

## Assignment 3

1.



Cropped Image from the video



Output

2.

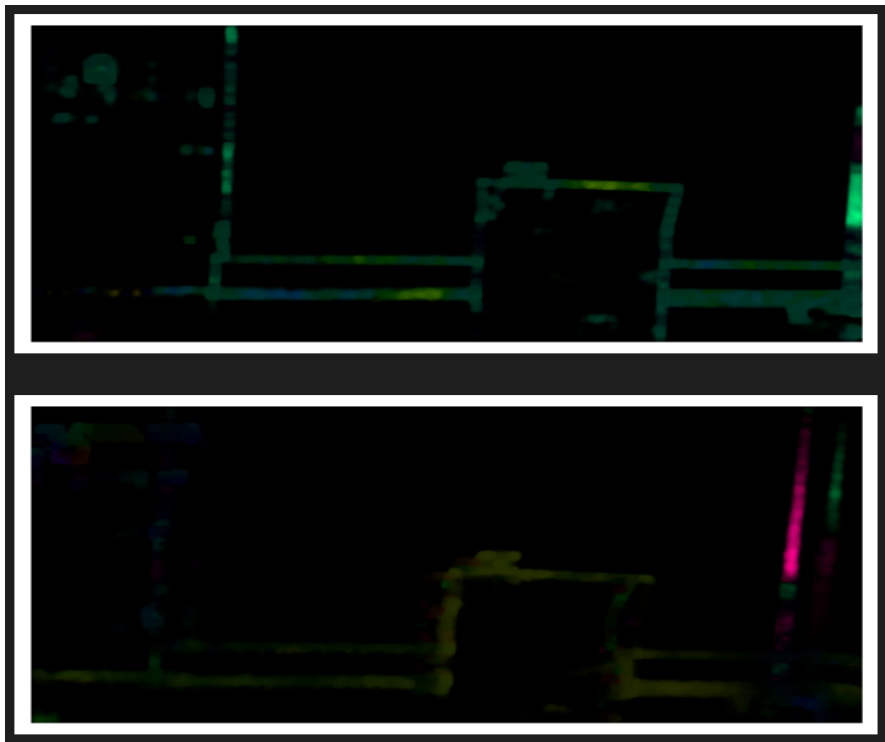
```

Motion function estimate for frame0 frame30[[      nan      nan      inf ... 329.50003      inf      inf]
[      nan      nan      inf ... 329.50003      inf      inf]
[      nan      nan      inf ... 465.27274 465.98343      inf]
...
[      inf      inf      inf ... 169.5      167.5      234.75946]
[      inf      inf      inf ... 239.70921 167.00002 165.5      ]
[      inf      inf      inf ... 238.29501 117.7333 232.63814]]
Motion function estimate for frame30 frame60[[      inf      inf 37.000004 ... 630.0322      inf 447.      ]
[      inf      inf 37.000004 ... 630.03705      inf 447.      ]
[ 37.000004 37.000004 53.033016 ... 630.0322      inf 447.      ]
...
[      inf      inf      inf ... 381.1306 382.54187 384.66617 ]
[ 34.648235 34.648235 25.000002 ... 270.00003      inf 384.6632 ]
[ 35.355343 36.769554 37.47666 ... 190.21248 381.1306      inf]]
Motion function estimate for frame60 frame90[[      inf      inf      inf ... 485.00003 484.50006 484.00006 ]
[      inf      inf      inf ... 485.      484.50003 484.      ]
[      inf      inf      inf ...      inf      inf      inf]
...
[ 71.00001 71.00001 71.50001 ... 253.00098 251.00002 352.1392 ]
[ 34.000004 34.000004 34.500004 ... 252.50098 158.11388 350.01788 ]
[ 92.631 92.631      inf ... 251.50096 124.250244 348.60367 ]]
Motion function estimate for frame90 frame120[[ 66.46804 65.05383 44.500004 ...      inf 663.9784 330.9247 ]
[ 66.46804 65.05383 44.500004 ...      inf 663.9733 330.92474 ]
[ 65.05383 63.639618 30.759148 ... 469.00003 330.92474 659.7357 ]
...

