Sudhir Kumar Suman

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EDUCATION

- Pursuing **Dual(Btech+Mtech)** in **Electrical Engineering** from **IIT Bombay** Expected 2021
- **Key Courses Undertaken:** Computer Vision, Digital Image Processing, Advance Machine Learning*, Reinforcement Learning*, Automatic Speech Recognition*, Computer Programming and Utilization, Probability and Random Processes, Linear Algebra, Data Analysis and Interpretation **to be completed by Nov'19*

SCHOLASTIC ACHIEVEMENT

- Secured a rank in top **1.2%** in JEE Advance having **0.2** million candidates 2016
- Secured a rank in top **2%** in JEE Mains having over **1.2** million candidates 2016

KEY PROJECTS UNDERTAKEN

- **Instance Segmentation:** Aug'19-present
  Course: Advance Machine Learning | *Guide:Prof.Amit Sethi*
  - Implementing deep neural network **Mask-RCNN** to detect and provide segmentation masks to object belonging to 300 different categories
  - Extending the model Mask-RCNN to **Open Image dataset** provided by Google AI for Instance Segmentation Open Image Challenge 2019
- **Image Classification on CIFAR:** Oct'19
  Course: Advance Machine Learning | *Guide:Prof.Amit Sethi*
  - Implemented forward and backward pass of different layers of Fully Connected Neural Networks from scratch with the flexibility to take variable size input
  - Trained the implemented **Neural Network** for object classification on CIFAR dataset and achieved 75-80% accuracy on each class of CIFAR
- **License Plate Detection and Recognition:** April'19
  Course: Computer Vision | *Guide: Prof.Arjun Jain*
  - Implemented an EECV 2018 paper in PyTorch using CNN layers to extract features from the input image
  - Used fully connected layers in the end for prediction of the bounding box around License Plate
  - Built a **Recognition Module** which exploits **Region of Interest** from CNN layers to extract features map of interest and several **classifiers** to predict the corresponding license plate number
- **Automation of Gate Security System:** June'19
  - Collected around 1700+ images of vehicles and manually annotated all the desired class present in it
  - Trained model **YOLOv3** on annotated images to detect vehicle along with its type and locate the License Plate of the detected vehicle for recognition purpose
  - Delivered a **Detection Module** of Automation model for automating the gate security system to ease the guard's job
- **Non-Invasive Glucometer:** April'19
  Course: Electronic Design Lab | *Guide:Prof.Shalabh Gupta*
  - Designed an analog circuit to get the amplified voltage level for corresponding glucose concentration present in the body
  - Collected blood sugar concentration data using the designed setup and invasive glucometer and trained **Regression** model on it
  - Delivered an alternative **low-cost solution** to traditional invasive glucose testing method for **monitoring glucose-related** diseases
- **Image Classifier:** Dec'18
  Course: Deep Learning with PyTorch(MOOC) | *Guide:Udacity*
  - Built an **Image classifier** using **Neural Networks** in PyTorch to recognize 102 different species of flowers present in the dataset
  - Achieved a test accuracy of 95% by setting appropriate **optimizer**, **loss function** and **learning rate**

- **Toonification of Image:** Nov'18
  Course: Image Processing | *Guide:Prof.Ajit Rajwade*
  - Implemented **Bilateral Filtering** for **smoothing and quantizing** the colors and **Edge Detection** for **detecting and boldening** the edges in the image
  - Combined these implementation to get an **artistic and comical** effect on a wide range of images
  - Enhanced speed and accuracy of the algorithm using **Fast Bilateral Filtering** by working in higher dimensional space
- **Transferring & Receiving Of Image Using Gnu Radio:** Nov'18
  Course: Communication Lab | *Guide:Prof.J.K Nair*
  - Performed all processing of data like modulation, demodulation, encoding, decoding within GRC
  - Resolved all effects of a channel which distort the data during transmission through the atmosphere
  - Performed **wireless transfer** of image data from one computer to another using GRC and USRP
- **Reaction Game:** Nov'18
  Course: Digital Circuits | *Guide:Prof M.P Desai*
  - Programmed the Altera's MAX V CPLD board to calculate the reaction time of the player in milliseconds and display it on a 16x2 LCD display over a period of eight iterations
  - Wrote VHDL programs in Quartus to make an led blink at a random time. The player has to press a button as soon as possible while the CPLD computes the reaction time of the player

TECHNICAL SKILLS / EXTRA COURSES(MOOC)

- **Programming:** C++, Python, Embedded-C, VHDL, Assembly-Language, Bash
- **Web Development:** HTML, CSS, JavaScript
- **Software:** MATLAB, Quartus, ngSPICE, Octave, AutoCAD, SolidWorks, KEIL, Gnu-Radio
- **MOOC:** Deep Learning in Pytorch, Applied Machine Learning, Algorithmic Toolbox, Front End Web Development, Introduction to Data Science

POSITION OF RESPONSIBILITY

- **Coordinator of Techfest:** 2017
  Asia's largest college technical festival
  - Materialised the social initiative SHE(menstrual health awareness campaign,organizing seminars and distributing sanitary pads in 50+ villages) and Nirbhaya(self defense workshops for women)
  - Negotiated and interacted with over 30 international and national artist for ambiance
- **Organizer of Techfest:** 2016
  - Participated in CURED as an organizer, a camp to cure diabetes
  - Witnessed more than 60,000 free diabetes by setting up 178 camp all over India
  - Responsible for smooth execution of event, ensured enforcement of event rules and regulations
- **School Pupil Leader:** 2012-13
  Highest post of leadership at school level
  - Elected by the student to represent the student body of school
  - Worked with head of school to plan school wide events

EXTRA CURRICULAR ACTIVITIES

- Brought 1st prize to school in Inter School General Science Competition 2011
- Won the 1st place in Intra School English Elocution competition 2012
- Bagged the 2nd position in singing at school level singing competition 2016
- Bagged 3rd position in Relay Race at Annual Sports Meet held at School 2016
- Successfully completed a one year course under the National Service Scheme(NSS) IIT Bombay, involving ideation and implementation of solutions to social problems 2016-17