

Project Report 17

Face Detection

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Question: Implement a face tracking algorithm using haar cascade algorithm and opencv. Using haar cascade, first implement a face detection algorithm that counts the total number of faces present in any given frame. Write the total number of faces detected on the top left of the image. Further modify the code to track the face if only one face is detected. Make sure that you draw the bounding box corresponding to all video frames. Note: you may need to fine tune the parameters for Haar Cascade Classifier to get optimal results and remove false positives.

Prerequisites

What things you need to install the software and how to install them:

Python 3.6 This setup requires that your machine has latest version of python. The following url <https://www.python.org/downloads/> can be referred to download python. Once you have python downloaded and installed, you will need to setup PATH variables (if you want to run python program directly, detail instructions are below in how to run software section). To do that check this: <https://www.pythoncentral.io/add-python-to-path-python-is-not-recognized-as-an-internal-or-externalcommand/> . Setting up PATH variable is optional as you can also run program without it and more instruction are given below on this topic.

Second and easier option is to download anaconda and use its anaconda prompt to run the commands. To install anaconda check this url <https://www.anaconda.com/download/> You will also need to download and install below 3 packages after you install either python or anaconda from the steps above Sklearn (scikit-learn) numpy scipy if you have chosen to install python 3.6 then run below commands in command prompt/terminal to install these packages pip install -U scikit-learn pip install numpy pip install scipy if you have chosen to install anaconda then run below commands in anaconda prompt to install these packages conda install -c scikit-learn conda install -c anaconda numpy conda install -c anaconda scipy . then you have to install tensorflow use pip install tensorflow in terminal

Importing the required libraires

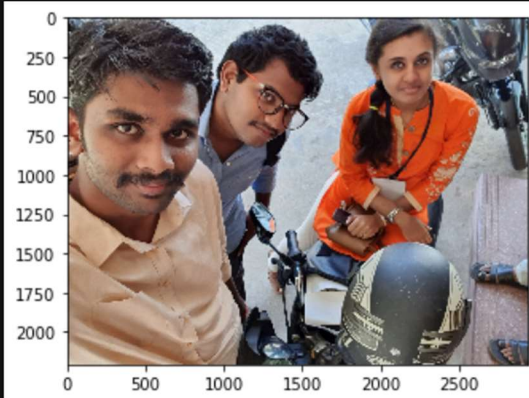
```
Importing the required libraries

[3]: import numpy as np
      import cv2
      import matplotlib.pyplot as plt

[4]: face_cascade = cv2.CascadeClassifier(cv2.data.harcascades + 'haarcascade_frontalface_default.xml')
```

Loading a sample image

```
[5]: img = cv2.imread("IMG.jpg")
plt.imshow(cv2.cvtColor(cv2.imread("IMG.jpg"), cv2.COLOR_BGR2RGB))
plt.show()
```



FACE DETECTED IMAGE

```
[6]: gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)

[7]: faces = face_cascade.detectMultiScale(gray, 1.3, 5)

[8]: print(faces)

[[1970  134  426  426]
 [   55  346  945  945]]

[9]: for (x,y,w,h) in faces:
    img = cv2.rectangle(img, (x,y), (x+w,y+h), (255,0,0), 8)
    roi_gray = gray[y:y+h, x:x+w]
    roi_color = img[y:y+h, x:x+w]

[10]: # FACE DETECTED IMAGE
plt.xticks([])
plt.yticks([])
plt.imshow(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))
plt.show()
```



Detecting from the video

```
[11]: # create a video capture object and read from input file
cap = cv2.VideoCapture("VIDEO1.mp4")

# face detection in video
face_cascade1 = cv2.CascadeClassifier(cv2.data.haarcascades + 'haarcascade_frontalface_default.xml')

# read until video is completed
while(True):
    # capture frame by frame
    ret, frame = cap.read()

    # convert video into gray video without color
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

    # detect faces in video
    faces = face_cascade1.detectMultiScale(gray, 1.3, 5)

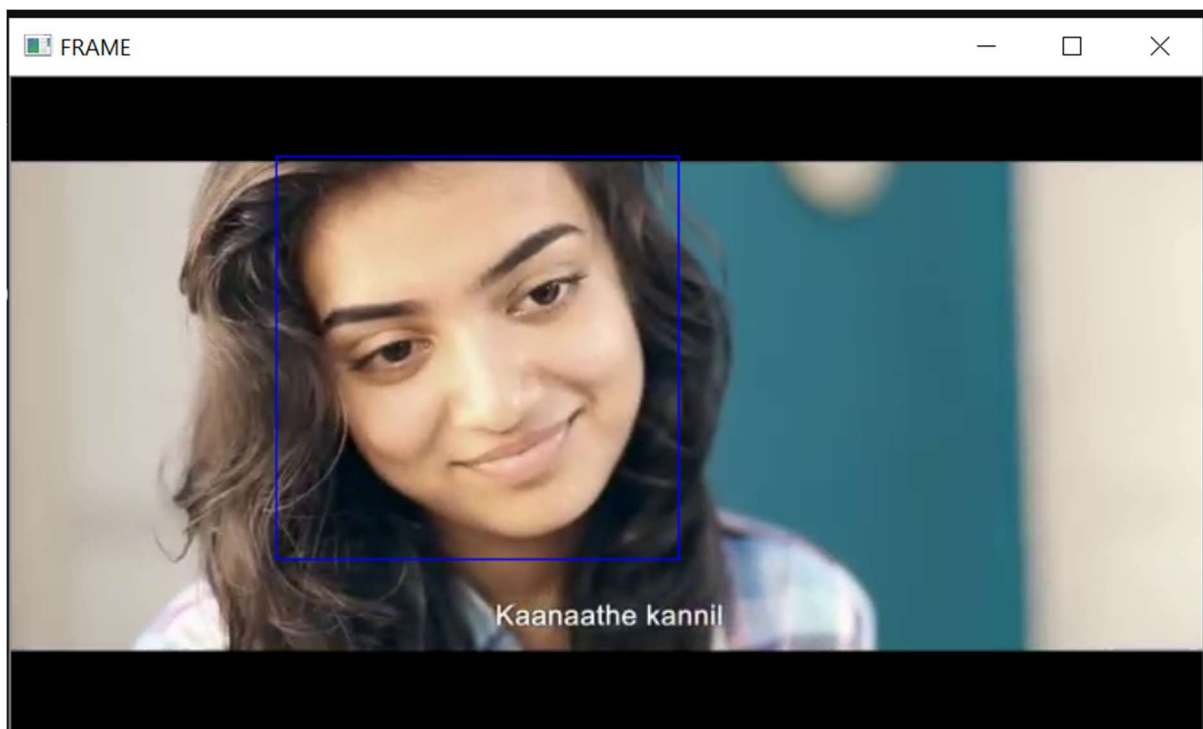
    # draw rectangle boxes around the faces
    for (x,y,w,h) in faces:
        cv2.rectangle(frame, (x,y), (x+w,y+h), (255,0,0), 1)

    # display resulting frame
    cv2.imshow("FRAME", frame)

    # press q on keyboard to exit
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break

# release video capture object
cap.release()

# close all frames
cv2.destroyAllWindows()
```



FRAME

