

CS825-001, Spring/Summer 2020
Assignment 3
Submitted to Dr. Xue Dong Yang
By
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Q1)

Below image is the screenshot of template matched output from q1. Black Squares are the template matched results.



Fig-1: Template matching output

Below image is the screenshot of all the computation of q1.

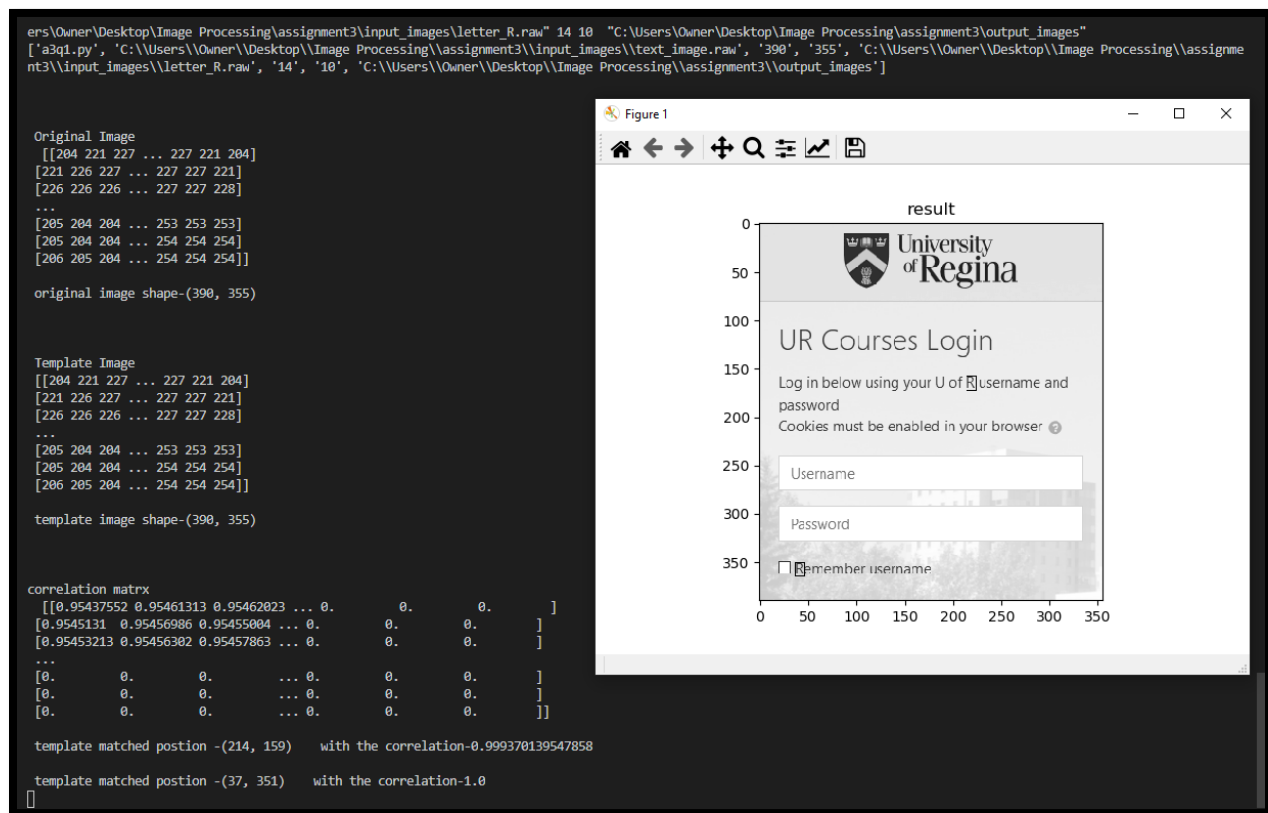


Fig-2: Q1 computations

Q2) Gx image

