Utsav Desai
Centre for Machine Intelligence and Data Science
Indian Institute of Technology Bombay
LinkedIn GitHub Email

Roll No.: 200100054
Interdisciplinary Dual Degree
Gender: Male
DOB: 24-10-2002

Examination	University	Institute	Year	CPI/%
Graduation*	IIT Bombay	IIT Bombay	2025	8.41

Auxiliary Degree: Pursuing a **Minor** in '**Computer Science and Engineering**', IIT Bombay

SCHOLASTIC ACHIEVEMENTS

- Selected for pursuing **IDDDP** in **Centre for Machine Intelligence and Data Science** at IIT Bombay *[2023]*
- Achieved **99.46** percentile in JEE Mains 2020 examination amongst **1 million +** candidates across the nation *[2020]*
- Secured **All India Rank 3419** amongst **0.15 million+** candidates in JEE Advanced 2020 examination *[2020]*
- Obtained a total of **347** marks out of 450 in BITSAT examination conducted by BITS Pilani *[2020]*
- Secured District **Rank 1** in IAPT examination organized by Physical Research Laboratory(Ahmedabad) *[2019]*

PROFESSIONAL EXPERIENCE

AI and Computer Vision Intern | Michelin *(May '23 - Jul '23)*

- Tasked with creating an **autonomous drone** equipped with advanced Computer Vision tools and **voice control** features
- Handling the engineering aspect of ChatGPT's prompt system to ensure smooth conversion of voice commands into actions
- Utilized **Microsoft's AirSim drone simulator** to meticulously **simulate** the 3D environment and project operations
- Successfully **deployed** the project on the DJI Tello drone, allowing **real-time** voice commands and **object localization**
- Integrated the tyre dimensions detection model developed by Michelin in the drone for the data collection purpose
- **Presented** the concept of the project and live demo in-person to the **CTO of Michelin, Yves Caseau**

IAI Project Pipeline Simulation | Godrej Aerospace *(Nov'21 - Dec'21)*

- Worked on a simulation software for tube bending on CNC machine for aircraft engines for Israel Aerospace Industries(IAI)
- Identified and Rectified the errors faced in the CNC tube bending simulations on the software provided by SOCO machinery

POSITIONS OF RESPONSIBILITY

Vice Lead | Software Subsystem | Team RAKSHAK, IIT Bombay *(June'23 - Preent)*

*Develop a fleet of robust **Unmanned Aerial Vehicles (UAVs)** to support Search and Rescue Operations in the event of a disaster*

- **Leading** a team of 10+ students to excel in international competitions, leveraging **cutting-edge** Deep Learning models
- Utilizing Computer Vision models like VGG, YOLO, RCNN, and ResNet for **enhanced** object detection and recognition
- Driving **innovative solutions** and strategies to tackle complex tasks and achieve outstanding results in the competitions
- **Collaborating** closely with the Team Lead and Vice Leads to **manage** a team of junior members effectively

Junior Engineer | *Software Subsystem | Team RAKSHAK, IIT Bombay* *(May '22 - June'23)*

*Develop a fleet of robust **Unmanned Aerial Vehicles (UAVs)** to support Search and Rescue Operations in the event of a disaster*

- Tasked with developing a Fast RCNN model to recognise alphanumeric, shape and colors from the image captured by drone
- Researched about different approaches and architectures like **YOLO**, **ResNet** for alphanumeric Recognition and Shape Recognition and compared their effectiveness on the basis of computational time required and accuracy of the model

Marketing Co-ordinator | *TechFest, IIT Bombay* *(May'21 - Apr'22)*

*Part of a team responsible for streamlining the placement process for over **1000** students*

- Assisted in a social initiative **'NIDAAN'** to spread Breast Cancer awareness and onboarded **10+** NGOs, and **100+** universities
- Articulated an extensive database of **20+** Companies and deliberated with them to increase the overall budget by **100%**

TECHNICAL STRENGTHS

PROGRAMMING	• **Languages:** Python, C++, Markdown, LaTeX, SQL, HTML • **Data Science:** numpy, pandas, sklearn, openCV, scipy, seaborn, tkinter • **DL Frameworks:** Tensorflow, Keras, Pytorch, Huggingface
INTERESTS	• AI, Computer Vision, Drone Programming

KEY PROJECTS

Efficient Lane Detection | **Computer Vision** *(May' 23 - Apr '23)*
Course Project | Faculty Advisor: Prof. Sharat Chandran, CSE, IIT Bombay

- Incorporated **attention** module within the **LLDNet** architecture,enhancing model's ability to capture intricate lane features
- Employed diverse datasets & applied image augmentation, boosting model's performance by **8%** on low lighting images
- Implemented post-processing techniques, including **morphological** operations, to ensure smooth & coherent lane detection

Gesture Controlled Drone | **Institute Technical Council** *(May '22 - July '22)*
Institute Technical Summer Project, IIT Bombay

- Designed and trained a **neural network** model for recognizing **ten** hand gestures utilizing **MediaPipe & Tensorflow**
- Mapped controls of **DJI Tello drone** using python code utilizing libraries such as **djitellopy, numpy, pandas, openCV**
- Implemented a **Viola Jones** model & combined with a **PID control** system to direct the drone to track a person's face

