

Introduction to Computer Vision

Coursework

Submission

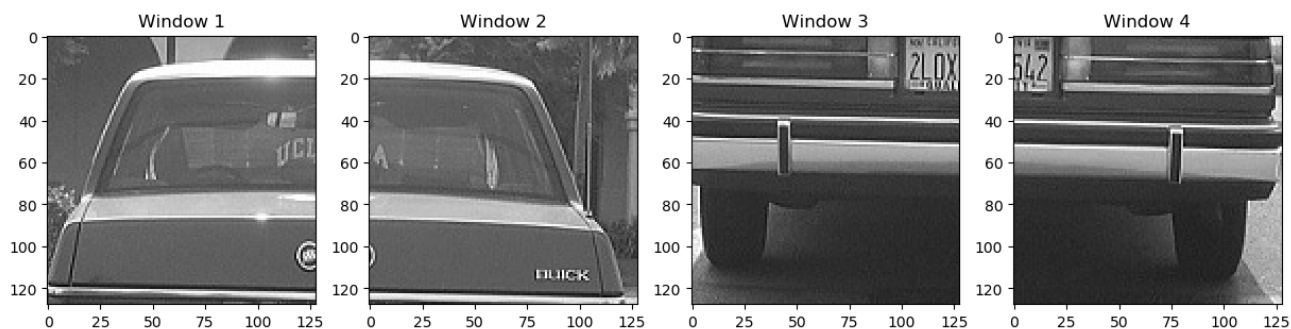
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190826664

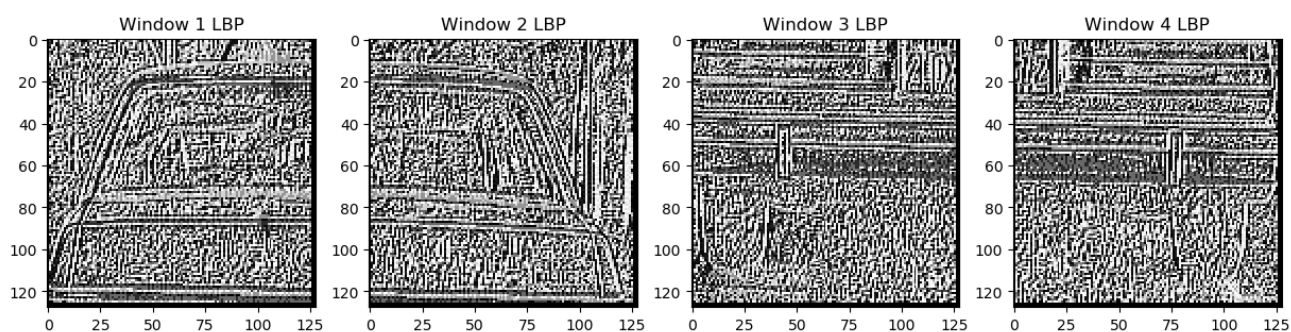
Descriptors and Classification

Question 4(a)

