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ATOM: CS Team **Registration No.:** 19BEC1122

ATOM CS TEAM

TASK 1

QUESTION:

Detect whether a person is wearing face mask using Computer vision and python, and please follow the following conditions while coding:

a) Do not use Convolutional Neural Networks or any ML concepts.

b) Your free to use any python libraries and any of the Haar cascade files given in the link below and also can look up and get other Haar cascade files from google according to whatever you need.

(https://github.com/opencv/opencv/tree/master/data/haarcascades)

SOFTWARE REQUIRED:

Python

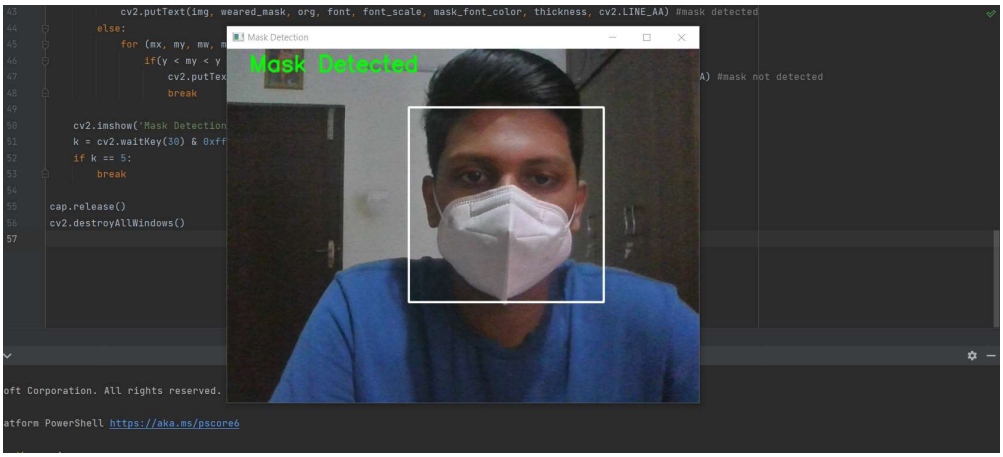
CODE:

```
import numpy as np
import cv2
import random

face_cascade =
cv2.CascadeClassifier('cascade\\haarcascade_frontalface_default.xml')
mouth_cascade =
cv2.CascadeClassifier('cascade\\haarcascade_mcs_mouth.xml')

threshold = 80  #light_threshold

font = cv2.FONT_HERSHEY_SIMPLEX
org = (30, 30)
no_face_font_color = (255, 255, 255)
mask_font_color = (0, 255, 0)
no_mask_font_color = (0, 0, 255)
thickness = 2
font_scale = 1
no_face = "Face Not Detected"
weared_mask = "Mask Detected"
no_mask = "Mask Not Detected"

cap = cv2.VideoCapture(0)
```

