Section 2: Prototype Development

Code for Face Recognition (Menon, 2019)

In this project, I am going to build a simple machine learning model that recognizes the persons from an image. I used OpenCV in my project. I have downloaded the trained classifier XML file which can help me with the facet detection. **Here, the code is referred from the reference given above.**

To install the above packages, use the following command.

1. pip install opencv-python

OpenCV is an open-source library written in C++. It contains the implementation of various algorithms and deep neural networks used for computer vision tasks.

Load the cascade

2. face_cascade = cv2.CascadeClassifier('haarcascade_frontalface_default.xml')

Read the input image

3. img = cv2.imread('test1.jpg')

Convert the image into grayscale

4. gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)

Detect the faces

5. faces = face_cascade.detectMultiScale(gray, 1.1, 4)

Draw rectangle around the faces

6. for (x, y, w, h) in faces:
7. cv2.rectangle(img, (x, y), (x + w, y + h), (255, 0, 0), 2)

Display the output

cv2.imshow('img', img)

cv2.waitKey()

Few key notes:

1. The detection works only on grayscale images. So, it is important to convert the color image to grayscale.

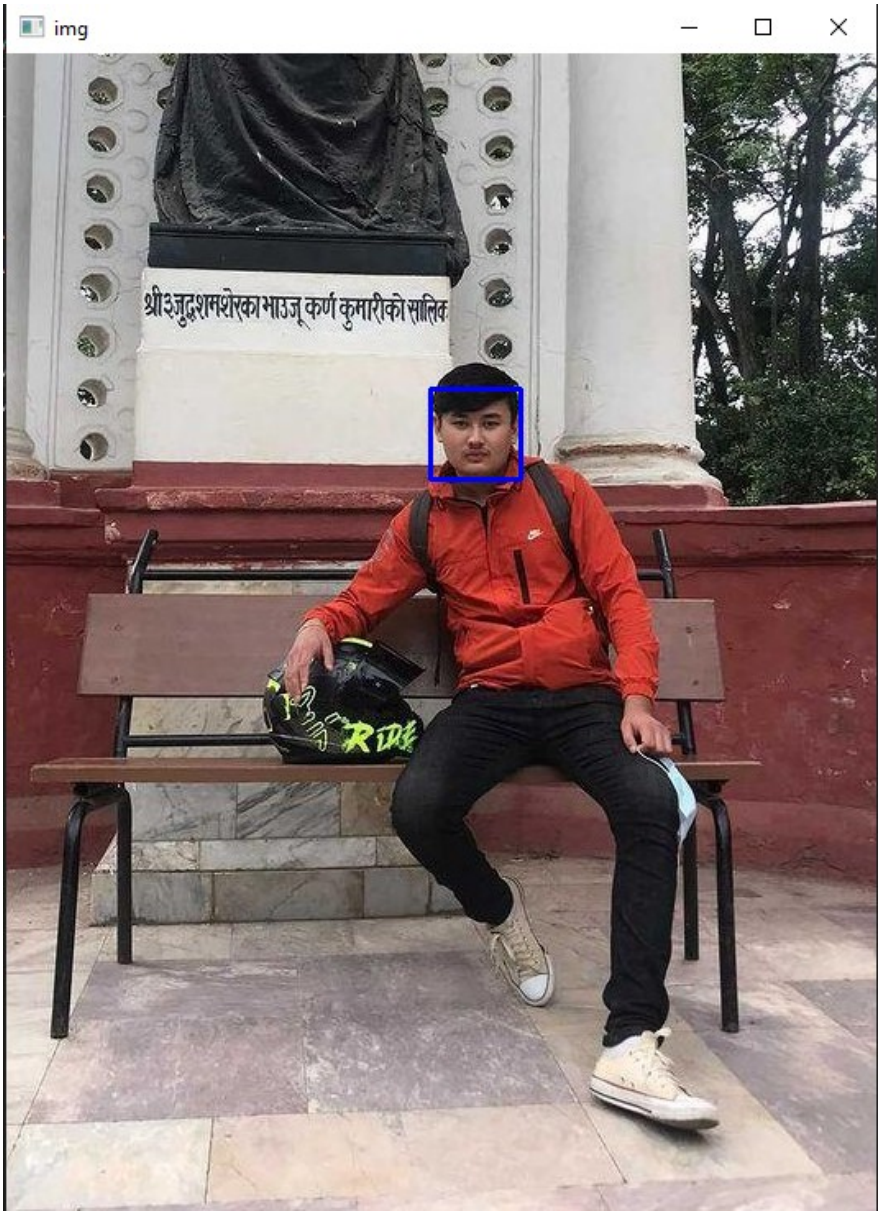
2. detectMultiScare function is used to detect the faces. It takes 3 arguments – the input image, scaleFactor and minNeighbours. scaleFactor specifies how much the image size is reduced with each scale. minNeighbours specifies how many neighbors each candidate rectangle should have to retain it.
3. faces contains a list of coordinates for the rectangular regions where faces were found. We use these coordinates to draw the rectangles in our image.

Face Recognition Output

Let's see the output of the model.

1. Here is the group photo of my colleague detecting the faces of them.

2. Here is the photo of my own.



Section 3: Evaluation report

Finally, the application prototype is completed. I will be building even advanced face detection and recognition with full research on it. As the project is completed, detecting the faces of animals and non-human structures will be a bad thing. So, lets have a test on it.

Test 1:

As the face of statue is not detected. We passed it.

Fig: Statue

Test 2:

Here, I am wearing the mask and system didn't detect it. As the face with mask is not applicable.

Fig: Man with mask on

Test 3:

We passed the dog test as well.

Fig: Dog

Conclusion:

Hence, the face detection and recognition using images is completed successfully. While using this research I came to learn so much of AI and python coding. It is true that experience is the most important part of our life. I referred many sites and pdfs, got different codes for this project.