysis**, unravelling **spatial patterns** and **correlations** among the gauge stations, providing valuable insights into the river's dynamic behavior.
- Employed **advanced LSTM models**, integrating **24 previous hours timestamps**, to predict, initially river flow and then water quality parameters with **lead times** ranging from **1 hour to 24 hours**.
- Showcased expertise in **environmental data analysis**, cutting-edge time-series forecasting, and geospatial methodologies, contributing to **better water resource management and sustainability practices**.

Curiosity-Driven AR Developer | YoZu | Unity Developer Internship *Aug '21 - Jan '22*
Deep-Tech startup building an AI curiosity companion to solve for curiosity in kids

- Spearheaded the seamless fusion of scientifically intricate Blender models, into an **interactive Unity3D application**
- Proficiently orchestrated **model integration**, while intricately **refining lighting nuances**, culminating in an engaging **augmented reality** encounter that captivated 8th-grade students' inquisitiveness.
- Skillfully curated augmented reality interactions through the **smartphone camera**, resulting in an **immersive edTech solution** that brought 8th-grade science experiments vividly to life

Research Intern | Cloud Tracking Algorithm *Dec '22 - Jan' 23*

- Analyzed the 3-dimensional cloud temperature data using **xarray data structure** in python for tracking of clouds
- Implemented **FarneBack's Algorithm** on cloud temperature animations for analyzing the gradient of the temperature.
- Used **scalar functions** and **threshold values of cloud temperature** to track different types of clouds

Research Intern | Analysis of Low Cost Sensors *May '22 - Jun '22*
Field monitoring campaign followed by data analysis to identify issues and biases associated with low cost sensors

- Handled sophisticated **real-time sampling instruments** such as Dustrak, OPC, Alphasensor, E-BAM and PurpleAir
- Performed **data analysis** and interpretation of the results and **inter-comparison of different instruments**

Key Projects

Min Heap-Based File Compressor and Decompressor *May '23 - Jun '23*

- Implemented file compression-decompression tool using **C++ and Huffman coding** algorithm for reducing file sizes
- Engineered a custom **Min Heap** data structure to construct and maintain **Huffman trees** efficiently
- Built proficiency in working with **binary files** and **I/O operations**, enabling seamless compression-decompression

CodeCipher Keeper: Password Manager *Jul '23 - Aug '23*

- Developed **Python-based** password manager with **MySQL integration** to securely store and manage credentials
- Designed an intuitive **command-line interface** (CLI) for user interaction, enhancing user-friendliness and ease of use
- Enabled users to **add, search, and retrieve entries** using a variety of parameters such as **site name, site URL, email, and username** with integration of **Rich library** to present results in a visually appealing **tabular format**
- Utilized Crypto libraries for key derivation & **AES encryption** & implemented **secure copying feature** using the **Pyperclip library** to copy decrypted passwords to the clipboard while **maintaining data confidentiality**

Closing the Gap: Predicting Question Closure on Stack Overflow *Nov '22 - Dec '22*

Guide: Prof. Amit Sethi | Course Project | Centre of Machine Intelligence and Data Science, IIT Bombay

- Developed predictive models (Gaussian Naive Bayes, Random Forest & LSTM) for **Stack Overflow** question **closure**
- Achieved **60% accuracy using LSTM**, showcasing the better performance of neural networks over other ML models.
- Employed **feature engineering** and rigorous evaluation to gain insights into **question closure dynamics**

Socio-Economic Voting Patterns: An ML Approach | Datathon | DPhi *May '22 - Jun '22*

Predicted the political party of the taxpayer using various ML models on the socio-economic features of the public

- Conducted extensive **exploratory data analysis** and **feature engineering** to inform precise model selection
- Employed a diverse set of ML algorithms (**logistic regression, SVM, KNN, random forest, MLP**) and fine-tuned hyperparameters using **GridSearchCV**, resulting in optimized political party preference predictions.
- Demonstrated expertise in data preprocessing, model evaluation, and result interpretation, leading to successful implementation of robust ML solution for predicting **political affiliations based on socio-economic factors**