Three Men Morris Game | **Decision Analysis and Game Theory** *(May '22 - Apr '22)*
Course Project | Facult Advisor: Prof. Urban Larsson, IEOR, IIT Bombay

- Developed an interactive CLI version of a classic game, **Three Men's Morris** using Python, enhancing user engagement
- Incorporated a computer player utilizing the **Minimax** algorithm with **Backtracking**, providing a challenging experience

Portfolio Optimization | **Industrial Engineering and Operations Research** *(Feb '22 - Apr '22)*
Course Project | Facult Advisor: Avinash Bhardwaj, Mechanical Engg., IIT Bombay

- Leveraged Python's **Gurobipy** library for **SENSEX** stock portfolio optimization, meticulously investigating varied correlation matrices, including **Distance, Spearman, Kendall,** and **Pearson**, to discern the optimal correlations among the equities
- Leveraged **Markowitz** optimization model & explored Mixed Integer Nonlinear Programming techniques for stock weight
- Improved weight allocation methods from continuous to integer-based, ensuring realistic portfolio investment decisions

Facial Expression Recognition with Pytorch *(Dec'22)*
Online Project | Coursera

- Implemented an **efficient-net** neural network with an accuracy of **70%** to build a **Facial Expression Recognition** model
- Testing the model on real life dataset and usage of **Image Augmentation** techniques to increase the training dataset

Image Segmentation with Pytorch *(Dec'22)*
Online Project | Coursera

- Created a Image Segmentation model by using the **UNet** model and **'timm-efficientnet-b0"** encoder and imagenet weights
- Utilize **albumentation** library of python for Image Augmentation on the Human Segmentation and Arial images Dataset

CFD Modeling of Additive Manufacturing | **Manufacturnig Proceses** *(Mar'22)*
Course Project | Facult Advisor: Ramesh Singh, Mechanical Engg., IIT Bombay

- **Spearheaded** a team of **5** to study particle flow in a nozzle used in **Additive Manufacturing** by varying angle of inclination
- Developed an improved model of a partitioned nozzle in **Solidworks** with 18 partitions to maximize the flow symmetricity
- Maximised the powder catchment efficiency for a given inclination angle by analysing the particle flow in **Ansys Fluent**

Deep Face Recognition Model | **Computer Vision** *(Dec '22 - Jan '23)*
Guide: P Balasubramanian | Analytics Club, IITB

- Surveyed literature on state-of-the-art face recognition deep learning models like **Facenet**, **Deepface** and **Arcface**
- Implemented the FaceNet paper in python and tensorflow using the LFW data containing 5K+ people and 13.4K+ images

ONLINE COURSES & CERTIFICATIONS

Neural Networks and Deep Learning | **Online Course** | **Coursera** *(May'22 - July'22)*

- Completed a **4** week long online course consisting of sessions by industry experts, projects and challenges with real-world data covering the fundamentals of **Deep Learning and Neural Networks**, Digital Image Processingand basics of the CNN
- Trained a convolutional neural network architecture with accuracy of **92%** to recognize alphanumeric digit from drone

Computer Vision and Image Processing | **Online Course** | **Coursera** *(May'22 - June'22)*

- Enrolled in a 6 week long online course on Computer Vision covering various topics including, transformations, histogram and intensity transformations, spatial filtering and classification models including Convolutional Neural Networks

Python for Data Science and Machine Learning Bootcamp | **Online Course** | **Udemy** *(Dec'21 - Jan'22)*

- Aquiring knowledge of various libraries like numpy, pandas, matplotlib, SciKit Learn, seaborn, etc. useful in Data Science
- Learned various ML libraries including Linear Regression, Logistic Regression, KNN, Decesion trees, Random Forests etc.

COURSES UNDERTAKEN

CS - AI/ML	Computer Networks(M), Introduction to Machine Learning(M), Data Structures and Algorithms(M), Image Processing, Computer Vision, Computer Programming and Utilization, Advanced topics in deep learning for image analysis*, Foundations of Intelligent and Learning Agents*
MATHEMATICS	Linear Algebra, Differential Equations, Introduction to Numerical Analysis, Multi variable and vector calculus, statistical Machine Learning and Data Mining
MECHANICAL	Solid Mechanics, Thermodynamics, Fluid Mechanics, Manufacturing Processes, Engineering Graphics and Drawing, Applied Thermodynamics
OTHERS	Introduction to Electrical and Electronics Circuits, Economics, Philosophy, Quantum Mechanics

**to be completed by Nov'23*

EXTRA CURRICULAR

SPORTS	• Secured **Rank 1** in District Level Skating Tournament and participated in the **State Level** Tournament for **Three** consecutive years • District Champion in Skating for February 2016, October 2016, September 2017 • Member of District team in **State Level** *Rollball Tournament* during 2014 • Participated in the **State Level** Rope Tournament during 2012
SOCIAL	• Took part in 10 days **trekking** program at Mount Abu organised by **YHAI** in 2010
MISCELLANEOUS	• Midway prize winner in **SARCASM** event organized by SARC, IIT Bombay