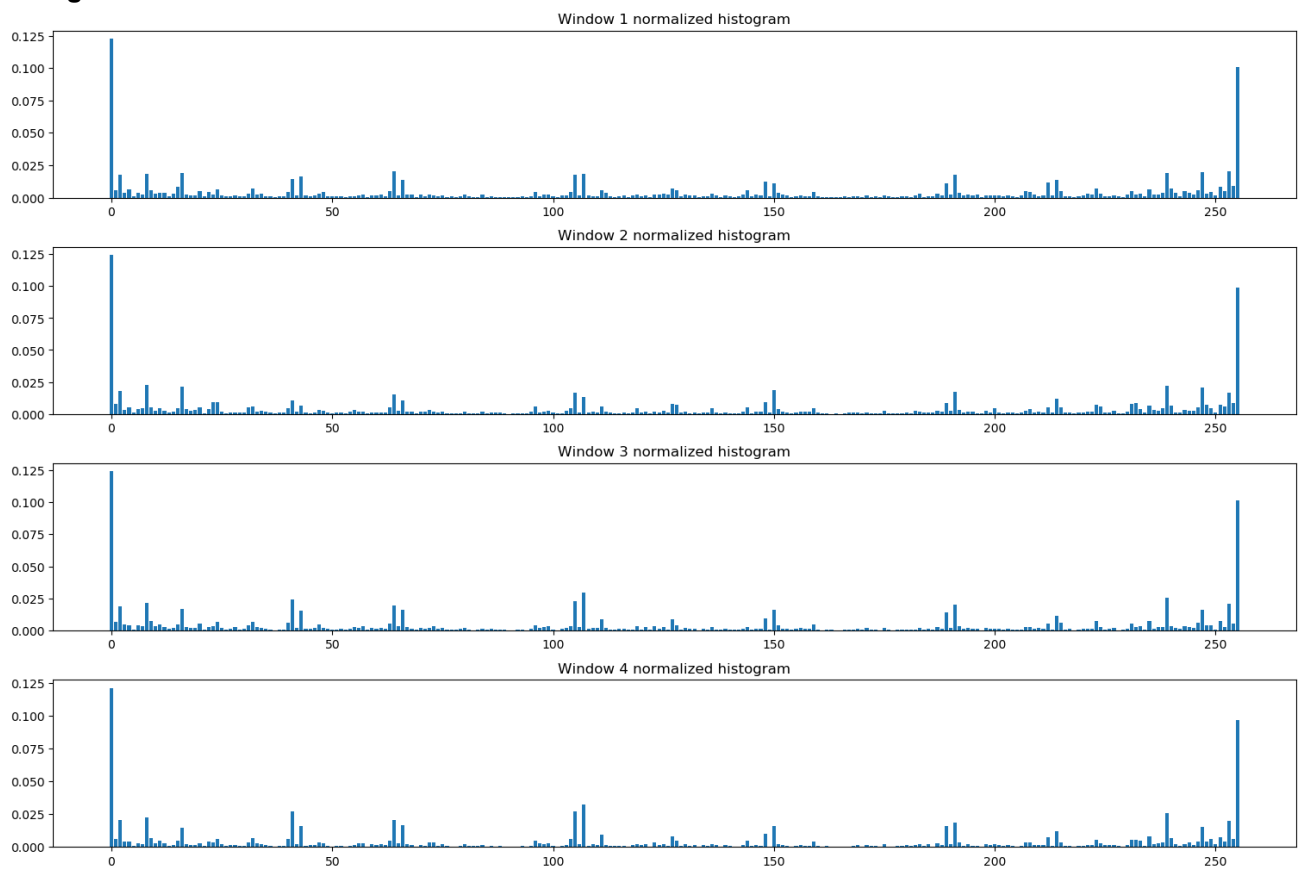
Three non-consecutive windows



LBP of windows

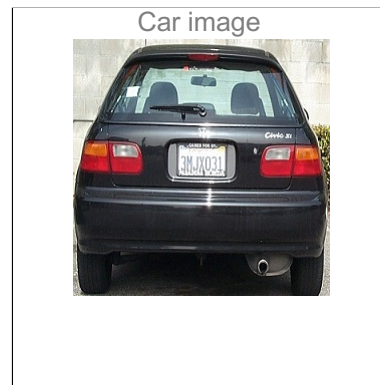
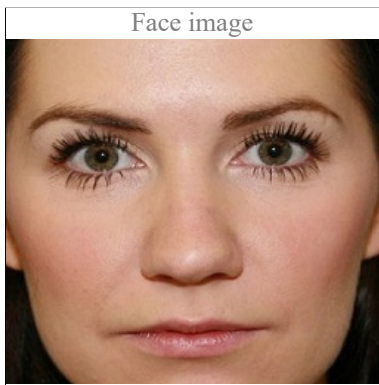


