Pankti Hitesh Parekh

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GOAL

My interests lie in the intersection of Computer Vision and Machine Learning. I believe in the combination of both can help us built Machines of Conscience while we realize our cybernetic dream. I like to code, build efficient algorithms and work on problem solving. Having enthusiasm for photography, I always wanted to amalgamate my hobby with engineering to get in depth of the features present in an image and use it various applications such as giving vision to robots, object detection classification, motion estimation. I wish to work in the core of computer vision especially in the field of robotics to evaluate perception techniques used in development of robots. When I have some free time, I also rejoice learning about Psychology as my favourite pastime.

EDUCATION

- **University of Pennsylvania- Fall 2021** — Philadelphia, USA
  Masters of Science in Electrical Engineering — *August 2021 - Present*

  ***Coursework**:*
  ESE 542- Statistics for Data Science
  CIS 581- Computer Vision and Computational Photography
  CIS 520- Machine Learning.

- **SVKM's Dwarkadas J. Sanghvi College of Engineering (DJSCE); GPA: 8.08/10** — Mumbai, India
  Bachelor of Engineering in Electronics and Telecommunication Engineering — *July 2015 - May 2019*

SKILLS SUMMARY

- **Programming**: Python, C/C++, JAVA, MATLAB, HTML5, CSS3, SQL
- **Machine Learning Tools**: Scikit-learn, XGBoost, TensorFlow, Keras, SciPy, Nltk, Pandas, Numpy, Scipy, Matplotlib, OpenCV
- **Software Tools**: MS Office, MySQL, Tableau, Git and Github, Eagle, Proteus, Simulink, Cadence, OrCad, Keil µVision, AutoCAD, Visual Studio Code, Cisco Packet Tracer

EXPERIENCE

- **University of Pennsylvania, TA- MCIT 593 Online (Introduction to Computer Systems)** — Philadelphia, USA
  Graduate Teaching Assistant — *Aug 2021 - Present*
  - Conducted Office hours to clear concepts of students related to C programming, Assembly Programming Language, Data Structures.
  - Worked as a grader for the assignments as well as conducted recitations for various programming topics.

- **University of Pennsylvania, TA- ESE 572 (Analog Integrated Circuits)** — Philadelphia, USA
  Graduate Teaching Assistant — *Sep 2021 - Present*
  - Conducting recitations & , private and open office hours for doubt solving of topics like BJT, MOSFETS, Analog to Digital signal converter, Amplifiers etc.
  - Covered installation of cadence and implementation of circuits on cadence to get graphical outputs.

- **Infini Systems** — Mumbai, India
  Software Intern — *Sep 2020 - Dec 2020*
  - Developed websites such as www.telrshops.com, www.leafv2.infini.work , www.emandi.infinilive.com under the Team Leads.
  - Worked on the front-end development of the websites and used technologies such as HTML5, CSS3, JavaScript.

- **TakenMind Global Internship, recognised by United Nations** — Remote
  Data Analytics Intern — *Oct 2019 - Nov 2019*
  - Learnt Data Analysis using Python libraries such Numpy, Matplotlib, sklearn, Pandas along with data manipulation, statistical analysis of data, mapping data frames and data visualization.
  - Analysed a set of data on the characteristics of employees who are going to leave the company and characteristics of those who are prone to leave next using Python.

PROJECTS

- **Video Keyframe Summarization for Object Detection** — *Present*
  - Using K-means clustering to group images with similar semantic composition and clas- sify features in each cluster as the principle features in that particular keyframe and take centroid to extract the unique frames containing maximum number of objects to summarize the video.
  - Challenge is to find the most appropriate algorithm to extract key features that gives more information of objects in the unique frames to be extracted.
  - To compare the performance of a pre-trained object detection algorithm, we intend to use YOLOv3 on both the original and the summarised versions of the video to evaluate the accuracy of our algorithm.

- **Glaucoma Detection using MATLAB** — *Nov 2018*
  - Developed an algorithm inn MATLAB to scan the image of the eye where intra-ocular pressure increased by performing primary and secondary segmentation using active contour to single out the HRF image and to find the region of interest.

- Computed the area of triangle to help doctor with graphical analysis of increased fluid pressure in eye.

