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**.

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**

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

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

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

Storm-water Management Network *Jan '22 - Feb '22*

Guide: Prof. Subhankar Karmakar | Course Project | Environmnetal Science and Engineering Department, IIT Bombay

- Designed an effective and efficient **drainage network system** for IIT Bombay Campus using only its **DEM File**
- Examined and compared the **effectively designed** IIT Bombay Drainage System with the existing drainage network in ArcGIS to look for new changes which could be implemented to IIT Bombay Campus for storm water management

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**