Pratik Chetan Shah | **200100121**
Mechanical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 9/8/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	HSC	Dnyan Ganga Education Trust's Junior College Of Science And Commerce	2020	
Matriculation	ICSE	Pawar Public School Bhandup	2018	

Pursuing **dual minor degrees** in **Artificial Intelligence and Data Science** and **Computer Science**

Scholastic Achievements

- Received **AP** (Academic Proficiency) grade in ME201 **Solid Mechanics** course awarded to **3** out of 231 students [2022]
- Attained a rank of **979** in **JEE Advanced** examination | Achieved a percentile of **99.75** in **JEE Main** examination [2020]
- Recipient of the **KVPY Fellowship** in both **SA** and **SX** categories awarded by the Government of India [2019 & 20]

Internship Experience

Data Science Intern | Data Axle [May'22 - Jul'22]

*Received a **Letter Of Recommendation** for exemplary work in the functional title consolidation project*

- Worked on project of consolidating **50,000** job titles to within **1,000** standardized titles to be used in the identification of professionals working in various domains hence enabling sales to offer a database to job portals and lead generators
- Learned the **kedro framework** by completing its tutorial and used it extensively in the project to develop modular code
- Employed **NLP** techniques such as **tokenization**, **lemmatization** and **part of speech tagging** using the **spaCy** library for the cleaning, pre-processing and EDA of the data by breaking down job titles into useful tokens
- Vectorized the resulting tokens using **GloVe** vectors followed by reducing their dimensions using **PCA** and **t-SNE**
- Clustered the resulting vectors using **K-means clustering** and calculated **silhouette score** and **WCSS** as metrics
- Implemented **topic modeling** using **LDA** and **GSDMM** models to identify the top 10 words describing each cluster
- Worked with DBeaver **SQL** client to fetch data from the database and use it further in the project
- Used **AWS** services such as **S3** to store the raw and processed datasets and **EC2** to run high computational notebooks

Industrial Exposure

Larsen & Toubro Defence | Mechanical Designer | Subsea Surveillance Vehicle, Mumbai (IN) [Aug'21 - Present]

Principal Investigator: Prof. Leena Vachhani, Department of Systems and Control, IIT Bombay

The technology transfer project is a joint effort by **AUV-IITB** and **Larsen & Toubro Ltd.** under the IMPRINT II.C initiative of **MHRD**. Currently in the **Fabrication Phase**, the ROV will be used at sea for scanning, surveillance and maintenance purposes

- Pivotal role in **mechanical** design, development, testing and optimization of an **underwater, Class-1, ROV**
- Created a model and performed extensive **CFD analysis** on ROV to calculate laminar drag values using **ANSYS Fluent**

Drona Aviation | Mechanical Designer | Mass Manufacturable ROV [Feb'22 - Present]

Principal Investigator: Prof. Leena Vachhani, Department of Systems and Control, IIT Bombay

The project is an industrial collaboration between **AUV-IITB** and **Drona Aviation Pvt. Ltd.** to design an underwater drone kit

- Aided in the mechanical design of a mass manufacturable ROV kit suitable for young students while **optimizing its cost**

Key Projects

Facial Emotion Recognition Program | Institute Technical Summer Project, IIT Bombay [May'21 - Jun'21]

- Created a **deep learning** program that predicts the most probable emotion of the user from among 7 different emotions
- The program initially accepts an image of the user or the real-time video of the user as the input using the **OpenCV** and **matplotlib** libraries and identifies the face of the user using the **haar cascade** algorithm
- Employed the concepts of **transfer learning** by using **MobileNetV2** a pre-trained **CNN** model and modifying its final layers to serve the purpose of emotion prediction and then training the model on a set of **1000** labeled images
- Used deep learning python libraries and packages such as **keras and TensorFlow** extensively in developing the model

Customer Segmentation Using Data Analysis and Machine Learning [Oct'21 - Nov'21]

Course Project | Course: DS203 Programming for Data Science *Course Instructor: Prof. Amit Sethi*

- Performed **data cleaning**, **pre-processing** and **EDA** (Exploratory Data Analysis) on the customer data using **pandas** library and also used **one-hot encoding** on the categorical data to use it in clustering
- Employed dimensionality reduction techniques such as **PCA** (Principal Component Analysis) and **t-SNE** on the data to get better clusters and saw an increase in silhouette score from **0.2** to **0.5**. This also helped to visualize the clusters
- Used various clustering algorithms such as **K-Means**, **Hierarchical Clustering** and **DBSCAN** to cluster the data and found the optimum number of clusters using **silhouette score** and hence categorized the customers into **4** segments

Matsya, Autonomous Underwater Vehicle (AUV-IITB) [Jan'21-Present]

RoboSub, AUVSI & US Office of Naval Research *Principal Investigator: Prof. Leena Vachhani, Prof. Hemendra Arya*

All-student team working on designing and developing a **state-of-the-art AUV**, worth INR **6 million**, capable of performing **realistic naval tasks in marine conditions** that competes internationally at **RoboSub** competition for universities across the globe

