Manav Doshi | **200100094**
Mechanical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 26/12/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	HSC	Pace Junior Science College	2020	90.10%
Matriculation	IGCSE	Witty International School	2018	92.30%

Pursuing a **Dual Minor** in **AI and Data Science** and **Computer Science and Engineering**

Scholastic Achievements

- Secured an **All India Rank 896** in **JEE Advanced** out of over **0.15 million** candidates appearing nationwide *(2020)*
- Achieved **99.84** percentile in **JEE Main** among over a pool of **1 million** students appearing across the nation *(2020)*
- Secured **AA grade** in course Differential Equations awarded to top the **25** out of **1355** undergraduates *(2021)*

Key Technical Projects

IARC | *Project AeRoVe, Unmesh Mashruwala Innovation Cell, IIT Bombay* *(Oct 2021 - Present)*

Working towards International Aerial Robotics Competition (IARC) - world's longest running aerial robotics challenge

- Working as a **Senior Machine Learning and Computer Vision** Engineer in the AeRoVe division of UMIC, an interdisciplinary team of 40 students with the objective of developing cutting-edge fully autonomous quadcopters
- Achieved mAP of over **95%** @IoU 0.5 by training deep learning models like **YOLOv4** for custom class detection
- Developed algorithms to augment positional accuracy using state estimation techniques like **Kalman Filters**
- Decreased inference time of model by **300%** by optimizing detection and tracking algorithms by building **TensorRT engines in C++** using the Python library while deploying deep learning algorithms on **Nvidia Jetson Xavier NX**
- Evaluated literature on object detection and tracking, particularly the **R-CNN**, Fast **R-CNNs**, **YOLOv3**, **YOLOv4**, **SORT** and **DeepSORT** to enhance localisation accuracy and ensure smooth flight of the drone while tracking objects

DRDO's UAV-Guided UGV Navigation Challenge | *Inter IIT Tech Meet 10.0* *(Mar 2022)*

*Secured **third place** in DRDO's navigation challenge among **12** other IITs as a part of the **10th InterIIT Tech Meet***

- Designed robust algorithms to assist in UGV navigation through snow covered terrains using **drone feedback**
- Developed python scripts using **Ardupilot firmware** to perform **road segmentation** using RGB and depth feed
- Implemented a **Stanley controller** from scratch to have the vehicle navigate across various turns and altitudes
- Used **OpenCV** and deep learning techniques like **YOLOv4-tiny** to calculate vehicle position and velocity vector

UAV Challenge | *International Conference on Unmanned Aircraft Systems 2022* *(May 2022)*

- Implemented **3D obstacle avoidance algorithms** such as **Vector Field Histogram** to guide UAV through arena
- Accurately localised drop location using custom dictionary **Aruco marker detection** by processing UAV imagery
- Precisely delivered payload at drop location by performing performing highly specific "swing & drop" maneuver

DIY FaceApp | *Summer of Code, Web and Coding Club, IIT Bombay* *(Mar 2021 - Jul 2021)*

- Assessed and implemented a paper on **Deep Convolutional Generative Adversarial Networks** (DCGAN)
- Trained GAN models on **200,000+** images from **CelebA Dataset** to generate celebrity faces using **Adam Optimizer**

Customer Segmentation | *Course Project* | *Prof Amit Sethi* *(Nov 2021)*

- Performed customer segmentation on a dataset with **10,000+** records using **unsupervised learning** techniques
- Grouped data by implementing clustering techniques like **KMeans, Mean Shift and Hierarchical Clustering**
- Achieved a silhouette score of **0.587** by optimising KMeans and using dimensionality-reduction methods like **t-SNE**

Visual Explanation for CNNs | *Winter in Data Science, Analytics Club, IIT Bombay* *(Jan 2022)*

- Surveyed various papers on techniques to visualise and plot hidden layers in a **Convolutional Neural Network**
- Implemented algorithms like Class Activation Maps, Gradient Based Class Activation Maps, Occlusion Sensitivity and Saliency Maps on frameworks like **PyTorch and TensorFlow** to generate heatmaps showing pixel importance

Alumni Student Mentorship Program | *Student Alumni Relations Cell, IIT Bombay* *(Aug 2021)*

*Alumni Student Mentorship Program - a platform to foster relationships between **500+** students and **300+** alumni*

- Collaborated with **6 undergraduates** to develop the website | **1,500+** registrations | **150%** y-o-y increase
- Implemented features to ease selection from **150+** mentors by optimizing backend tasks using **Django framework**

