

Assignment 5 Report
Image Registration and Automatic Image Stitching
MSEE18005
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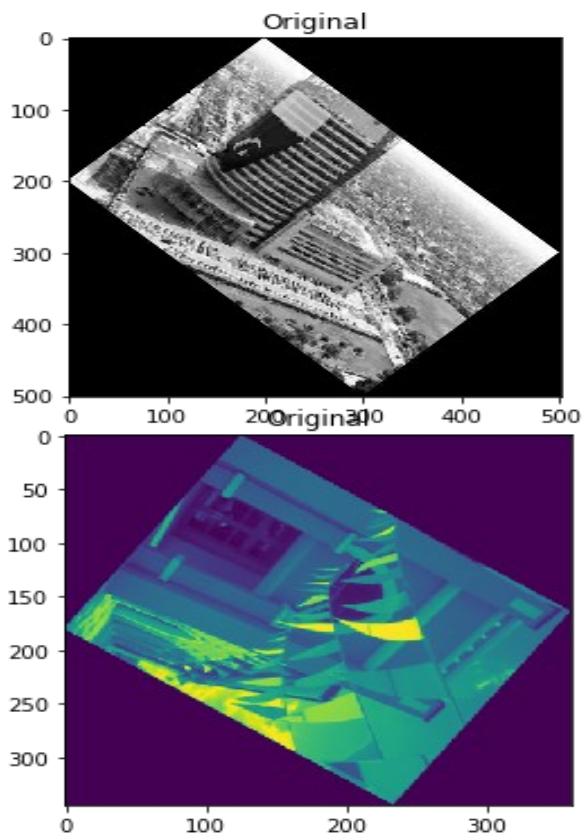
TASK 1:

In TASK 1, we have to find the correspondences in two images and then used these correspondences to recover affine transformation. In this submission, to find the affine transformation matrix, first of all problem is formulated as $y=Ax$, where y is points on target image and x is corresponding points in input image. Simply finding the pseudo inverse of A gives the least square solution to the problem.