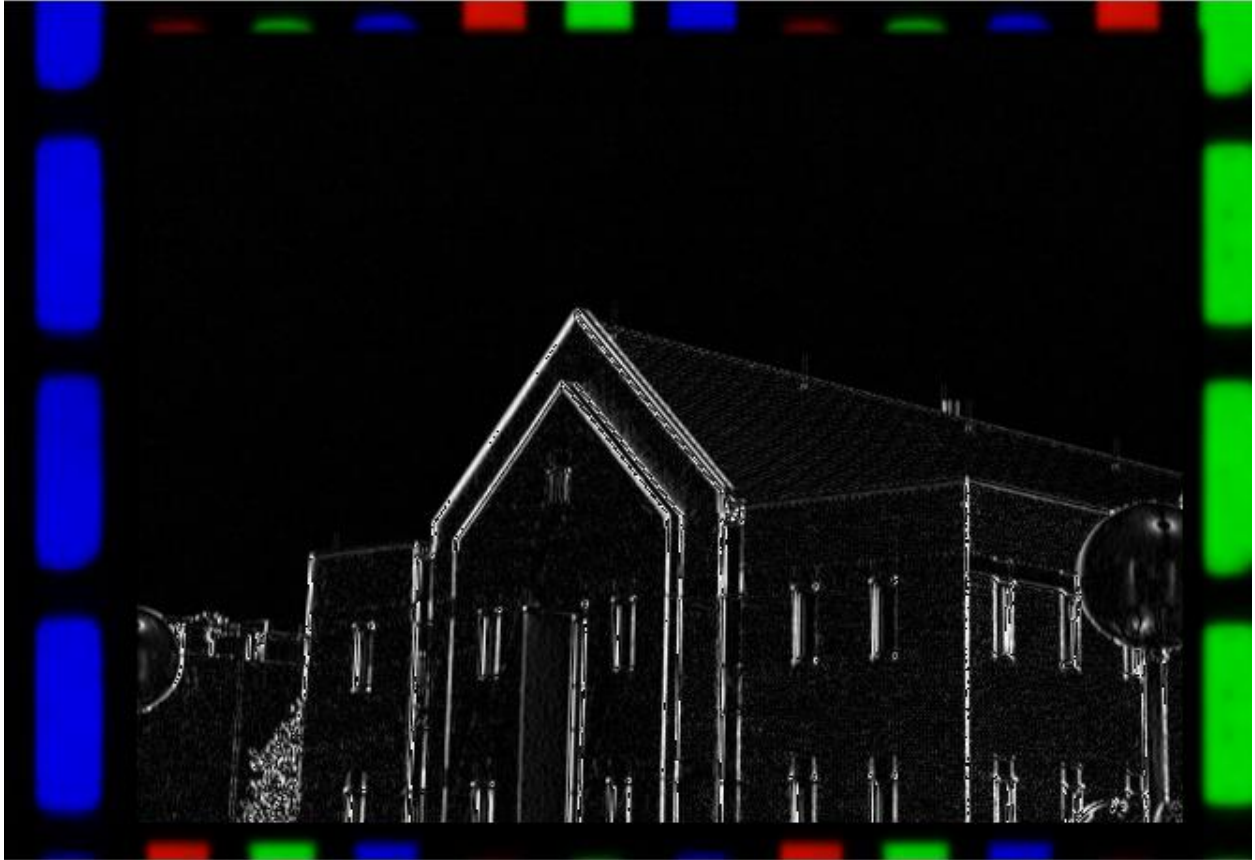


Fig -3 : Gx image

Computation involved in Gx

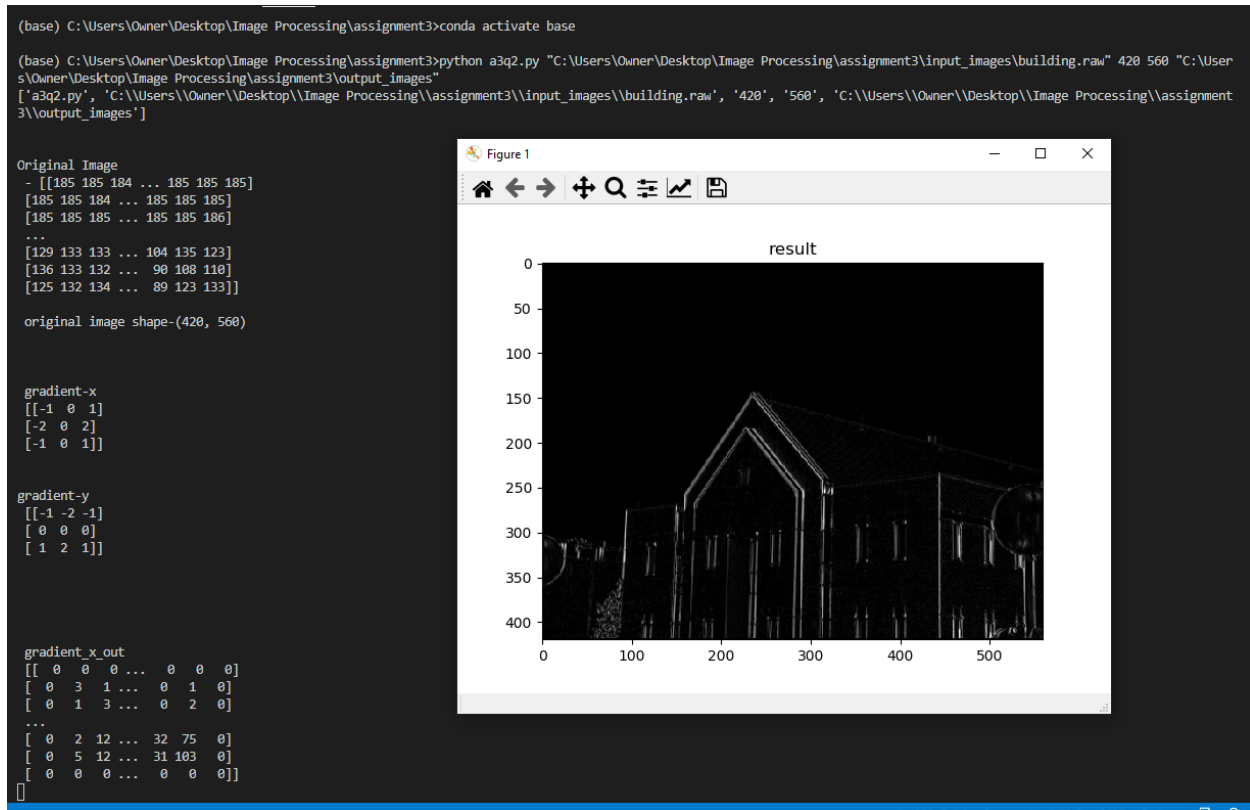


Fig-4 Computation Involved in Gx

Q2) Gy Image



Fig 5- Gy image

Computation involved in calculating G_y