```

Motion Function Estimates

3.



Optical Flow

4.

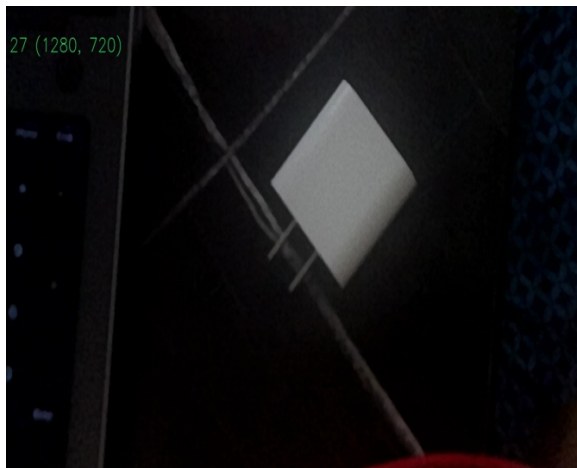


Image 1

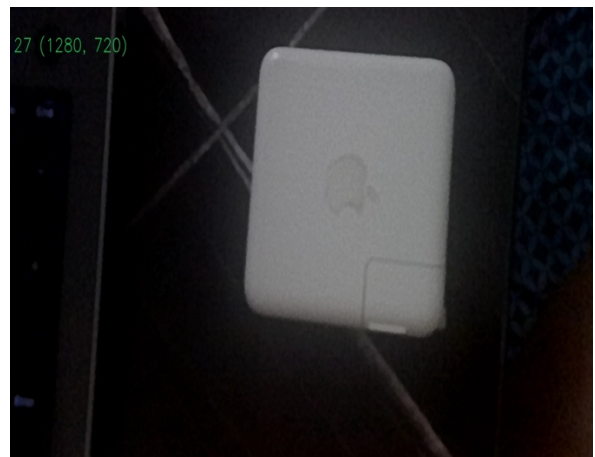
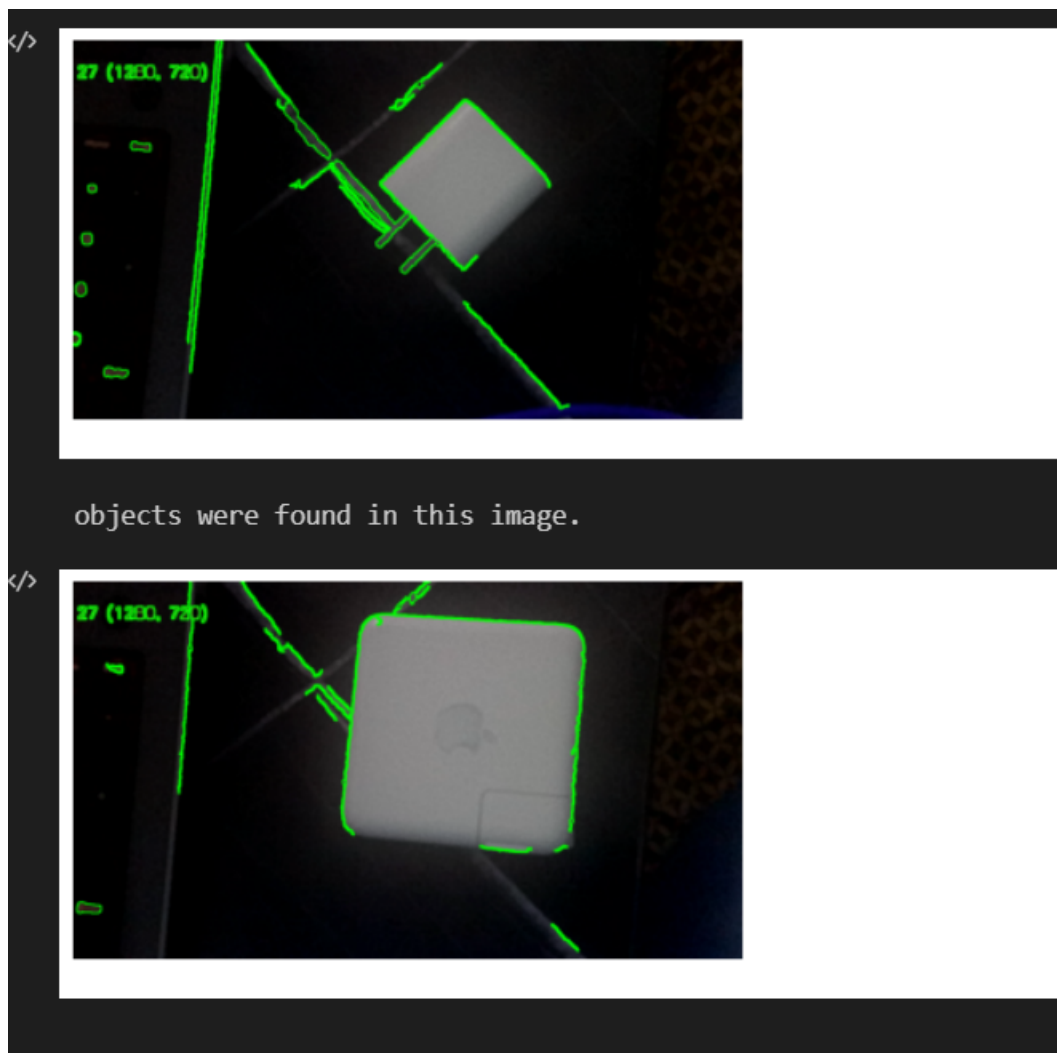
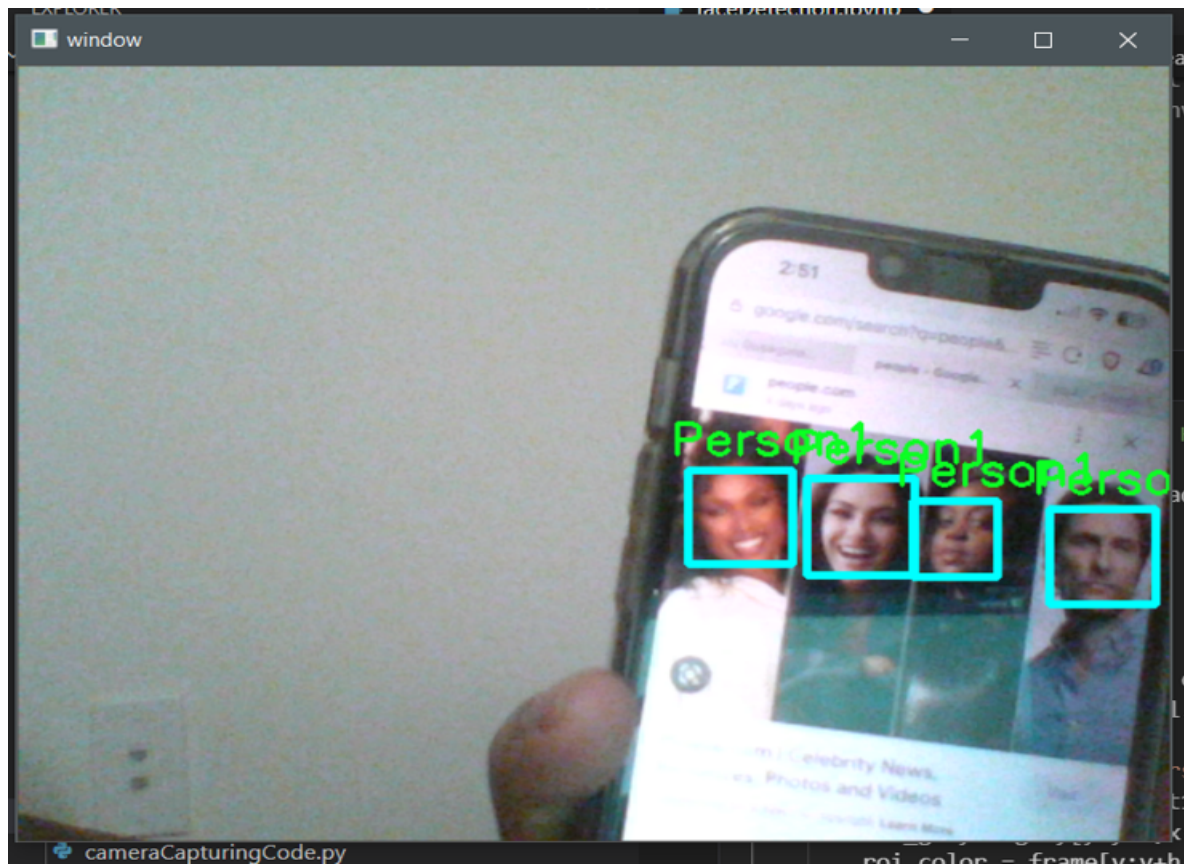


