

Project Development Phase

Sprint-3 Coding (Drowning Detection along with age prediction)

Date	14 November 2022
Team ID	PNT2022TMID43878
Project Name	VirtualEye - Life Guard For Swimming Pools To Detect Active Drowning
Maximum Marks	8 Marks

app.py :

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# import necessary packages
import cvlib as cv
from cvlib.object_detection import draw_bbox
import cv2
import time
import numpy as np
import math
import argparse

def getFaceBox(net, frame, conf_threshold = 0.75):
    frameOpencvDnn = frame.copy()
    frameHeight = frameOpencvDnn.shape[0]
    frameWidth = frameOpencvDnn.shape[1]
    blob = cv2.dnn.blobFromImage(frameOpencvDnn, 1.0, (300, 300), [104, 117, 123], True,
    False)

    net.setInput(blob)
    detections = net.forward()
    bboxes = []

    for i in range(detections.shape[2]):
        confidence = detections[0,0,i,2]
        if confidence > conf_threshold:
            x1 = int(detections[0,0,i,3]* frameWidth)
            y1 = int(detections[0,0,i,4]* frameHeight)
            x2 = int(detections[0,0,i,5]* frameWidth)
            y2 = int(detections[0,0,i,6]* frameHeight)
            bboxes.append([x1,y1,x2,y2])

    cv2.rectangle(frameOpencvDnn,(x1,y1),(x2,y2),(0,255,0),int(round(frameHeight/150)),8)

    return frameOpencvDnn , bboxes

faceProto = "opencv_face_detector.pbtxt"
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faceModel = "opencv_face_detector_uint8.pb"

ageProto = "age_deploy.prototxt"
ageModel = "age_net.caffemodel"

genderProto = "gender_deploy.prototxt"
genderModel = "gender_net.caffemodel"

MODEL_MEAN_VALUES = (78.4263377603, 87.7689143744, 114.895847746)
ageList = ['(0-2)', '(4-6)', '(8-12)', '(15-20)', '(21-24)', '(25-32)', '(38-43)', '(48-53)', '(60-100)']
genderList = ['Male', 'Female']

#load the network
ageNet = cv2.dnn.readNet(ageModel,ageProto)
genderNet = cv2.dnn.readNet(genderModel, genderProto)
faceNet = cv2.dnn.readNet(faceModel, faceProto)

# open webcam
webcam = cv2.VideoCapture(0)
padding = 20

if not webcam.isOpened():
    print("Could not open webcam")
    exit()

t0 = time.time() #gives time in seconds after 1970
#print('t0=',t0)
#variable dcount stands for how many seconds the person has been standing still for
centre0 = np.zeros(2)
isDrowning = False

#this loop happens approximately every 1 second, so if a person doesn't move,
#or moves very little for 10seconds, we can say they are drowning

# loop through frames
while webcam.isOpened():

    # read frame from webcam
    status, frame = webcam.read()

    if not status:
        break
    #small_frame = cv2.resize(frame,(0,0),fx = 0.5,fy = 0.5)
    # apply object detection
    bbox, label, conf = cv.detect_common_objects(frame, confidence=0.25,
model='yolov3-tiny')

    print(bbox, label, conf)

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if(len(bbox)>0):
    bbox0 = bbox[0]
    #centre = np.zeros(s)
    centre = [0,0]

    #for i in range(0, len(bbox)):
        #centre[i] =[(bbox[i][0]+bbox[i][2])/2,(bbox[i][1]+bbox[i][3])/2 ]

    centre =[(bbox0[0]+bbox0[2])/2,(bbox0[1]+bbox0[3])/2 ]

    #make vertical and horizontal movement variables
    hmov = abs(centre[0]-centre0[0])
    vmov = abs(centre[1]-centre0[1])

    #there is still need to tweek the threshold
    #this threshold is for checking how much the centre has moved

x=time.time()

threshold = 10
#print("hmov=",hmov)
if(hmov>threshold or vmov>threshold):
    print(x-t0, 'sif')
    t0 = time.time()
    isDrowning = False

else:
    print(x-t0, 'selse')
    if((time.time() - t0) > 10):
        isDrowning = True
        small_frame = cv2.resize(frame,(0,0),fx = 0.5,fy = 0.5)

        frameFace ,bboxes = getFaceBox(faceNet,small_frame)
        if not bboxes:
            print("No face Detected, Checking next frame")
            continue
        for bbox in bboxes:
            face = small_frame[max(0,bbox[1]-padding):min(bbox[3]+padding,frame.shape[0]-1),
                                max(0,bbox[0]-padding):min(bbox[2]+padding, frame.shape[1]-1)]
            blob = cv2.dnn.blobFromImage(face, 1.0, (227, 227),
MODEL_MEAN_VALUES, swapRB=False)
            genderNet.setInput(blob)
            genderPreds = genderNet.forward()
            gender = genderList[genderPreds[0].argmax()]
            print("Gender : {}, conf = {:.3f}".format(gender, genderPreds[0].max()))

            ageNet.setInput(blob)
            agePreds = ageNet.forward()

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age = ageList[agePreds[0].argmax()]
print("Age Output : {}".format(agePreds))
print("Age : {}, conf = {:.3f}".format(age, agePreds[0].max()))

label = "{}{}".format(gender, age)
cv2.putText(frameFace, label, (bbox[0], bbox[1]-10),
cv2.FONT_HERSHEY_SIMPLEX, 0.8, (0, 255, 255), 2, cv2.LINE_AA)
cv2.imshow("Age Gender Demo", frameFace)

print("time : {:.3f}".format(time.time() - t0))

#print("Entered in to true")
#print('bounding box: ', bbox, 'label: ' label , 'confidence: ' conf[0], 'centre: ', centre)
#print(bbox,label ,conf, centre)
print('bbox: ', bbox, 'centre:', centre, 'centre0:', centre0)
print('Is he/she drowning: ', isDrowning)
#print('End of the program')

centre0 = centre
# draw bounding box over detected objects
# draw bounding box over detected objects
out = draw_bbox(frame, bbox, label, conf, write_conf=True)
# display output
cv2.imshow("Real-time object detection", out)

# press "Q" to stop
if cv2.waitKey(1) & 0xFF == ord('q'):
    break

# release resources
webcam.release()
cv2.destroyAllWindows()

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