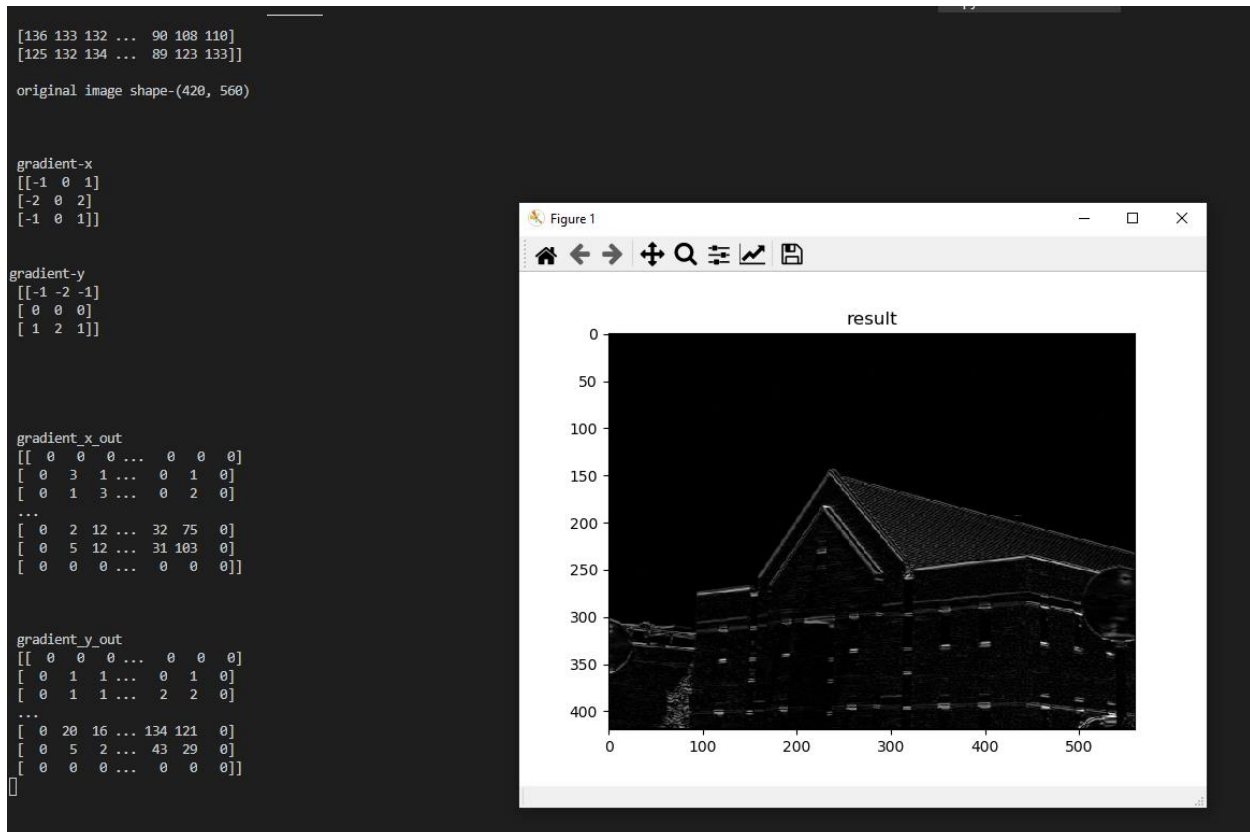


Fig 5- G_y computation

Q2) Gradient Image

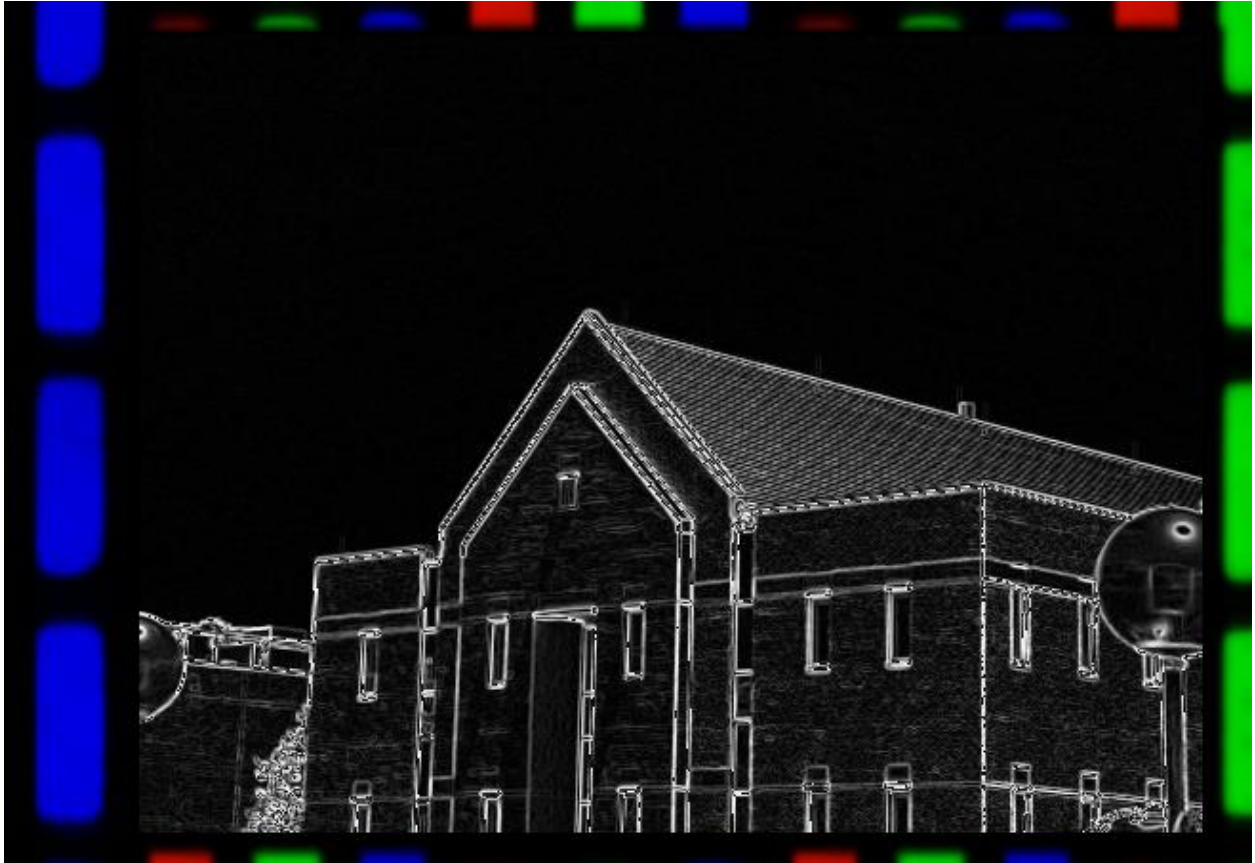


Fig-6 : Gradient Image

Gradient output and image

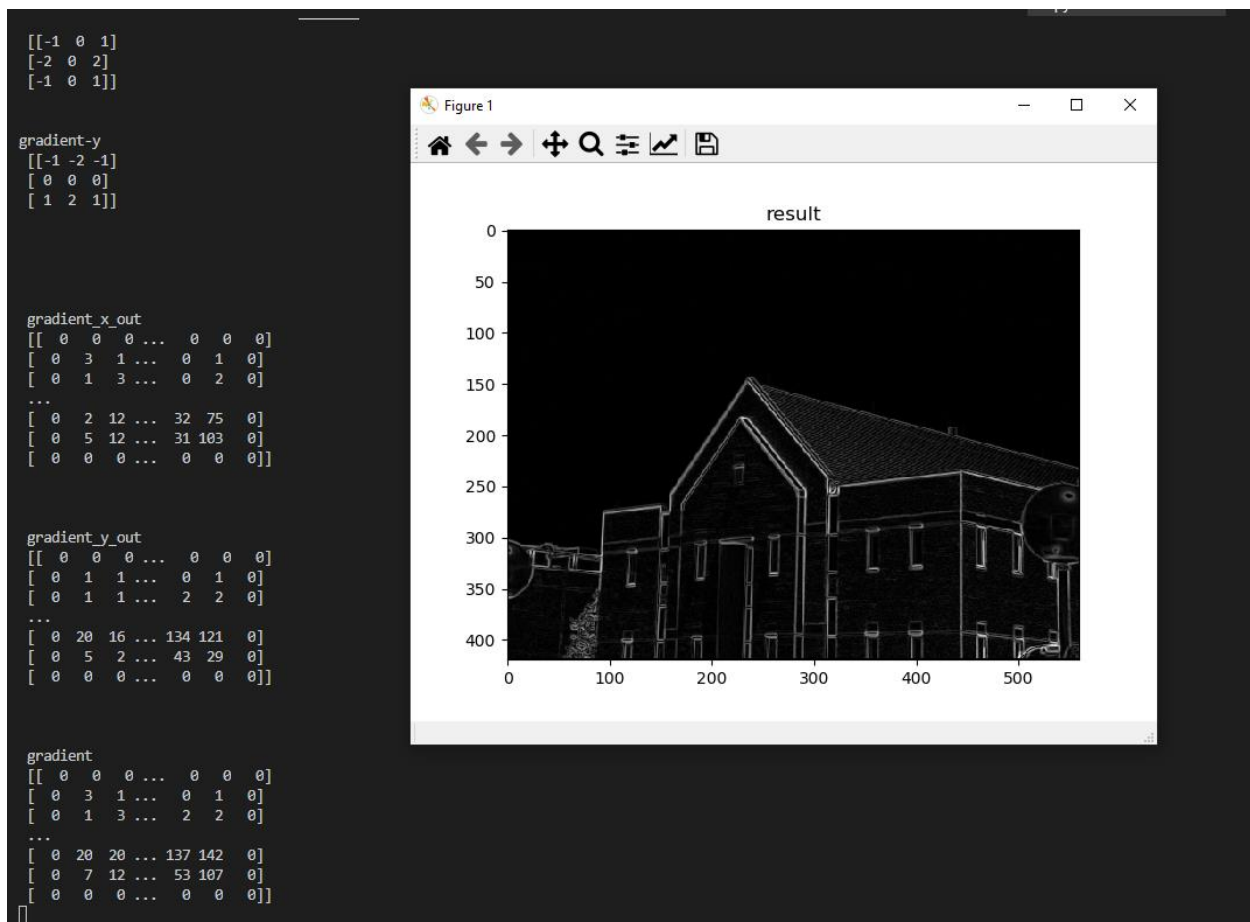