Histograms of LBPs

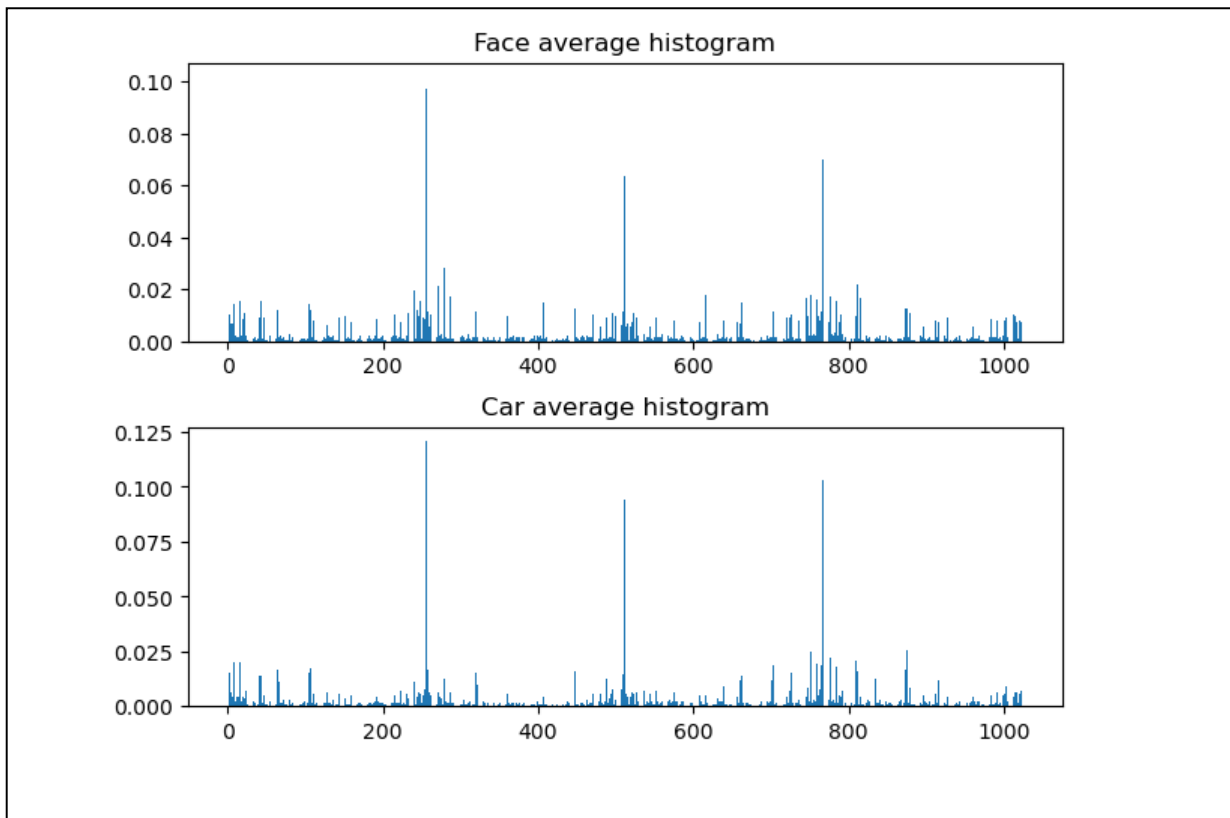


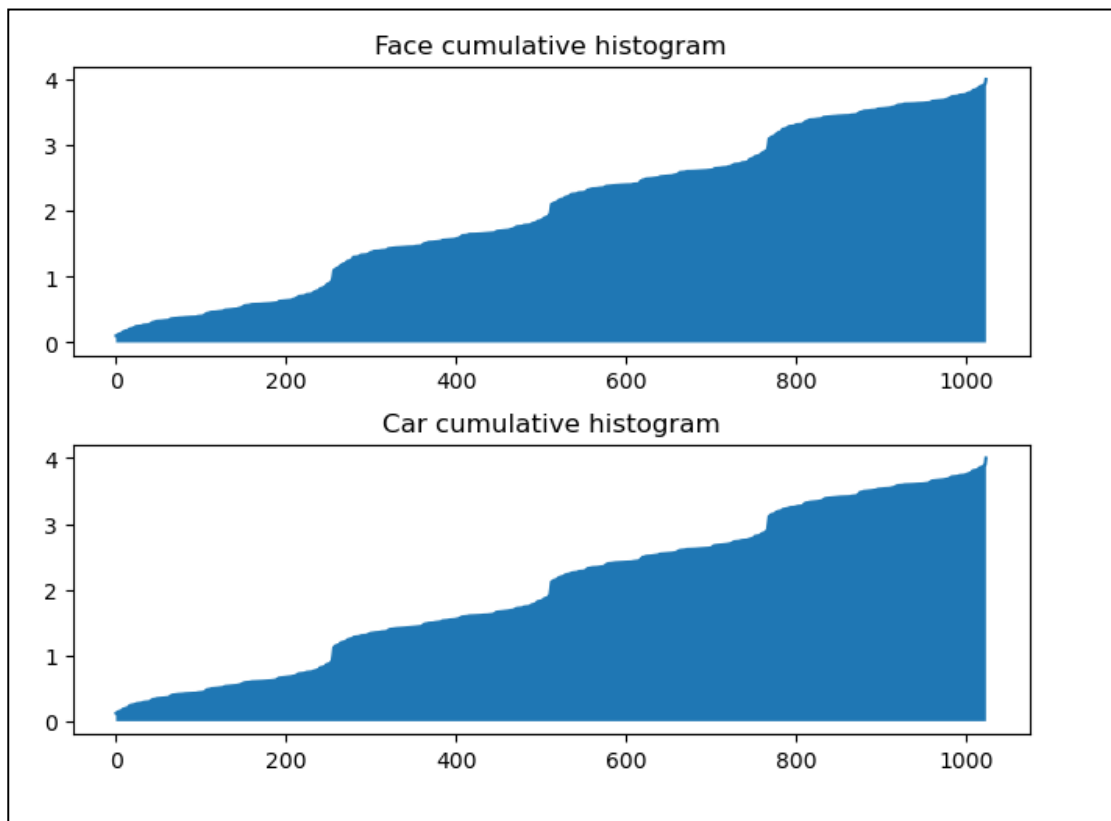
Question 4(b)

