



Mitali Meratwal
Electrical Engineering
Indian Institute of Technology, Bombay

190070033
B.Tech.
Gender: Female
DOB: 06-04-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	null

Pursuing a **minor** in **Computer Science**

SCHOLASTIC ACHIEVEMENTS

- Secured **All India Rank 116** in **JEE Mains** emerging as **City Topper** and **State Girls' Topper** (2019)
- Conferred with **AP grade** (Advance Performer) in **BB101-Biology** granted to **8** out of **578** students (2020)

INTERNSHIPS

Action Recognition in Smart Homes

(May'21 - Aug'21)

Prof. Thomas M. Deserno | Research Internship

TU Braunschweig, Germany

- Developed video analysis framework for multi-camera, **multi-person activity recognition** in smart homes
- Tested performance of existing work on enhanced **pose estimators** like OpenPose, AlphaPose, LightTrack
- Remodeled LSTM network from joints based **hand-crafted features**, to extracting features from pretrained **CNN** for **spatial dynamics** and multi layer **LSTMs** with **attention** block for **temporal modelling**
- Upgraded person tracking with **YOLOv4+Deepsort** to support re-identification and handle occlusions
- Expanded dataset to **300GB** and improved accuracy on realistic and simulated fall datasets from **79%** to **99%**

KEY PROJECTS

Self Driving Car | Team SeDriCa, UMIC

(Sept'20 - July'21)

- Developed a **Multi-Task Learning** model using uncertainty to weight losses for **object detection** and **road segmentation** on BDD100K dataset by fusing **Scaled-YOLOv4** and **PSPNet** to reduce computation cost
- Designed and tested **cross connected network** from Faster R-CNN and PSPNet with ResNet50 backbone
- Scrutinized Hierarchical Multi-scale attention, EfficientDet, D-LinkNet to replace existing models

Bosch's Traffic Sign Recognition Challenge | Inter IIT Tech Meet

(March'21)

Part of 10 membered team that won **Bronze** out of **23 teams** which participated

- Generated embeddings of dataset using **t-SNE** and **layer wise visualisations** of the model trained by user
- Implemented **GradCAM++** and **Lime** to enable the user to investigate incorrect predictions and devised automated scripts for explaining **failures of system** based on confusion matrix, loss and accuracy plots

Multi-Modal Image Registration using Unsupervised Deep Learning | Course Project

- Customised **Voxelmorph** to register **cross subject brain scans** of different modalities (MRI and CT)
- Trained **CycleGAN** network to register CT scans images with their MRI counterparts on the same dataset

Image Super Resolution | Course Project

(Dec'20)

- Implemented **SRGAN** to estimate high resolution images from low resolution with an aim to recover content
- Formulated a VGG based **content loss** using output features of VGG19 model pretrained on ImageNet

The Tracking and Navigation Challenge | Autumn of Automation, UMIC

(Aug'20)

- Programmed a bot with **ROS** to solve perfect maze while avoiding obstacles using **wall follower** algorithm
- Exploited **OpenCV** and **Canny edge detection** for procuring letters present on the walls of the room
- Performed letter recognition utilizing **transfer learning** and **fine tuning** achieving best accuracy of **93%**

Fruit Quality Predictor | Institute Technical Summer Project

(May'20-Jul'20)

- Built a **real time** application for non-invasive **quality assessment** of fruits by leveraging smartphone cameras
- Constructed a custom dataset and employed various **data augmentation** techniques to make the model robust
- Trained custom and SOTA models achieving best accuracy of 99%, 95% and 90% for banana, mango and pear

TECHNICAL SKILLS

Programming C/C++, Python, VHDL, MATLAB, HTML, CSS, JavaScript, Julia

Libraries PyTorch, Keras, Tensorflow, OpenCV, Numpy/scipy, matplotlib, Seaborn, Pandas

Softwares Quartus, Keil, Git, \LaTeX , AutoCAD, SolidWorks, Audacity

EXTRACURRICULAR ACTIVITIES

- Volunteered for community service under National Service Scheme by recording audio books for visually impaired
- Coordinated the execution of **FInCoF** Freelancers, Interns and Co-founders Platform getting 120+ startups on board and assisted in securing 90+ internships for the students during Covid-19 (June'20)
- One among ten students selected for **Science Film Making Workshop** organised by the Vigyan Prasar Department of Science of Technology, Govt. of India and Film society of Surat, Gujarat (Oct'2016)