Miscellaneous Projects

Laser Micro-drilling | *Course Project* | *Prof. Ramesh Singh* *(Apr 2022)*
- Studied several research papers on **laser micro-drilling** and analysis of the parameters which affect the process
- Analyzed and reported the trends in taper and circularity due to the variations in power and pulse duration

Placement Mentorship Program | *Student Alumni Relations Cell, IIT Bombay* *(Apr 2021)*
- Centralized institute wide placement mentoring, resulting in **41% y-o-y rise** in registrations and allotments
- Developed a full-stack application using HTML, CSS and JavaScript for frontend and backend in **Django** framework

Digit Recognizer | *Self Project* *(Apr 2021)*
- Achieved an accuracy of **98.6%** on test set by coding a Convolutional Neural Network based on LeNet architecture
- Coded functions from scratch for Forward Propagation and Back-propagation Algorithm using **NumPy** libraries

Lasso Computer Game | *Course Project* | *Prof. Bhaskaran Raman* *(Mar 2021)*
- Programmed a game using Object Oriented Programming in conjunction with **STL Libraries and Graphics** in **C++**
- Designed new and improved features like Levels, Randomised Objects and Lives while visually enhancing the game

Positions of Responsibility

Manager | *Unmesh Mashruwala Innovation Cell, IIT Bombay* *(Apr 2022 - Present)*
*Team of **80+** students working on developing cutting-edge autonomous aerial and ground vehicles for competitions*
- Managing a team of 22, responsible for developing the team's website and increasing social media outreach
- Spearheading presentations of technical work of the team to relevant companies and firms to gain **sponsorships**
- Managed a budget of **1.5+ million INR** and responsible for procuring required equipment for the core team
- Conducted the recruitment drive and took interviews to shortlist **20** students from a pool of **90+ UGs**

Department Research Co-ordinator | *Undergraduate Academic Council, IIT Bombay* *(May 2022 - Present)*
*Part of **7** member team responsible for securing and improving research opportunities for **6000+** UG students*
- Securing research opportunities to bolster the participation of **800+** students and inculcate UG research culture
- Proactively seeking collaborations to bridge the gap between research enthusiast UG students and professors
- Ideated the Summer Undergraduate Research Program, administered **16** research project entries from **7** professors and their allocations amongst **150+** applicants on the basis of rigorous interviews and statements of purpose

Department Academic Mentor | *Department of Mechanical Engineering, IIT Bombay* *(May 2022 - Present)*
*Selected to be a part of a **43** member team responsible for transitioning incoming sophomores in the department*
- Mentoring **6** sophomores in the department, providing general counsel and ensuring their academic well being
- Maintaining and curating the DAMP Blog containing **150+** extensive course reviews and articles on internships

Co-ordinator | *Student Alumni Relations Cell, IIT Bombay* *(Jun 2021 - Apr 2022)*
*Part of a **60** member student team responsible for fostering relations among **60,000+** alumni and students*
- Handled the web presence of Student Alumni Relations Cell (SARC) collaborating with a team of **6** undergraduates
- Managed the development of various websites and portals for SARC initiatives using **Django** and **ReactJS**
- Negotiated with **100+** alumni during the **34th Phonathon**, annual telephonic marathon of SARC, IIT Bombay

Teaching Assistant | *CE102 - Engineering Mechanics* | *Prof. Najeeb Shariff* *(Mar 2022 - Jul 2022)*
- Conducted weekly **tutorial** sessions for a batch of 80 freshmen and helped them through personal interaction
- Provided assistance to the instructor in **course logistics** by proctoring exams and evaluating answer scripts

Technical Skills and Courses

Technical Courses	Completed Coursera courses - Deep Learning & Neural Networks, Hyperparameter Tuning, Convolutional Neural Networks, Sequence Models, Structuring ML projects
Programming	C, C++, Python, Java, JavaScript, DART for Flutter
Development	BootStrap, Angular, Android Studio, HTML, CSS, Django, ReactJS
Frameworks	PyTorch, TensorFlow, Keras, Git, MATLAB, LaTeX
Libraries	Numpy, Pandas, Matplotlib, Seaborn, Scikit-Learn, BeautifulSoup4

Extracurricular Activities

Sport	• Part of IIT Bombay's football team in Mumbai District Football Association • Placed second in Institute Football League - IIT Bombay's annual sports competition • Took over 8 years of coaching lessons in Shotokan Karate achieving 3rd Kyu
Leadership	• Managing a group of **4** freshmen in CodeWars - India's first bot programming contest • Leading 10 freshmen in Summer of Code to develop a Generative Adversarial Network • Mentored 4 students during the S.T.A.R training program to use ROS, Gazebo and OpenCV