

# PYTHON CODE

```
import cvlib as cv
from cvlib.object_detection import draw_bbox
import cv2
import time
import numpy as np

# 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 variable
hmov = abs(centre[0] - centre0[0])
vmov = abs(centre[1] - centre0[1])

# there is still need to tweak 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)
```

```
# press "Q" to stop
```

```
if cv2.waitKey(1) & 0xFF == ord('q'):
```

```
    break
```

```
# release resources
```

```
webcam.release()
```

```
cv2.destroyAllWindows()
```