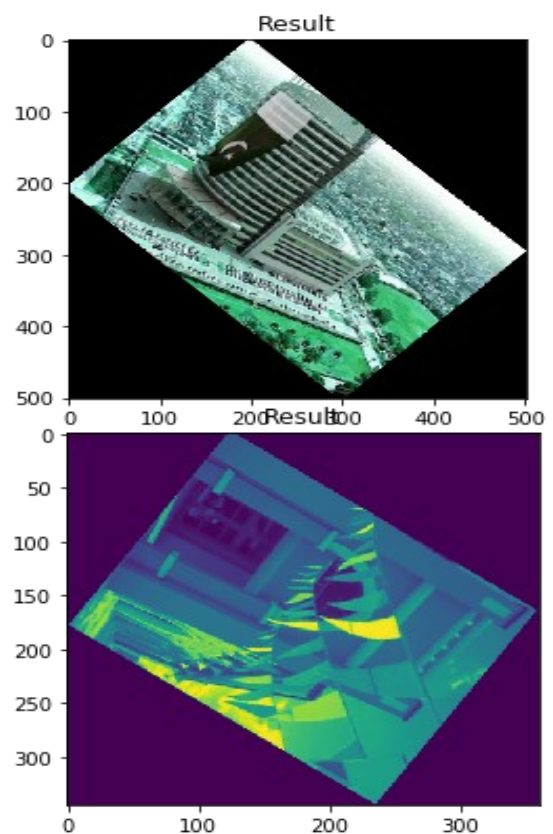
Results

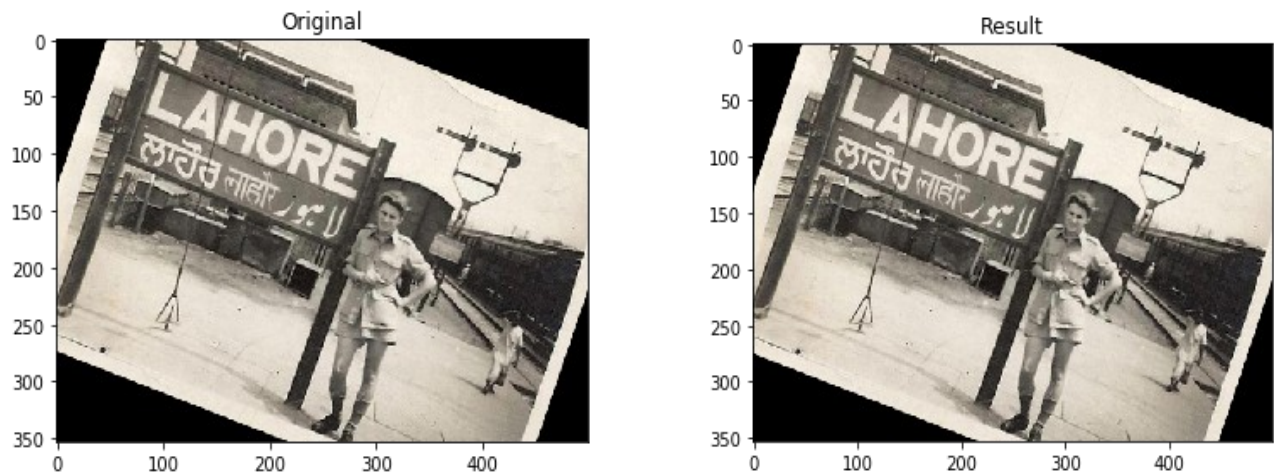
Results	Arfa	Mecca	Station
MSEPix	46.90	19.68	42.046
MSECorPts	0.954	2.062	0.589
T matrix	[[0.710, -0.712, 197.7] [0.696, 0.735, -1.39]]	[[-0.615, -0.900, 357.68] [0.899, -0.639, 164.08]]	[[0.934, -0.343, 75.17] [0.335, 0.946, -75.43]]

Original



Transformed





TASK2:

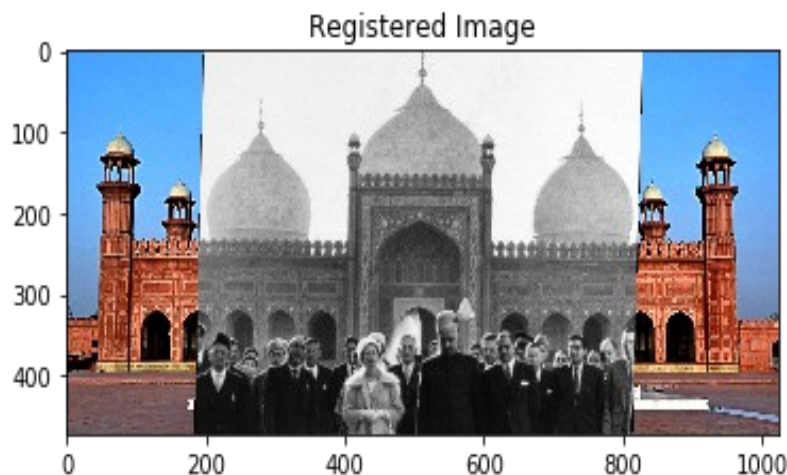
In TASK 2 algorithm for image registration is implemented, given two images taken at different times and different conditions we have to map the old image on the new image at same locations.

Mask is used to find the locations where resultant transformed image will be mapped in the new image. To get mask a, first a matrix of ones of same size as old image is wrapped in the dimensions of new image and all pixels of the wrapped image which are above 0 are set to 1 and remaining are set to zero.

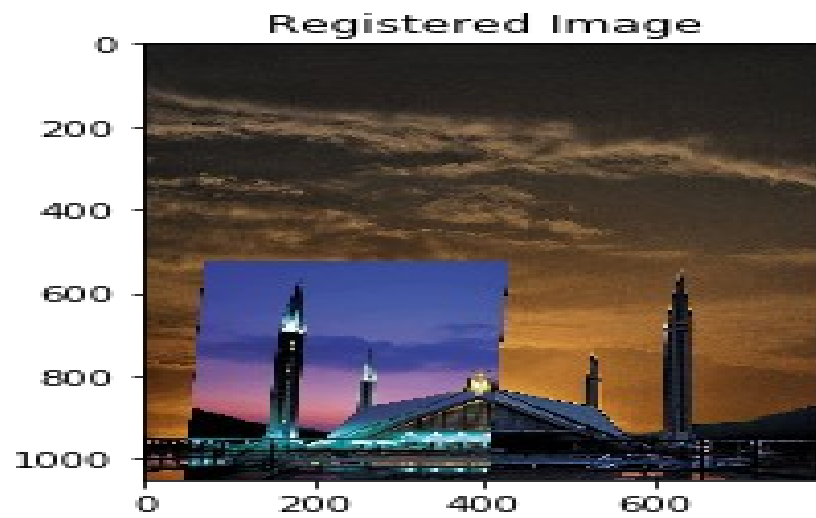
After getting map it is straight forward to replace these pixels with old transformed image

