Lab Ass. 1: Homography estimation and interpretation

1.1.1 Exercise1:- Homography defined by four pairs of transformed points. Original Image and Restored Image

Original Image

Restored Image- Method 1

Original Image

Restored Image- Method 2

Transform Matrix-1

```
   1.4064    0.4004    0.0001
  -0.1307    1.8918    0.0006
  -6.9449 -224.0339    1.0000
```

Transform Matrix-2

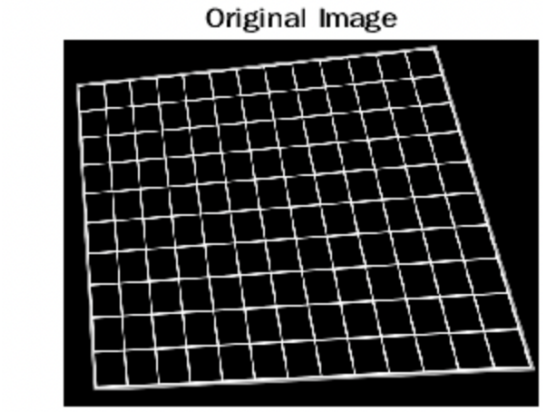
```
   0.0063    0.0018    0.0000
  -0.0006    0.0084    0.0000
  -0.0310   -0.9995    0.0045
```

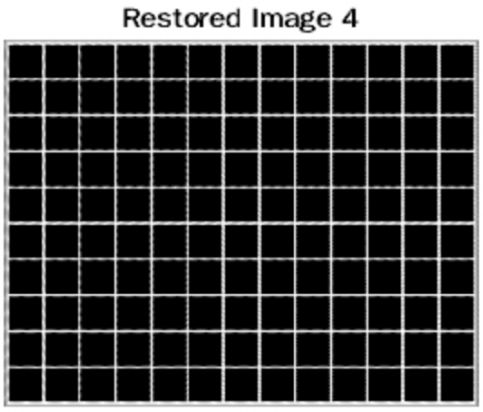
Homography Matrix-2

```
   0.0063   -0.0006   -0.0310
   0.0018    0.0084   -0.9995
   0.0000    0.0000    0.0045
```

Energy Difference = 0

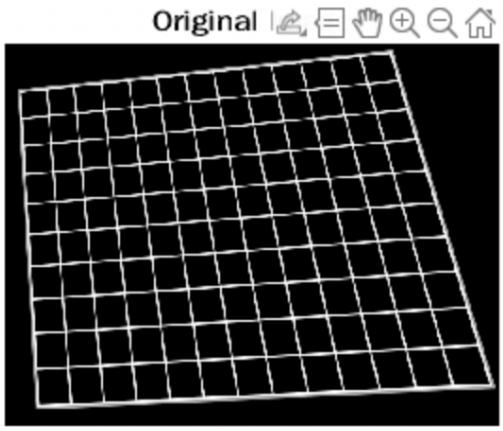
1.1.2 Exercise 2: problems in the definition of a homography from four pairs of transformed points.

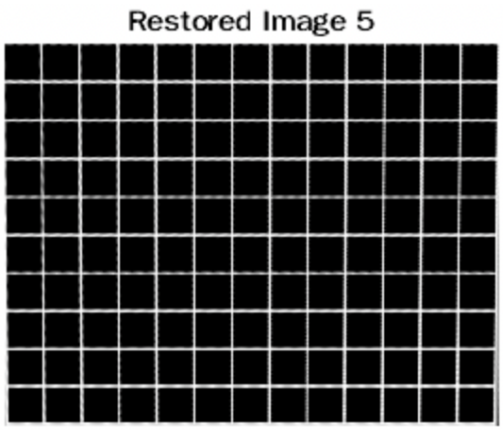




xy_origin = [18 475 599 41; 59 11 420 446];
xy_target = [4 604 604 4; 4 4 466 466];

Energy_Difference = 0





Manually Selected Co-ordinates:

23	472	599	43
62	15	418	444

Energy_Difference = 1.1325e+04

1.1.3 Exercise 3: homography that best fits more than four pairs of transformed points

First part:

No. of Points	4 Points	8 Points	12 points
Error	9.699957e+03	1.151060e+04	1.224981e+04

Second Part:

No of points	6 points
Error	3.281878e+02

Third Part:

No. Of Realization	1	2	3	4	5
Error	7.123131e+01	3.593978e+01	7.123131e+01	4.409427e+01	4.409427e+01
No. of points used	1021	1021	1021	1021	1021
No. of Iterations	3121	5815	1239	2717	8345

1.2.1 Exercise 4: vanishing points and the line at infinity

The points at infinity are joined to make the line at infinity.

1.3.1 Exercise 5: combining two images in a panorama

For pan Demo-1/2

	No. of points	Quality
Th=0.01	0	NA
Th=0.05	725 best 112	Low
Th=0.1	725 best 346	Medium
Th=0.5	725	High
Th=1	725	High

For Mountain-1/2

	No. of points	Quality
Th=0.01	137	low
Th=0.05	1638 best 401	Low
Th=0.1	1638 best 1019	Medium
Th=0.5	1638	High
Th=1	1638	High

1.3.2 Exercise 6: combining several images in a panorama

For a low value of threshold 0.05, lesser number of features are matched. Out of 1638, 401 best matches features are matched. To achieve better results we should use a threshold of 1 and a higher number of points to, so that maximum SIFT features are matched between the two images and a better panoramic image is generated.