Two example images:



Descriptors:





Your comments:

Question 4(b)

Block diagram of classification process

- Out of time

I will explain this in an interview (if asked)

Your comments:

Question 4(c-e)

Your comments:

```
Average cars histogram correlation in 1x2 window:
0.9885949936488952
Average faces histogram correlation in 1x2 window:
0.9089148502377543
Average faces vs cars histogram correlation in 1x2 window:
0.9076055963693614
2x2 window

Average cars histogram correlation in 2x2 window:
0.985444505376837
Average faces histogram correlation in 2x2 window:
0.9052176247414992
Average faces vs cars histogram correlation in 2x2 window:
0.9080641262274374
Increased 4x4 window

Average cars histogram correlation in 4x4 window:
0.9787973058977757
Average faces histogram correlation in 4x4 window:
0.9001973971957584
Average faces vs cars histogram correlation in 4x4 window:
0.899460591230855
```

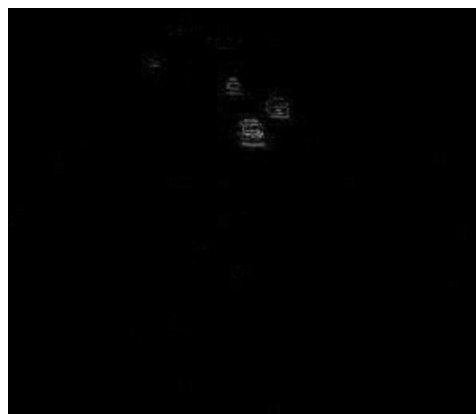
Larger windows shows lower histogram correlation

Object Segmentation and Counting
Question 5(a)



Question 5(b)

Original frame:



Your comments for 5a,5b:

I looked at the report last and did not see that it asked for selected frame. I only produced a function that runs as a whole and I have no time to fix my code to extract each frame for 5a and b so I use screenshots instead.

Comment:

What I noticed is when only the the first frame is used as reference, the objects present in first frame will be kept as considered part of the background. This is not the case when using previous frame as reference where objects are no longer kept as a part of the background.

Question 5(c)

```
first=True
nb_frames=0
count_per_frame=[]
while(vid.isOpened()):
    ret, frame = vid.read()

    if frame is not None:
        # to gray
        gray = Hardcoded.BGR2GRAY(frame)

        #To take previous
        if first:
            reference=np.zeros_like(gray)
            first=False

        else :
            #after reference is previous and previous will store present frame
            #reference=cv2.add(reference,gray)/counter
            reference = np.mean([reference,np.array(gray)], axis=0)
            reference = reference.astype(np.uint8)

        # saturated difference
        res=Hardcoded.diff(gray,reference)

    #####
```

Your comments:

Question 5(d)

Your comments:



*** I implemented this into both 5c and 5d, which I commented out. After you decomment, you should be able to see the count appear on the output frame***

I use simple clustering by comparing new points to seeds as I can take into accounts of two parameter: dst and cluster size to filter the noise. At this point, I do not have enough time to try to code filters or clustering algorithm from scratch, which will take a lot amount of time given the limited time I'm given.

I have also decided to implement fast clustering, although this method is weaker against noise. The first simple clustering takes longer time which is why the second one is more preferable. I wasted time on this part, which is why I do not have enough to write a proper report.

And I have tried to produce the code to create bar plot, however, it doesn't show, so there might be some bugs, or I simply did something wrong.