Fig-7: Gradient result

Q2) the edge map with threshold $TE = 128$

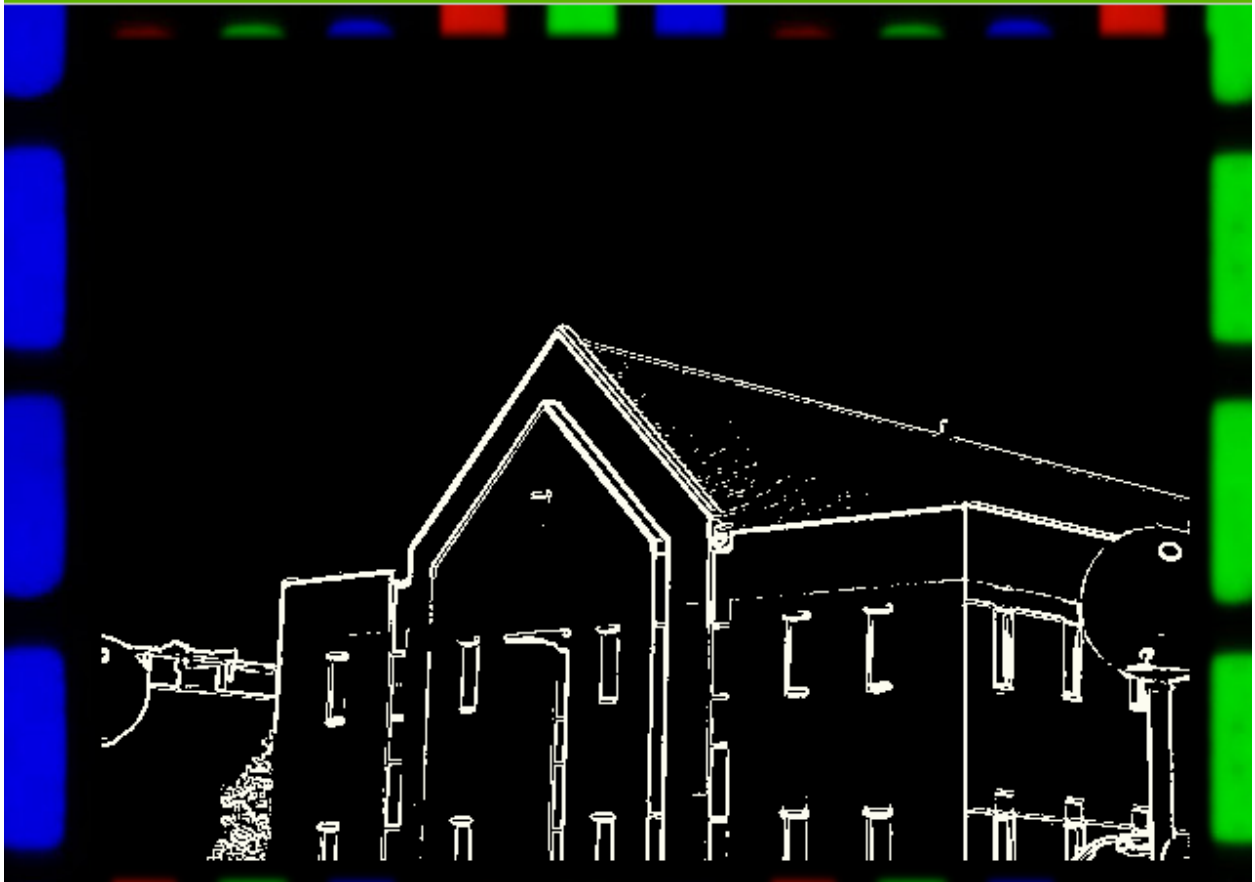


Fig-8: the edge map with threshold $TE = 128$

the edge map with threshold =128 result and image

