

Build Python Code

Date	06 Nov 2022
Team ID	PNT2022TMID45200
Project Name	Virtual Eye - Life Guard For Swimming Pools To Detect Active Drowning
Maximum Marks	4Marks

App.py:

```
import time

import cv2
import numpy as np
from cloudant.client import Cloudant
from flask import Flask, request, render_template, redirect, url_for
from playsound import playsound

import cvlib as cv
from cvlib.object_detection import draw_bbox

# Loading the model

# Authenticate using an IAM API key
client = Cloudant.iam('5a1ffd26-d995-410e-af77-546fb6498fd8-
bluemix','5rUgrIfVeYtIyTqJ0hAvTOvIYvJDNiKlr-sDUHQRClnN', connect=True)

# Create a database using an initialized client
my_database = client.create_database('my_database')

app=Flask(__name__)

#default home page or route
@app.route('/')
def index():
    return render_template('index.html')

@app.route('/index.html')
def home():
    return render_template("index.html")

#registration page
@app.route('/register')
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def register():
    return render_template('register.html')

@app.route('/afterreg', methods=['POST'])
def afterreg():
    x = [x for x in request.form.values()]
    print(x)
    data = {
        '_id': x[1], # Setting _id is optional
        'name': x[0],
        'psw': x[2]
    }
    print(data)

    query = {'_id': {'$eq': data['_id']}}

    docs = my_database.get_query_result(query)
    print(docs)

    print(len(docs.all()))

    if(len(docs.all())==0):
        url = my_database.create_document(data)
        #response = requests.get(url)
        return render_template('register.html', pred="Registration
Successful, please login using your details")
    else:
        return render_template('register.html', pred="You are already a
member, please login using your details")

#login page
@app.route('/login')
def login():
    return render_template('login.html')

@app.route('/afterlogin', methods=['POST'])
def afterlogin():
    user = request.form['_id']
    passw = request.form['psw']
    print(user, passw)

    query = {'_id': {'$eq': user}}

    docs = my_database.get_query_result(query)
    print(docs)

    print(len(docs.all()))

    if(len(docs.all())==0):
        return render_template('login.html', pred="The username is not
found.")
    else:
        if((user==docs[0][0]['_id'] and passw==docs[0][0]['psw'])):
            return redirect(url_for('prediction'))
        else:
            print('Invalid User')

```

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@app.route('/logout')
def logout():
    return render_template('logout.html')

@app.route('/prediction')
def prediction():
    return render_template('prediction.html')

@app.route('/result', methods=["GET", "POST"])
def res():
    webcam = cv2.VideoCapture('drowning.mp4')

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

    t0 = time.time() #gives time in seconds after 1970

    #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:
            print("Could not read frame")
            exit()

        # apply object detection
        bbox, label, conf = cv.detect_common_objects(frame)
        #simplifying for only 1 person

        #s = (len(bbox), 2)
        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
if(hmov>threshold or vmov>threshold):
    print(x-t0, 's')
    t0 = time.time()
    isDrowning = False

else:

    print(x-t0, 's')
    if((time.time() - t0) > 10):
        isDrowning = 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 drowning: ', isDrowning)

    centre0 = centre
    # draw bounding box over detected objects

out = draw_bbox(frame, bbox, label, conf,isDrowning)

#print('Seconds since last epoch: ', time.time()-t0)

# display output
cv2.imshow("Real-time object detection", out)
if(isDrowning == True):
    playsound('alarm.mp3')
    webcam.release()
    cv2.destroyAllWindows()
    return render_template('prediction.html',prediction="Emergency
!!! The Person is drowning")
    #return render_template('base.html')

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

# release resources
webcam.release()
cv2.destroyAllWindows()
#return render_template('prediction.html',)

""" Running our application """
if __name__ == "__main__":
    app.run(debug=True)

```

Detect.py:

```
import cvlib as cv
from cvlib.object_detection import draw_bbox
import cv2
import time
import numpy as np
from playsound import playsound
#for PiCamera
#from picamera Import PiCamera
#camera = PiCamera
#camera.start_preview()
# open webcam
webcam = cv2.VideoCapture(0)

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

t0 = time.time() #gives time in seconds after 1970

#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:
        print("Could not read frame")
        exit()

    # apply object detection
    bbox, label, conf = cv.detect_common_objects(frame)
    #simplifying for only 1 person

    #s = (len(bbox), 2)

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

        else:

            print(x-t0, 's')
            if((time.time() - t0) > 10):
                isDrowning = 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 drowning: ', isDrowning)

        centre0 = centre
        # draw bounding box over detected objects

    out = draw_bbox(frame, bbox, label, conf,isDrowning)

    #print('Seconds since last epoch: ', time.time()-t0)

    # display output
    cv2.imshow("Real-time object detection", out)
    if(isDrowning == True):
        playsound('alarm.mp3')

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

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

```