MOHD SAFWAN

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EDUCATION

Indian Institute of Technology Bombay, *Mumbai, India*
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
- **City Winner** of Vodafone Derek's Faster Smarter Better Challenge **Twice in '13, '14**

EXPERIENCE

Chief Technical Officer — Augle AI (augle.ai) *Jan '20 - Present*
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 of a Person from a Selfie *Summer '20*
Reels & Frames *reelsandframes.in*
Developed a solution to find all photos of a person from a collection by looking at a single selfie. Tested and achieved 95%+ accuracy. Optimized the search time to a few milliseconds for 1000 images.

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

Realtime Coherent Style Transfer for Videos — Deep Learning, Computer Vision [Code] *Spring '19*
Prof. Arjun Jain *Computer Science & Engineering, IIT Bombay*
- Implemented *"ReCoNet: Real-time Coherent Video Style Transfer Network"* architecture in PyTorch
- Used pretrained *VGG19* for loss as described in *"Perceptual Losses for Real-Time Style Transfer"*
- 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 generating, combining, estimating, and applying 2D transforms like Affine and Projective.
- Implemented multiple transforms in NumPy and wrote unit tests with complete code coverage.

Chord Sequence Extraction from Music — Machine Learning *Summer '18*
Institute Technical Summer Project *IIT Bombay*
- Processed the music data to extract $\mathbb{R}^{12}$ *Pitch Class Profile* vectors using optimized *Fourier Transform*
- Achieved above **98%** test accuracy with *Additive* χ^2 *kernel* and *SVM Classifier*

DL Research Papers Reproduced in PyTorch on GitHub[Code] *Summer '19*
- Auto-Encoding Variational Bayes — *Diederik P Kingma, et al - ICLR 2014*
- Wasserstein Generative Adversarial Networks — *Martin Arjovsky, et al - ICML 2017*
- A Neural Algorithm of Artistic Style — *Leon A. Gatys, et al - Journal of Vision*
- Generative Adversarial Networks — *Ian Goodfellow, et al - NIPS 2014*

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*

Inverse Compositional KLT Object Tracker — Computer Vision [Code] *Summer '20*
Learning Project

Made an object tracker using the Inverse Compositional Kanade-Lukas-Tomasi framework to compute Optical Flow and track feature points within an ROI. Used DLT method to estimate the geometric transform.

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

Crypt Hunt Discord ChatBot *Autumn '18*
Web and Coding Club *Institute Technical Council, IIT Bombay*

Made a smart Discord Chatbot for conducting a QnA type treasure hunt for freshmen

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, Machine Learning for Remote Sensing, Control Theory, Probability & Random Processes, Computer Programming and Utilization, Signals and Systems, 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**