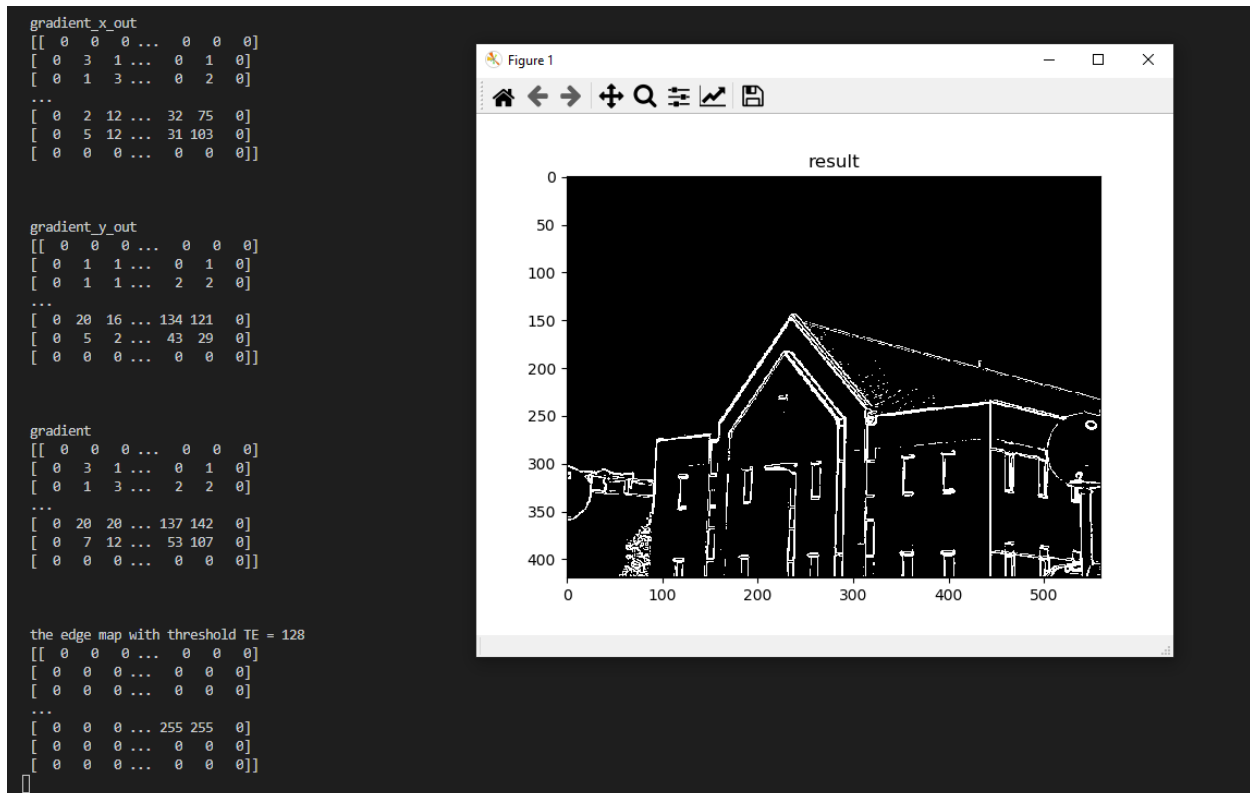


Fig-9: the edge map with threshold TE = 128 and results

Q3) zero-crossing points map.



Fig-10: zero-crossing points map.

Computation involved in zero-crossing points map.

