MOHD SAFWAN

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EDUCATION

Indian Institute of Technology Bombay, *Mumbai, India* — Graduating in June 2022
B.Tech + M.Tech in Electrical Engineering with specialization in Communication and Signal Processing

ACHIEVEMENTS

- Secured *All India Rank* **457**/ **Top 0.23%** in JEE Advanced 2017 out of *200,000* students
- Ranked in **Top 0.12%** in JEE Main 2017 out of *1.2 million* students
- Was placed in Statewise **Top 1%** in NSEA (Astronomy Olympiad) and selected for INAO
- Winner of TechFest IITB's National Coding Challenge: **Enigma** from **10,000+** teams
- Won Capture The Flag 2020 conducted by CSE Cybersecurity Club, IITB
- *Won* Scratch Day, coding competition organized by Web and Coding Club, IIT Bombay in '17
- **2 Time National Winner**, IPL Auction Competition '18 & '19 by Entrepreneurship Cell, IIT Bombay
- Secured **3rd** place in annual Jigyasa: Science Quiz 2017 held by University of Mumbai

EXPERIENCE

Chief Technical Officer — Augle AI (augle.ai)   *Jan '20 - Dec '20*
Ideated, developed, and deployed robust state-of-the-art Face Recognition based attendance and temperature logging system on mid range Android devices to tackle problems due to COVID 19. Managed a team of 10 researchers and developers to successfully develop multiple AI powered solutions.

Freelance Project — Finding Images/Videos of a Person from a Selfie   *Summer '20*
Reels & Frames   *reelsandframes.in*

Developed a solution to find all photos and videos of a person from a collection by looking at a single selfie. Tested and achieved 95%+ accuracy. Optimised GPU memory usage for arbitrary aspect ratios. Optimized the search time to a few milliseconds for 1000 images/frames. Added robust blur detection technique to filter out unwanted results. Added a GUI to use and adjust parameters in *tkinter*.

Research Project — Single Image Dehazing using GAN   *Autumn '20*
Prof. Biplab Bannerjee   *Electrical Engineering, IIT Bombay*

Succesfully trained a generative network to remove haze using the GAN framework applied on artifically created hazy images using depth dataset. Used a modified U-Net as generator and a patch Discriminator.

Research Project — Measurement of Fetal Head in Ultrasound Images   *Spring '19*
Prof. Amit Sethi   *Electrical Engineering, IIT Bombay*

Used PyTorch to implement **U-Net** architecture with a modified ResNet as encoder network. Implemented *elliptical weight map for loss* according to the bounding ellipse to get smoother boundary. Used **Dense Conditional Random Fields** post-processing for removing noise from segmentation mask

Research Project — Role of Reviews & Reviewer on Consumer Decisions   *Summer '18*
Prof. Arti D. Kalro   *SJM School of Management, IIT Bombay*

Scraped previous year's online reviews on *Zomato* using *Selenium* for *Automated* Web Scraping. For each restaurant, the reviews' content, likes, comments, photos, management responses and reviewer's total reviews, followers, images posted & other profile variables were extracted

KEY PROJECTS

Tic Tac Toe Learning Environment — Reinforcement Learning, Web Dev [Code]   *Spring '19*
Prof. Amit Sethi   *Electrical Engineering, IIT Bombay*
Wrote an open source framework for testing reinforcement learning algorithms on the simple tic tac toe games using websockets communication and web GUI. Added several reference implementation of classic learning algorithms including Deep Q Networks.

Realtime Coherent Style Transfer for Videos — Deep Learning, Computer Vision [Code]   *Spring '19*
Prof. Arjun Jain   *Computer Science & Engineering, IIT Bombay*

- Implemented *"ReCoNet"* architecture in PyTorch to transfer artistic style to videos while preserving content
- Implemented a *Temoral Loss* by warping outputs using *Optical Flow* forcing smoothness in time domain

Petyr — An Open Source Python Library [Code]   *Summer '20*

· Python library for working with 2D geometric transforms with around 400 monthly downloads currently.
· Implemented multiple transforms in NumPy and wrote unit tests with complete code coverage.

DL Research Papers Reproduced in PyTorch on GitHub

· Deep Image Priors [Code]
· Auto-Encoding Variational Bayes [Code]
· Wasserstein Generative Adversarial Networks [Code]
· A Neural Algorithm of Artistic Style [Code]
· Generative Adversarial Networks [Code]

OTHER PROJECTS

Panoramic Image Stitching — Computer Vision [Code]   *Spring '19*
Prof. Arjun Jain   *Computer Science & Engineering, IIT Bombay*

Normalized brightness in images using *Histogram Equalization* and then extracted *SURF* feature points.
Matched the feature points using *RANSAC* and stitched the images by computing *Homography Matrices*

16-bit RISC Microprocessor Design   *Soring '19*
Prof. Virendra Singh   *Electrical Engineering, IIT Bombay*

Designed and implemented a multicycle processor with RISC architecture using VHDL.The architecture was
augmented with hazard mitigation techniques and data forwarding.

Walking Stick for Blind People   *Jul'17 - Mar'18*
National Innovation Club   *National Service Scheme, Govt. of India*

Manufactured a cost-effective walking stick for blind people that can detect obstacles and alert the user by
programming an Arduino to use ultrasonic sensors for detection

InstiApp — Open Source App Development [Code]   *Autumn '18*
Developer Community   *IIT Bombay*

Part of *10+* membered team of developers involved in making an Open Source *Android App* for the residents
of IIT Bombay. Solved many *UI/UX* as well as *core bugs* and also implemented various new features

POSITIONS OF RESPONSIBILITY

Convener — Web and Coding Club, IITB   *Apr '18 - Mar'19*

Organized and conducted various boot-camps, events, competitions while managing the club's resources
with a long term goal of creating a thriving programming community in the institute

Mentor — School of Science, Maths & Physics Club, IITB   *Summer '19*

Mentored 4 freshmen during summers to study and implement basic DL algorithms from scratch

Instructor — Technical Summer School, Career Cell, IITB   *Summer '19*

Taught 100+ students to program in Python and concepts of Object Oriented Programming

TECHNICAL SKILLS

Programming - Python, C/C++, Embedded C, MATLAB/Octave, Java, Bash
Frameworks/Libraries - PyTorch, TensorFlow 2.0, Keras, OpenCV, Scipy, Jupyter
Softwares - Vim, Git, GitHub, Android Studio, LaTeX, AutoCAD, SolidWorks, Blender
Hardware - VHDL, Arduino, Raspberry Pi, Beaglebone Black, 8051 controller

COURSES UNDERTAKEN

Key Courses - Advanced Machine Learning, Foundations of Intelligent Learning Agents, Computer Vision,
Digital Image Processing, Speech Processing, Digital Signal Processing, Control Theory, Probability & Random Processes, Computer Programming and Utilization, Data Interpretation and Analysis

Mathematics - Calculus, Linear Algebra, Differential Equations 1 & 2, Complex Analysis, First Course in
Optimization, Cryptography

EXTRACURRICULAR ACTIVITIES

- Volunteered in NSS to teach Mathematics to underprivileged children
- *Active participant* in the growing Indian *Rainbow Six Siege* community
- Mentored a team for *XLR8 2018* Robotics Competition who went on to win the **2ⁿᵈ prize**