WeatherNet: Deep Learning for Weather Image Classification | Datathon | DPhi *May '22 - Jun '22*

Processed the image dataset and classified it into 5 types with the help of Convolutional Neural Networks

- Developed a weather image classification system using **Neural Networks**, achieving **83% accuracy**
- Conducted **comparative analysis** of CNN models (VGG16, ResNet50, ResNet101) for optimal performance
- Utilized **OpenCV** library for **image processing** and performed exploratory data analysis to gain valuable insights

Big Data Analysis on Air Pollution Index Value *Sept '21 - Nov '21*

Guide: Prof. Manoranjan Sahu | Course Project | Environmnetal Science and Engineering Department, IIT Bombay

- Performed statistical tests including **Time Series Graph, Average Plotted Graph, Particle Distribution Graph and Hypothesis Testing** on the air pollution index data provided from various Covid-19 lockdown periods
- Used Anova and Turkey Test to find the location-pair having maximum correlation and analysed the relation between **temperature and PM** concentration by comparing the results from linear and multiple regression models

Solar Power Analysis For a Household *Oct '22 - Dec '22*

Guide: Prof. Munish K. Chandel | Course Project | Environmnetal Science and Engineering Department, IIT Bombay

- **Guided Solar Unit Blueprint**: Meticulously researched & crafted a detailed plan for 30kW solar power unit installation on residential building, optimizing critical parameters like rooftop space and adhering to budget constraints
- **Innovative Modeling**: Developed a sophisticated precise solar power unit model aligning with the technical requirements and financial prudence like budgetary considerations, laying the groundwork for successful implementation
- Quantified money savings & carbon footprint reduction, displaying project's holistic environmental & economic benefits

Technical Skills

Programming	C, C++, C#, Solidity, HTML, CSS, JAVASCRIPT, Python, LaTeX, MATLAB, Octave, R
Softwares & Tools	Unity, VS Code, Github, AutoCAD, SolidWorks, Visual MINTEQ, QGIS, ArcGIS
Libraries	NumPy, Pandas, Matplotlib, Sklearn, SciPy, Seaborn, Keras, Tensorflow, OpenCV

Organisational Roles

Damp Mentor | Department Academic Mentorship Program *May '22 - May '23*

Selected as mentor, after a rigorous interview process, ethical assessment, along with extensive peer review

- Co-mentoring 10 sophomore students, catering to their academic needs and helping them achieve overall stability
- Responsible for developing **website**, and increasing the **social media outreach** of the ESED Damp website
- Updating the ESED Damp blogs with reviews pertaining to Courses, internships, Projects & Higher Studies

Extracurriculars

Sports	• Created and registered under the **Guinness Book of World Records** for 24hr Skating Relay • Named in Asia Book of Records, **Asia Pacific records, National Records, India Book of Records** for participating in **Khelo India Multiactivities Skating marathon** • Secured **5th position** in **National level Skating Competition** held at Mumbai • Bagged **2nd price** in Mumbai City Powerlifting **district level** Championship in **junior** category • Represented Thane district in **Maharashtra Skating Championship (affiliated to RSFI)** • Attended **Military Camp** under "Marshal Cadet Force Maharashtra Adventure Training Camp" • Secured **3rd place** in Mumbai City Powerlifting **district level** Championship in **novice** category • Represented school as a part of a **football team** in interschool football tournaments • Attended **Karate Camp** at Raigad during the winter holidays in December 2014 • Completed a year long course on **swimming** at Father Agnel Sports Complex, Navi Mumbai
Culturals	• Participated and secured **2nd place** as a **keyboardist** in the inter-school **Band Competition** • Represented the school in **Cascades Competition** held by Jamnabai Narsee School • Pursued an extensive two-year-long course on playing **Keyboard, Guitar and Drums**