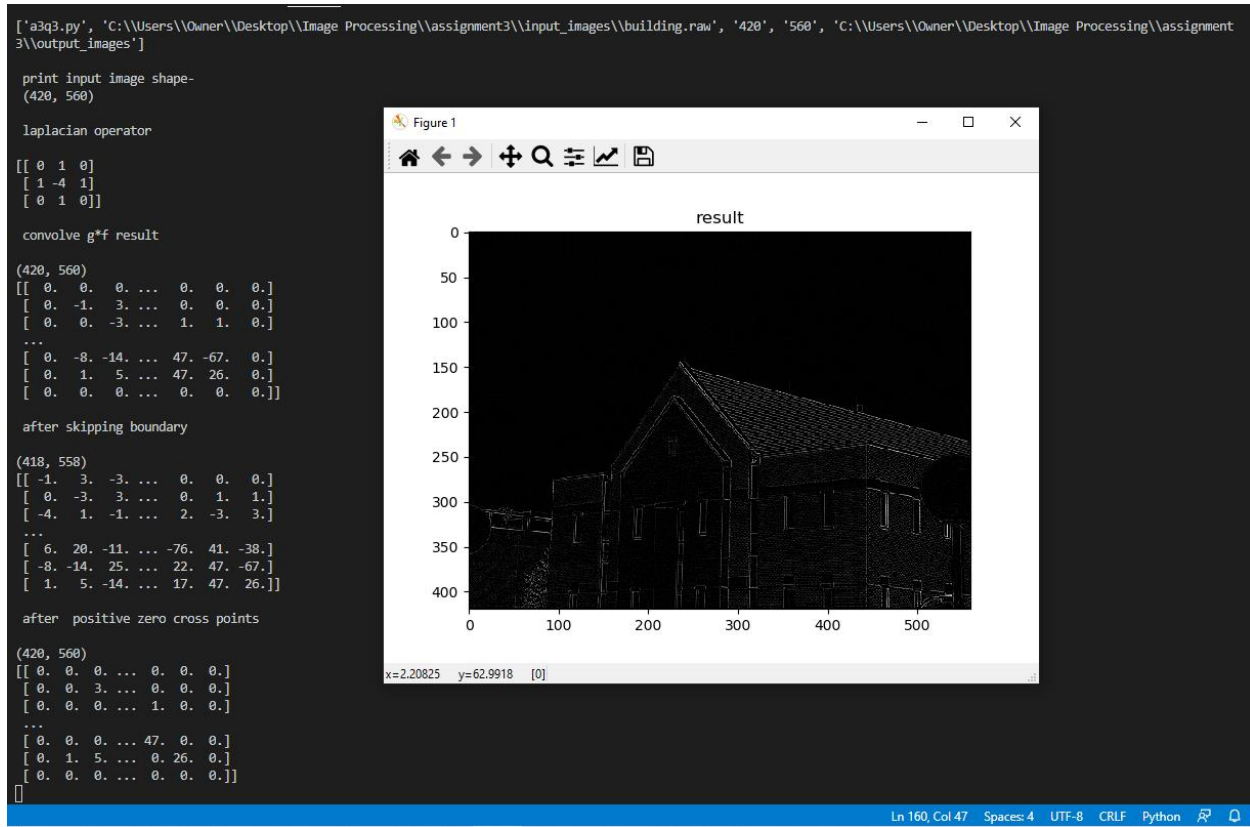


Fig 11: zero-crossing points results and image

Q 4) $W=1$



Fig 11: Image Sharpening with $w=1$

Image sharpening with $w=1$ results and image

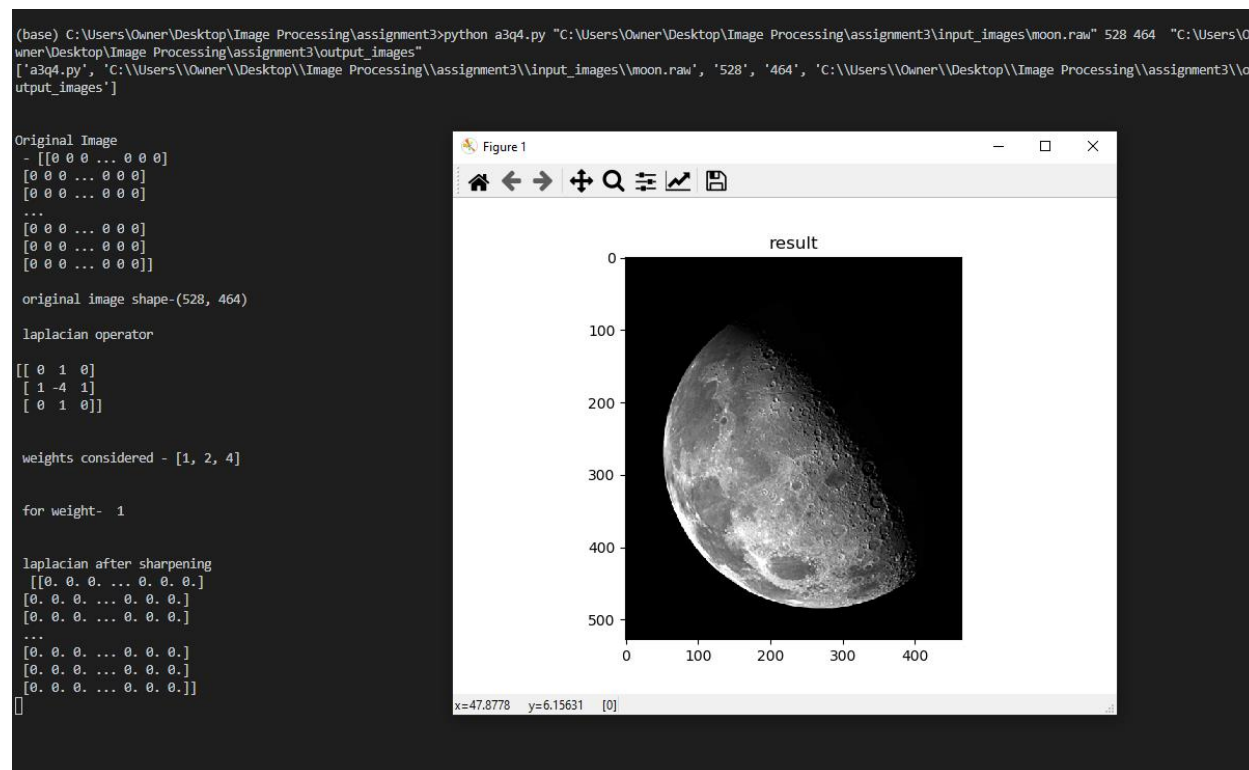


Fig-12: Image sharpening with $w=1$ results and image

Q 4) $W=2$



Fig-13: Image sharpening with $w=2$

```

- [[0 0 0 ... 0 0 0]
[0 0 0 ... 0 0 0]
[0 0 0 ... 0 0 0]
...
[0 0 0 ... 0 0 0]
[0 0 0 ... 0 0 0]
[0 0 0 ... 0 0 0]]

original image shape-(528, 464)

laplacian operator

[ 0  1  0]
[ 1 -4  1]
[ 0  1  0]]

weights considered - [1, 2, 4]

for weight- 1

laplacian after sharpening
[[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]
...
[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]]

for weight- 2

laplacian after sharpening
[[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]
...
