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Assignment 2 (Computer Vision)
Mosaic

First I converted my image into gray scale image, so that computation will be easier.

1. In new_shift function i am passing 2 images as arguments and return the merged images as output. It demonstrates matching 2 images using sift features and ransac and computing their mosaic.
2. In Runmosa file i am calling all 5 images one by one and merging.
3. Merging_image is the file which perform the work which the inbuilt function im_backward performs. This function is performing Backward Warping.

Algorithm:

1.SIFT

- What Sift do?
  It detect the key points (relevant features) in scale space, then it assigns an orientation to each keypoint , and also assigns a descriptor to each keypoint. Later this descriptors are compared with the second image descriptors.
  In keypoint we have x and y coordinates , scale and orientation.

  I performed the sift using v1_sift library .

  Then using v1_ubcmatch library i get all the matched points.

The arguments of v1_ubcmatch is the descriptors of the 2 images.
Now in those matched points, we select any random 4 matching point.

2.Ransac

● Implemented Ransac using homography model.

Here first calculated A matrics, which is calculated using the 4 random matched point. Every point return 2 rows in A matrix.
So total A matrix contains 8 rows.

The rows are calculated using the below equation:

r1=[x1 y1 1 0 0 0 -x1*x2 -y1*x2 -x2];
r2=[0 0 0 x1 y1 1 -x1*y2 -y1*y2 -y2];

Hence after getting A matrix, using this we calculate H matrix.
This H matrix is called Homographic matrix.
First computing the SVD decomposition of A matrix.

For AH=0, here the solution will be the last eigen vector of V matrix in SVD decomposition of A.

Later then calculated the score for H matrix. Same way repeated the process 100 times until we get the best score for H matrix.

3.Moisac

● For implementing the mosaic, First calculated the size of box where both the images will be projected.

- Then one by one projected the images in that box
- If we get the overlapping pixels then performed blending or replaced it by averaging it.
- P2= H* P1   using this equation i calculated the coordinates of P2 (that is image 2 coordinates) with respect to the coordinates of P1.

Output:

1.IISc data set(With blending)
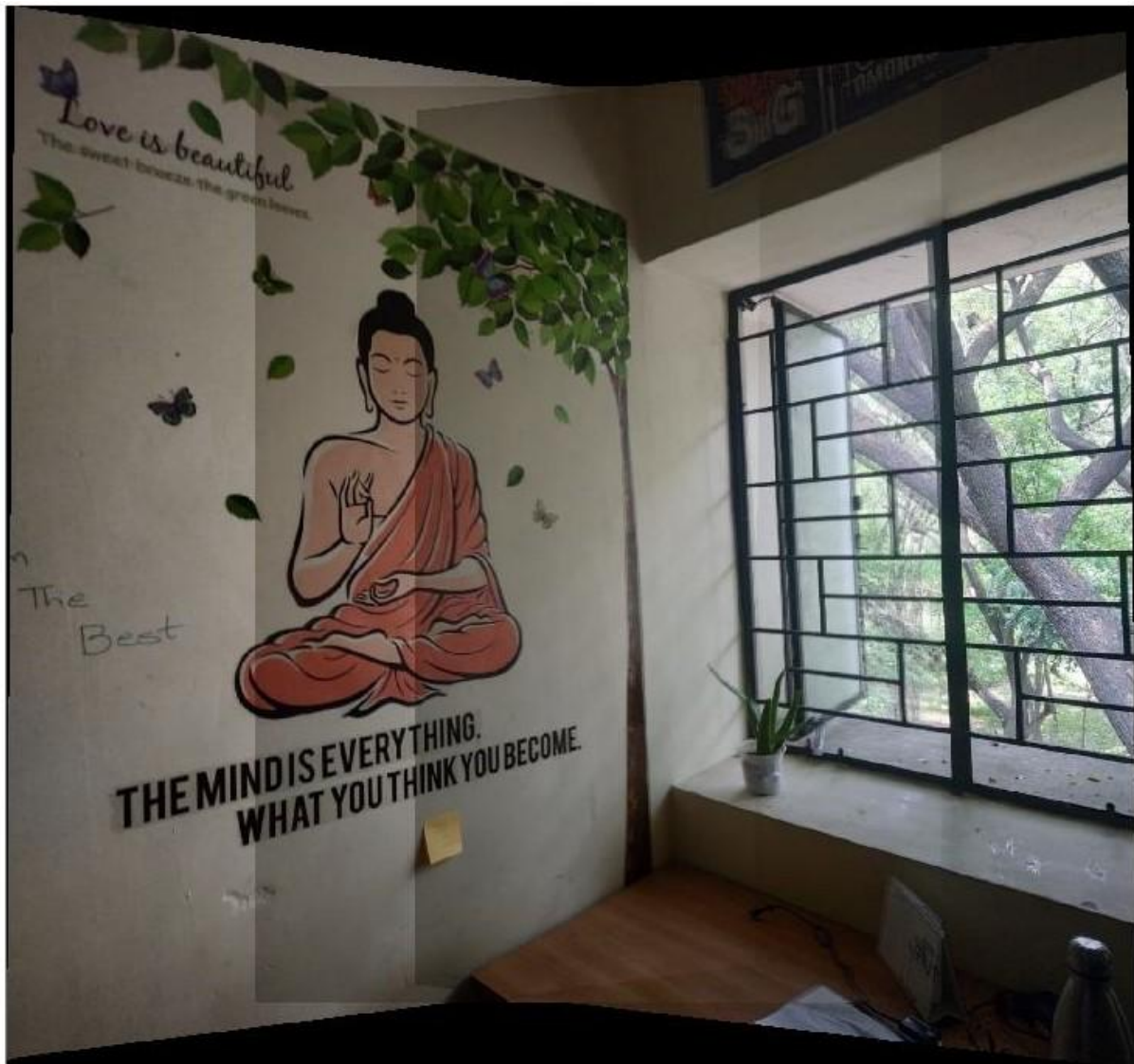

Without blending

Observation:

In without blending output: it is more sharp then the blending one. This is because in without blending taking the average of intensities Result in less accuracy. Hence result is not smooth.

2.Custom data set (output)

With blending

Without blending