Assignment 1

In this Assignment we tried to locate the eyes in the images. We had 10 images for validation purpose and our task was too able to get the X and Y co-ordinates of the both eyes in image accurately.

We were not allowed to use viola jones algorithm in this assignment. So; my thought process was since eyes looks similar to circle we can try to find the circles in the images and might able to locate the eyes correctly. So for that I decided to use Hough Transform method which can be used to find the circles in images using imfindcircles function.

The Dataset (images) got lots of variance in contrast, brightness, sharpness, Noise so I decided to preprocess this images first. I increased the brightness of image so that eyes can be more visible because they are more comparatively to whole face. Sharpness helped me in making eyes sharper. I also used Gaussian filter with the sigma value 1 which helped me little more while detecting the eyes.

So Imfindcircles need Range of radius in terms of co-ordinates and it will try to find circles of that radius range in whole image. Since we have to use one for loop to detect this circle for all images we have to use only one range of radius for all images. And all images are different in terms of tilt, brightness, shape. So it was very hard to get the circles properly in this images. Since nose can also be the circle or some hair can might look like circle shape my function was detecting not only just eyes circle but also all these types of circle. So I tried to make images more clean and preprocess it more I also tried to use the edge detection algorithms like canny and sobel tool. But I was not able to get it all the images accurately. I was able to locate 4 images with both eyes and 4 images with single eye using this algorithm. Which was making my accuracy nearly about 60%. But it was not good enough.

Since these method was not giving me as accurate result as I want I decided to try the different method called 'BRISK'. Brisk is normally used to extract the important parts from the images or to locate them. If something is written on the box image. Brisk can able to extract that part. So by using this method I used filter of finding 2 strongest brisk point i.e. extract the 2 strongest points in the image gave me the locations of eyes more accurately. I was able to detect the all the eyes using this feature which means it gives 100% accuracy but I was not able to locate the co-ordinates of all the images which was the task given assignment. So I was able to locate 80% of the eyes given in the validation set using this method we is better than the imfindcircles function method.

I am attaching both the code files for the reference of TA. One is imfindcircles and another is BRISK method code.

In brisk algorithm code, if we put more numbers of points it will give 100% accuracy for just detection but since we need to locate the eyes I am putting value 2 and which is giving me 80% accuracy.

We were not allowed to use viola jones algorithm which is known as one of the best face detection algorithm. Which It can also detect eyes too (locate as well) but Brisk algorithm was also comparatively very close in terms of detecting the eyes.

To execute the code just need to run main and it will detect eyes using brisk if imfindcircle code is need to check it can run using imfind file.

So in conclusion I would like to say it was very interesting assignment I had very much fun while performing it and can't wait for next assignment of computer vision.