[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]]

```

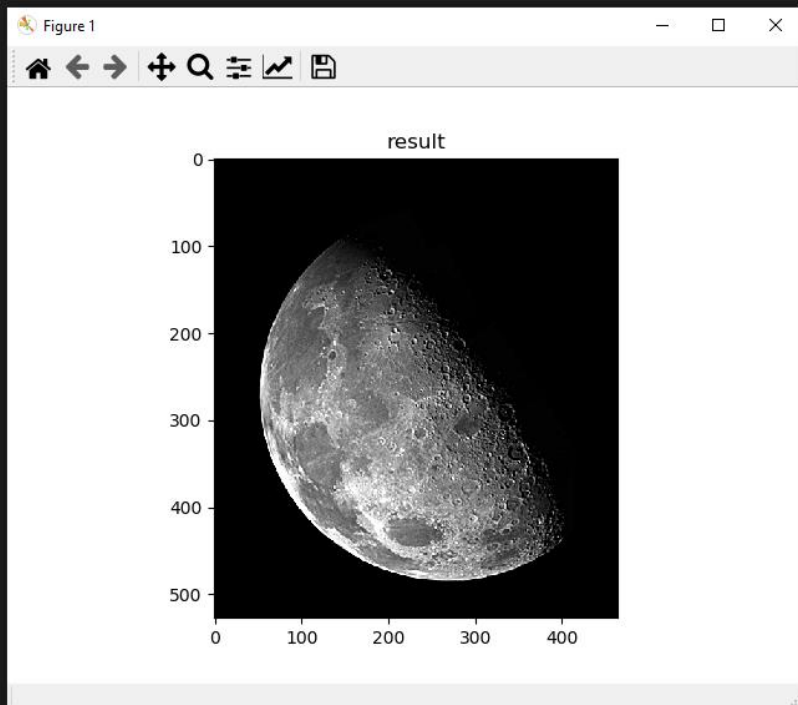


Fig-14: Image sharpening with w=2 results and image

Q 4) $W=4$



Fig-15: Image sharpening with $w=4$

```

[ 1 -4 1]
[ 0 1 0]]

weights considered - [1, 2, 4]

for weight- 1

laplacian after sharpening
[[0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 ...
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]]

for weight- 2

laplacian after sharpening
[[0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 ...
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]]

for weight- 4

laplacian after sharpening
[[0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 ...
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]]

```

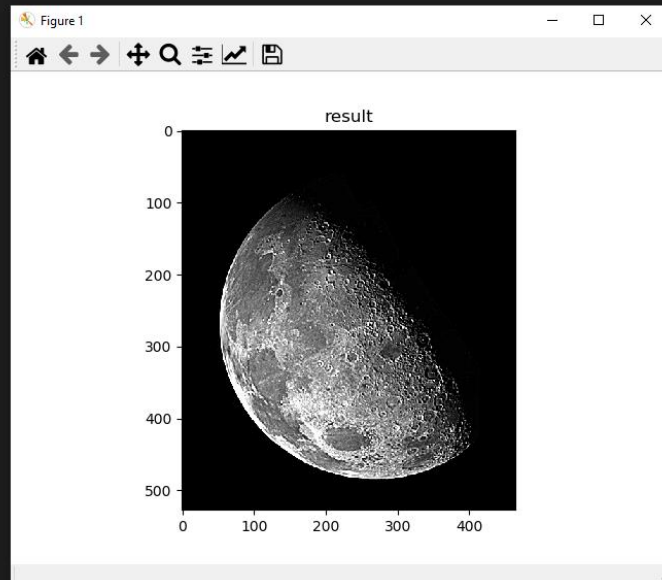


Fig-16: Image sharpening with w=4 results and image