Yash Niraj Mehta | **22B1504**
Energy Science and Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 25/08/2004

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2026	
Intermediate	HSC	RGA Science Jr. College	2022	
Matriculation	CBSE	Podar International School, Ambegaon	2020	

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

Scholastic Achievements

- Currently the **Department Rank 2** of the Energy Science and Engineering department, IIT Bombay [Present]
- Awarded **6 AAs (10/10)** (in EN313, EN203, EN204, EN213, EC101 and CS101) and an **AP** (in HS109) [2022-24]
- Secured an impressive All India Rank of **2203** in JEE Advanced'22 among **0.16 million** candidates of India [2022]
- Secured an outstanding percentile of **99.976** in the MHT-CET-PCM'22 exam among 0.23 million applicants [2022]
- Selected by CBSE as **one of the 50 most meritorious students** and invited to witness the **Republic Day Parade 2021** from the **Prime Minister's Box**, for scoring **99.6%** in 10th standard, CBSE [2021]

Research Experience

Battery Energy Storage System (BESS) Techno-Commercial Analysis [May'24 - Jul'24]

Project Intern | Guide: Prof. P. Sunthar, IIT Bombay

- Reviewed key engineering economics concepts: Net Present Value, Payback Period, Total Cost of Ownership, etc.
- Read literature to understand the current trends of BESS usage worldwide to analyse it's potential in India
- Developed models and derived a generalised simple expression of **Savings** for different BESS based strategies to reduce grid or DG set dependence & formulated **Levelized Cost of Energy** for BESS used alone and with solar PV
- Worked on creating a **Web Framework** to incorporate these models and make them available for industrial use

Key Projects

Data Quality Improvement | DS203 (Programming for Data Science) [Oct'23]

Course Project | Guide: Prof. Vinay Kulkarni, IIT Bombay

- Collaborated in a team of 3 to analyse a data-set of transformer current sampled every 5 minutes for 280 days
- Identified the missing days and classified the remaining as 'good' or 'bad' based on a threshold on the noise
- Changed 'good' days into 'really good' by replacing the noisy areas on the plot with **suitable moving averages**
- Used 80% of the data of 'good' days to develop an ML model to replace bad and missing days, using **polynomial regression** with required **backward elimination**; and validated the model on remaining 20% of the data

Skribbl Buddy | CS419 (Introduction to Machine Learning) [Apr'24 - May'24]

Course Project | Guide: Prof. Abir De, Computer Science and Engineering, IIT Bombay

- Developed an AI drawing recognition system using a **2 layer FNN** to classify hand-drawn images into 50 categories
- Implemented forward & backward propagation with **ReLU** and **softmax** activations for optimal model performance
- Processed and augmented a dataset of **100,000+** images by converting user-drawn strokes into pixel representations
- Achieved a test accuracy of 50% by splitting data & fine-tuning hyperparameters (learning rate and hidden-layer size)

Classification of Wines using FTIR Spectrum Analysis | Self Project [Dec'23 - Jan'24]

- Analyzed FTIR spectra of 37 wine samples, reducing dimensions & applying **peak-based data point extraction**
- Used **K-Means** to classify samples into two groups, as per the dataset's claim of 18 and 19 samples per class
- Optimized peak filtering per sample by reapplying K-Means on averaged sample data points for validation of results

Chemical Operating Plant Data Analysis | DS203 (Programming for Data Science) [Oct'23 - Nov'23]

Course Project | Guide: Prof. Vinay Kulkarni, IIT Bombay

- Worked on cleaning multidimensional data with **240+ features**, by dropping features with many missing values
- Implemented feature engineering to reduce total features, and checked for multicollinearity among features by calculating **Variance Inflation Factor (VIF)** for each of the features, and eliminated those with VIF value > 6
- Applied **Multilinear Regression** on the cleaned, low dimensional data & analysed metrics like regression coefficient

ReinFLY: AI Learns to Play Flappy Bird | Seasons Of Code 2024 [Jun'24 - Present]

- Created a fully functional Flappy Bird game from scratch using **PyGame** to understand the game mechanics
- Implementing a **Deep Q-Network** to train an AI agent to play the Flappy Bird game autonomously
- Exploring various RL techniques for optimizing the agent's performance and improving gameplay strategy

Hydrogen Train | EN610 (Hydrogen Energy) [Feb'24 - Apr'24]
Course Project | Guide: Prof. Pratibha Sharma, Energy Science and Engineering, IIT Bombay