Accolades

- Secured **2nd** position in the **Propulsion System Video** category and **4th** position in the **Technical Design Report** category among **50+** university teams from **12** different countries in **RoboSub 2021** organised by **RoboNation, Inc.**
- Awarded the prestigious **Young Researchers' Prize** by **IEEE OES** (Ocean Engineering Society) at the Underwater Technology Competition organized by the **University of Tokyo, Japan** with teams from **18+ countries**
- The team's latest iteration, Matsya 6, got featured in **Janes** - one of the most reputed international defence journal

Fabrication Engineer [Jan'22- Present]

- Employed various **industrial processes** such as **Vacuum Impregnation**, **3D Printing**, Waterjet Cutting, Laser Cutting, Powder Coating, Welding, CNC Machining, and Manual Milling to manufacture the structural components of the vehicle
- Manufactured custom penetrators for underwater hulls reducing cost by **90%** compared to its market counterparts
- Assembled the **pneumatic system** of Matsya 6 consisting solenoid valves, pistons, pneumatic cylinders and regulators

Mechanical Design Engineer [Aug'21 - Present]

- Assisted in planning and execution of the **overall testing** and **preparations** for RoboSub 2022 throughout the summers
- Devised a **Curved Surface Penetrator** for cylindrical hulls for the passage of wires without compromising its waterproofing
- Performed **Structural Analysis** and **Topology Optimization** on the vehicle frame using the **static structural module of ANSYS** resulting in reducing the material by **70%** while maintaining a safety factor of greater than 2 as desired
- Working on the **mechanical design** of a compact autonomous underwater swarm vehicle using **SolidWorks**
- Worked on the **CFD analysis** of the AUV in both laminar and turbulent conditions in heave and surge directions using **ANSYS Fluent** to find out the net drag force acting on the vehicle at different velocities in those directions

Program to Find Cash Flow and Control Rights in Pyramidal Ownership Structure [Dec'21 - Jan'22]

Econometrics Project | Prof. Tara Shankar Shaw, Department of Humanities and Social Sciences, IIT Bombay

- Developed a python program to calculate control rights in family controlled business groups using **pandas** and **numpy**
- Created a program to find people acting as directors in multiple companies from the dataset of directors of companies listed in BSE and used the double **metaphone algorithm** to tackle the problem of misspelled names and abbreviations

Position of Responsibility

Mechanical Subdivison Research Head | *AUV- IITB* [Jul'22 - Present]

- Co-leading a **3-tier** team of **11 members** on the research front by ideating and planning all the research activities
- Interviewed, recruited and mentored **5 freshmen** from the pool of **200+ UG applicants** by conducting a two-stage recruitment procedure that tested communication skills, time management, practical approach, and teamwork

Department Academic Mentor | *DAMP, Mechanical Engineering, IIT Bombay* [May'22 - Present]

- One among the **43** mentors, selected from **140 applicants** based on a stringent interview and extensive peer reviews
- Mentoring **six sophomores**, on a one-to-one basis and providing them academic guidance and counsel
- Part of the subgroup in the DAMP council in charge of conducting help sessions for department courses, and information dissemination for various activities such as higher studies, semester exchange, internships etc

Core Team Member | *Data Analytics And Visualisation Team (UGAC, IITB)* [Jul'22 - Present]

Part of a diverse 12-member team working to provide data-centric solutions to the institute and external organizations

- Selected from **100+** candidates spanning all years and programs via rigorous technical assignment and interview
- Dissected and interpreted national data on economics and housing, collaborating with Prof. Sarawagi from CSE, IITB

Teaching Assistant | *Department of Mechanical Engineering, IIT Bombay* [Mar'22- Jul'22]

- Responsible for tutoring and evaluating a batch of 170+ freshmen for the course **Engineering Graphics and Drawing**

Technical Convener | *Tinkerers' Laboratory, IIT Bombay* [Jun'21 - Apr'22]

A 24x7 'Makerspace' to promote hands-on learning and encourage prototyping among innovators

- Worked in a team of **7** students to ensure optimum utilization of resources to promote hands-on learning in IIT Bombay
- **Spearheaded** the Tinkering Bootcamp, a 4-week course arranged by Tinkerers' Laboratory. The bootcamp received over **150 registrations** and covered topics like Arduino, Communication protocols, Raspberry Pi and SolidWorks
- Contributed to organizing Tinkerers' Lab inventory worth **INR 6 million** critical to **6000+ students**
- **Lead** the 'How Things Work' session for the Post Graduate students in which the differences between additive and subtractive manufacturing were explained and demonstrations on using the 3-D printer and Laser cutter were given

Technical Skills

Programming	Python, C++, SQL
Software	AWS (S3 & EC2), SolidWorks, ANSYS (Fluent and Static Structural), AutoCAD, Git, LaTeX
Python Libraries	NumPy, Pandas, Matplotlib, plotly, Seaborn, OpenCV, TensorFlow, Keras , spaCy ,nltk

Extra-curricular Activities

- Completed a course on **NLP** (Natural Language Processing) from Udemy [2022]
- Represented my hostel in a team of 4 in the inter-hostel fitness championship and bagged the **2**nd place [2022]
- Won the **3**rd place in Aavhan Football RSL League as a part of team Argentina [2022]
- Participated in the **AIITRA Robotics Challenge 2021** and qualified the preliminary round to reach the finals [2021]
- Completed a year-long training in **Chess** under **National Sports Organization** [2020 - 21]
- Represented school in **(DSO)** District Level football and chess tournaments [2016]