Project 3

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Part 1:

In first part we are given an image with numerous people and our aim is to find or detect the faces. Their faces are not oriented in same direction. So, the challenge was to detect the faces in any orientation and direction. For this purpose, I have chosen Haar cascade. It is an algorithm where the algorithm is feeded with many images of faces and non faces and it classifies the faces in the input image we provide. To work with Haar cascade we need to import cv2 module which has been imported already. To carry out the process of Haar cascade first we need to read all the images. For that purpose I have given the path of our file or directory and used a for loop in order to read all the images. After reading the images I have stored them in order work on them. Later we convert them to gray scale images. Then face_cascade.detectMultiScale is used the detect the features. As we have seen in SIFT as well how feature detection is important it will detect the features and those features help to identify the faces. The we use one more for loop and x,y,w,h are used. The hyper parameters I have is scale factor = 1.2 and 6 is the min number of neighbors. Hance we can see that changing the hyperparameters accuracy is affected. Where x is x co-ordinates, y is y co-ordinates and w, and h is width and height respectively. Here we use the for loop to draw the boxes. The values of x,y,h,w are used in integers and every co-ordinate is mapped to the variable. There values are then inserted or appended to get the Jason.list – array. The accuracy is 80.5%.

Part2:

In Part 2 we must cluster the identical or similar images together. K means is very useful machine learning algorithm that we use to cluster all the faces. In K means algorithm we should find a optimum value of K. Then these points are used to calculate distance from given points to all points. The lowest distance is assigned to respective value of K and the centroid is shifted and new co-ordinates of centroid are formed and same process is repeated until we get a point where all the points belong to respective value of K. Random samples are selected while this algorithm is running. Firstly, we use the same steps we used in part1 to read and store the images. Then from the path we take the number of clusters. Then we use the K means algorithm. Now further we have 5 clusters, and we must find the labelling and assign each personality belongs to which cluster and label it properly. The results are displayed as follows.

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