- Worked in a team of 3 to analyse technological feasibility and economic requirements of a Hydrogen Train in India
- Mapped the locations of hydrogen refueling stations (HRS) across various routes of trains going from Mumbai to Delhi, based on the amount of hydrogen required for the entire journey using both fuel cells as well as HICEs
- Estimated the cost of Hydrogen Processing setup required for each solar based HRS to be around **150** crore rupees
- Determined the capacity of the required solar PV farm per HRS to be around **20 MW** and area to be **50 hectares**

Role of ESG Metrics in Investment Strategies | FinSearch'24 [Jun'24 - Present]

- Gained a deeper understanding of the various aspects of ESG Investing including **Sustainable Finance**, Impact Investment Spectrum and **ESG Investing Strategies** such as Positive/Negative Screening, ESG Integration etc.
- Attained a working knowledge of ESG ratings, risk scores and frameworks; and drafted a rough outline of steps involved in ESG Investing; aiming to build a detailed **ESG report** for a company and draft a sound investment plan

Wind Simulation on 2D Airfoil | EN222 (Fluid Mechanics & Heat Transfer) [Mar'24 - Apr'24]
Course Project | Guide: Prof. Manaswita Bose, Energy Science and Engineering, IIT Bombay

- Studied wind velocity and angle of attack effects on **NACA 4430 airfoil's** lift, drag, and moment coefficient
- Simulated wind on airfoil at three different velocities **(40, 45, 50 m/s)** and 6 angles of attack **(from 0°to 25°)**
- Proposed an **optimisation problem** based on resulting trends by assuming the airfoil to be a part of windmill blade

Mountain Cargo | MS101 (Makerspace) [Mar'23 - Apr'23]
Course Project | Guides: Prof. Ankit Jain, Prof. Joseph John, Prof. Kushal Tuckley, IIT Bombay

- Designed and built a **pre-programmed line-following bot** capable of climbing slopes up to **30°** with **500g** payload
- Crafted the mechanical parts of the bot using AutoCAD Fusion 360, 3D printing and laser cutting technologies
- Implemented the **electrical** architecture using Arduino, Motor drivers, intricate connections, and assembly
- Created a mechanism for dumping load, based purely on **gravitational force** which activates on reaching destination

Emergency Detection System for Deserted Areas | DE250 (Design Thinking) [Feb'24 - Apr'24]
Course Project | Guide: Prof. Nishant Sharma, Industrial Design Centre, IIT Bombay

- Collaborated in a team of 6 to develop a product to promote **Walk Friendly IITB Campus** for commuting
- Proposed a prototype of **360°camera & siren system** on a pole powered by solar energy supported by watch application to facilitate automatic emergency detection & response system using **ML models & image processing**

Position of Responsibility

Institute BioX Convenor | **Institute Technical Council, IIT Bombay** [Jun'23 - Mar'24]
Part of a club promoting biotechnology in the college by conducting various events based on bioinformatics, forensics, etc.

- Developed a segment based on **'Disease Modelling'** for **Bio-engineering GC** to be solved using **'Curve Fitting'**
- Designed a module for a 'Learners' Space' course **'Computational Genomics'** benefiting **70+ students**
- Successfully conducted the crypt hunt event **'Arcano'** with an **increased participation** of 40+ participants
- Successfully conducted the flagship event **'Crime Scene Investigation'** with a participation of **70+** participants
- Volunteered on the behalf of BioX Club for **Energy Swaraj Foundation's** (ESF) '1000 Days' event

Technical Skills

- **Programming** Python, MySQL, C++, Javascript
- **Data Science** NumPy, Pandas, SciPy, Scikit-Learn, Seaborn, Matplotlib
- **Software** AutoCAD Fusion 360, COMSOL, ANSYS, LaTeX, LaserCAD, Fraktory, Figma

Key Courses Undertaken

Course Category	Courses Taken
Energy Science and Engineering	Hydrogen Energy, Thermodynamics and Energy Conversion, Material Science for Energy Applications, Electrical Networks and Machines, Fluid Mechanics and Heat Transfer, Power Electronics, Reactions for Energy
Data Science and Mathematics	Calculus, Linear Algebra, Differential Equations, Optimisation, AI and Data Science
Computer Science and Machine Learning	Introduction to Machine Learning, Programming for Data Science, Computer Programming and Utilization

Certifications

- **Geographic Information Systems** | NPTEL
- **Data Structures and Algorithms** | Udemy

Extra-Curricular Activities

- Completed an year-long training in **Classical Vocals** under **National Sports Organisation (NSO)** [2022-23]
- Performed in **Commencement'23** at **Convocation Hall** and at **Republic Day'23** in NSO Vocals group [2023]
- Created & presented a watch-version of LinkedIn using Figma in **Vision'24**, the flagship event of Design Club [2024]
- Participated in **Crossy GC** and represented Hostel 6 by completing a **5.5 km Marathon** across the campus [2024]