- **Selection of Targets for Mergers and Acquisitions using Machine Learning** *May 2019*
  - Predicted profits for financial analysis of mergers or acquisition by comparing ratios such as PAT growth, Sales Growth, Return on Capital Employed, Total Assets, debt-equity ratio, etc.
  - Developed a software using python on google colaboratory by compiling, training and analysing data of different companies.
  - Compared various ratios of companies and estimated accuracy between them to recognise whether two companies can be merged or acquired using Machine Learning Models such as Logistic Regression, Decision Trees, K-NN, Support Vector Machines(SVM), Gaussian Naive Bayes.

- **Canny Edge Detection** *Sept 2021*
  - Detected pixels with maximum intensity in the edge direction after taking the gradients of the image.
  - Developed code modules in python for finding gradient along with its magnitude and direction, non-maximum suppression to detect local maximum, and performed edge linking to find potential edge map.

- **Laplacian Blending** *Sept 2021*
  - Implemented Laplacian Pyramid Algorithm for Blending of two images.
  - Developed functions in python for finding gaussian pyramid, laplacian pyramid and combined them to get a smooth blended image.

- **Homography Estimation** *Oct 2021*
  - Developed Python functional blocks to stitch two images into a single panoramic image using homography transformation of structural features.
  - Used Random sample consensus(RANSAC)to find best homography estimate from the estimated correspondences.

- **Image Morphing** Philadelphia, PA
  - Computed averages of two images using Delaunay Triangulation to find the average of two images.
  - Developed python modules for performing non-parametric warping and finding average colour to cross dissolve the warped images.

- **Poisson Image Blending** Philadelphia, PA
  - Performed gradient domain image blending by cropping a part of image and blending it with the second image.
  - Developed python functional blocks to reconstruct pixels in the blending area of target image so that in the gradient domain source image and target image are as similar as possible.

- **Age Estimation using Linear Regression** Philadelphia, PA
  - Used Linear Regression to predict age of the given images and developed python modules to train, test and validate the given data, optimize the loss function using Gradient Descent and Stochastic Gradient Descent(SGD) and compare it with the closed form solution.
  - The project was implemented using Convolution Neural Network using pyTorch library and optimizer used was SGD.

- **Animatronic Hand Using Wireless Module** Mumbai, India
  - Developed a Robotic Hand that imitates the actions performed by the transmitter (control glove) using flex sensors and servo motors which were interfaced with Arduino Uno boards.
  - Programmed using Arduino Ide Software (C programming).

- **Obstacle Detection by a Robotic Vehicle** Mumbai, India
  - Designed a system using ultrasonic range finder sensors to avoid collisions with obstacles encountered along the robot's path by using components such as chassis, Arduino Uno board containing ATmega 328p microcontroller as well as a motor driver L293 and Bluetooth module.
  - Implemented the system using Arduino 1.8.5. and C programming.

PUBLICATIONS

- P.Parekh, S.Vinie, C.Viren, and C.Dipak, "Animatronic hand using Wireless Module", *in Journal of DJ Strike,* Mumbai, India, 2018 (ISBN-978-93-5300-801-7).

HONORS AND AWARDS

- Secured *Second* place in event DJ Strike 2017-2018 Project Competition on Animatronic Hand using Wireless Module organised by the IETE-SF committee.
- Elected as *Chair of Logistics* at GSEG (Graduated Student Engineering Government) University of Pennsylvania- Created informative newsletters of events offered at the university, organised social events, and developed the website for GSEG
- Awarded by 'Vidyalankar Dnyanapeeth Trust' for securing Distinction in the subjects- Applied Mathematics-II and Engineering Design in the University Examination of semester II, May 2016.
- Successfully completed the Brahmatal Trek in Uttarakhand - (Dec-2017).
- Completed a course, "Public Speaking and communication skills" from Indo-American society - (2013).
- Selected as the Captain of EXTC Department - Organized and consecutively maintained the top 3 position in 12 events, ranging from technical competitions to cultural and sports events– (2016- 2017).
- Appointed as the Head of Events Department - Organised various technical events and workshops for student forum IETE - SF, DJSCE (2016-2017) as well as successfully organised the State Level Project Competition, DJ SPARK - 2017.