Image 2



Object Detection Image

5.



Multiple Faces Detection

- These are the values that are calculated manually based on the 20 different images taken

#### Accuracy

- $\text{Accuracy} = (\text{TP} + \text{FP}) / (\text{TP} + \text{TN} + \text{FP} + \text{FN})$
- $\text{Accuracy} = 18/20 = 0.90$

#### Precision

- $\text{Precision} = \text{TP} / (\text{TP} + \text{FP})$
- $\text{Precision} = 13/18 = 0.72$

#### Recall

- $\text{Recall} = \text{TP} / (\text{TP} + \text{FN})$
- $\text{Recall} = 10/11 = 0.91$

#### Intersection over Union

- $\text{IOU} = (\text{area of overlap}) / (\text{area of union})$
- $\text{IOU} = 41/58 = 0.71$
- this is for one image (41 is area of overlap and 58 is area of union)
- These are approximate values

Performance Metrics

6.

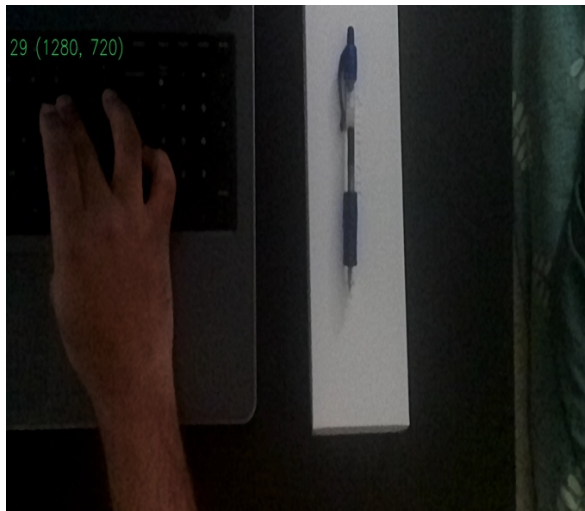


Image 1

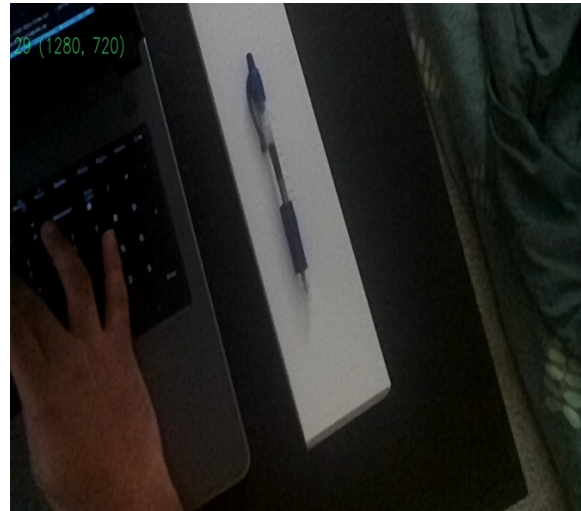


Image 2

```
D=457
T=25
b=546.1
f=1203.54736624058
z=(b*f)/(D-T)
print('The Disparity based depth estimation is '+str(z)+'mm')
✓ 0.1s
```

The Disparity based depth estimation is 1521.428742370326mm

Disparity based Depth Calculation