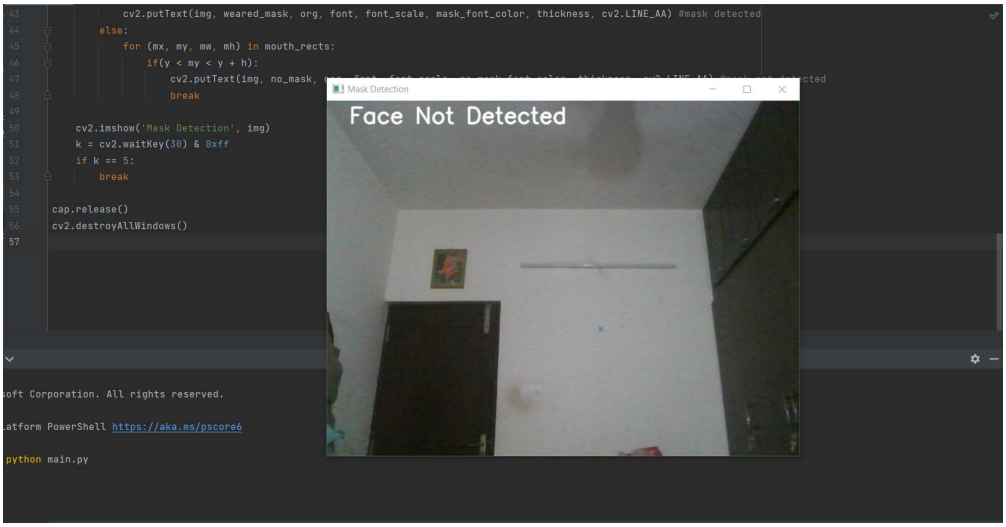
```
while 1:
    ret, img = cap.read()
    img = cv2.flip(img,1)

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

    (thresh, black_and_white) = cv2.threshold(gray, threshold, 255,
cv2.THRESH_BINARY)

    faces = face_cascade.detectMultiScale(gray, 1.1, 4)
    faces_bw = face_cascade.detectMultiScale(black_and_white, 1.1, 4)

    if(len(faces) == 0 and len(faces_bw) == 0):
        cv2.putText(img, no_face, org, font, font_scale,
no_face_font_color, thickness, cv2.LINE_AA) #face not detected
    elif(len(faces) == 0 and len(faces_bw) == 1):
        cv2.putText(img, weared_mask, org, font, font_scale,
mask_font_color, thickness, cv2.LINE_AA) #for facemask with white
color
    else:
        for (x, y, w, h) in faces:
            cv2.rectangle(img, (x, y), (x + w, y + h), (255, 255,
255), 2)
            mouth_rects = mouth_cascade.detectMultiScale(gray, 1.5, 5)
        if(len(mouth_rects) == 0):
            cv2.putText(img, weared_mask, org, font, font_scale,
mask_font_color, thickness, cv2.LINE_AA) #mask detected
        else:
            for (mx, my, mw, mh) in mouth_rects:
                if(y < my < y + h):
                    cv2.putText(img, no_mask, org, font, font_scale,
no_mask_font_color, thickness, cv2.LINE_AA) #mask not detected
                    break

    cv2.imshow('Mask Detection', img)
    k = cv2.waitKey(30) & 0xff
    if k == 5:
        break

cap.release()
cv2.destroyAllWindows()
```

OUTPUT:

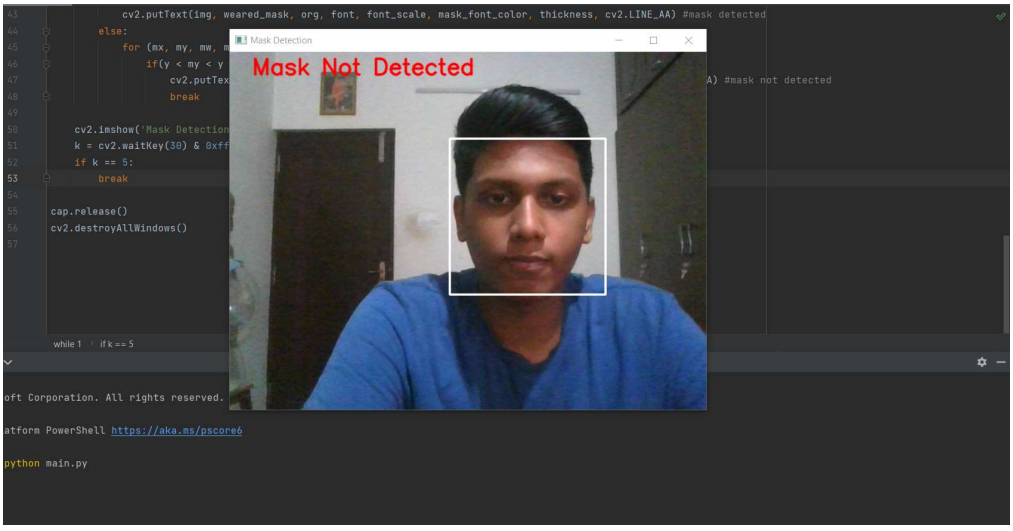
With Mask:



No face:



Without Mask:



INFERENCE AND RESULT:

We have used two conditions to check if mask is detected or not. If mouth and face are both detected then the message is displayed as “Mask Not Detected”, if face is detected but mouth is not, then the message is displayed as “Mask Detected”. If no face is detected, then the message is displayed as “Face Not Detected”.