Results

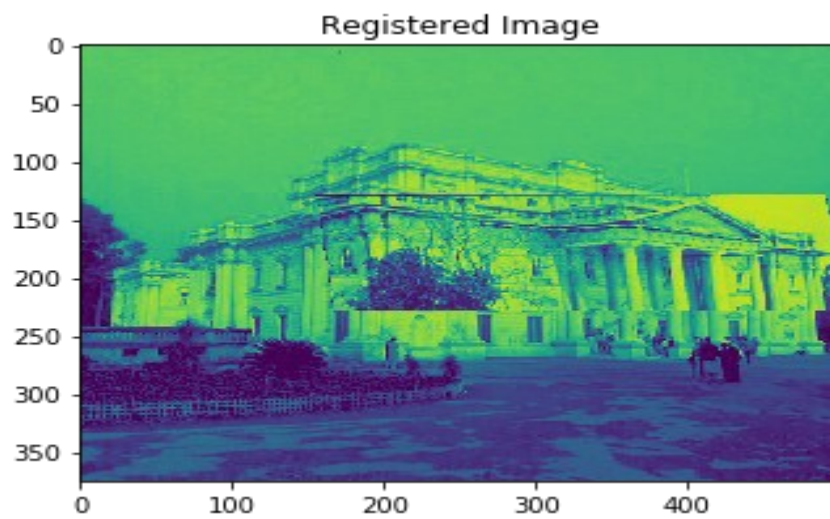
Badshahi Mosque



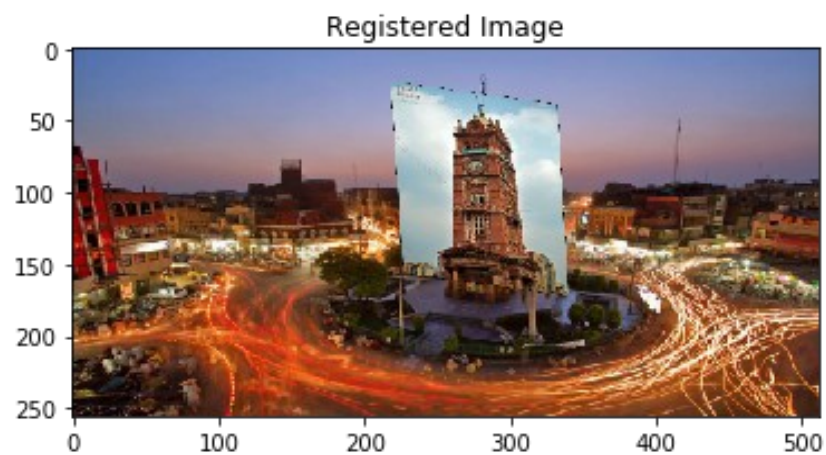
Faisal Mosque

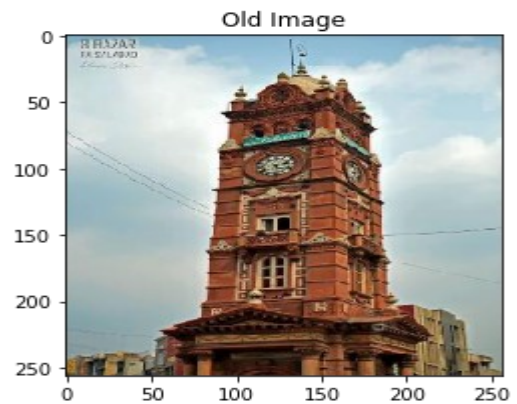


QLIB



Additional Result from Internet Clock Tower Faisalabad





TASK3:

In this task an interesting problem of creating mosaic from a series of images is solved. It is done step-wise as described in assignment.

Following steps summarizes the implemented algorithm:

- A function to load all the images given the set no is implemented and all the images are read in an array.
- SIFT descriptors and keypoints are calculated for all the images
- Descriptors and keypoints are for all images stored in .mat files and converted to arrays as well
- An algorithm for NNDR is implemented and a threshold of 0.8, 0.8 and 0.7 is selected mostly.
- Matches between consecutive images are found with NNDR.
- Outliers are removed from matches with RANSAC.
- Transformations are found based on these final matches

Given the transformations between consecutive images now images are blended together in the following reverse order:

```
warp pre stitched img into coordinates of img3 with h43
stitch warped stitched img with img3
warp pre stitched img into coordinates of img2 with h32
stitch warped stitched img with img2
warp pre stitched img into coordinates of img1 with h21
stitch warped stitched img with img1
```

For further details about algorithms described in each step please visit code.

Results

SIFT KEYPOINTS





Panaromas

