Writeup

Using vl_sift and vl ubcmatch I determined the corresponding feature points using showMatchedFeatures function the following output is shown:

It can clearly be seen that the image is shifted from the right to left or left to right depending on which time frame perspective examined ie if the first image was taken first then moved or the second image was taken then moved to take the first.

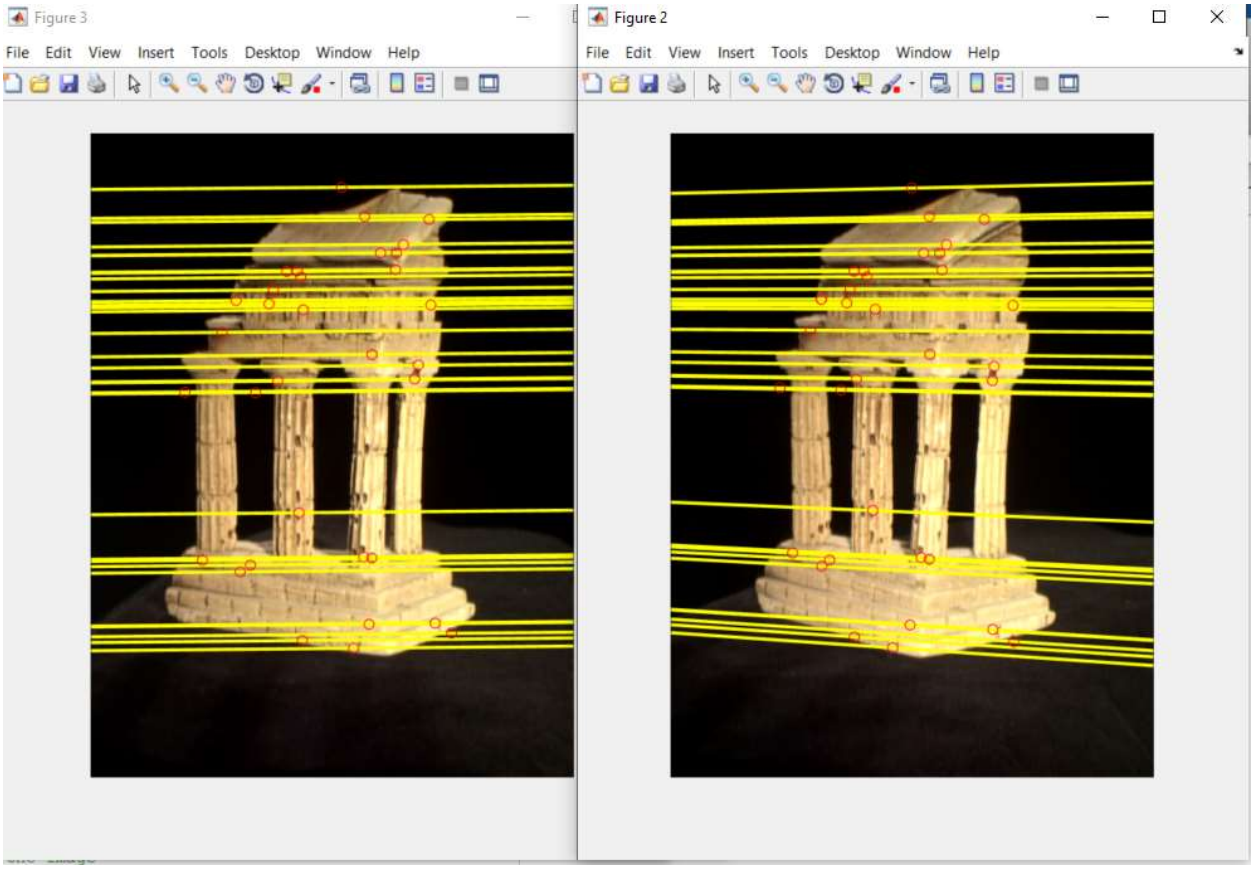
Question 2: RANSAC vs LMedS

Both these methods are iterative and takes a random m-amount of samples from the data pool they are both iterative so that generally the more iterations equals better accuracy up to a point. LMedS differs in that it generates a median between the data samples and then tries best to reduce the error between the estimation and the data across all data sampled. RANSAC takes the m-amount of samples and computes an estimation but then it will try to exclude outliers while LMedS tries to fit the outliers but tries to reduce the impact of outliers significantly by drowning the error caused by the outlier with the error from the inliers. This is only effective up to 50%, meaning the outliers needs to be below the 50% region of the data sampled otherwise the LMedS breaks, as stated by the article given. Furthermore, while this method won't break until 50% the accuracy and usefulness of its estimation will drop significantly as the percentage of outliers rise.

Sources:
http://homepages.inf.ed.ac.uk/rbf/CVonline/LOCAL_COPIES/AV0405/HEWARD/LeastMedianSquares.html
https://en.wikipedia.org/wiki/Random_sample_consensus

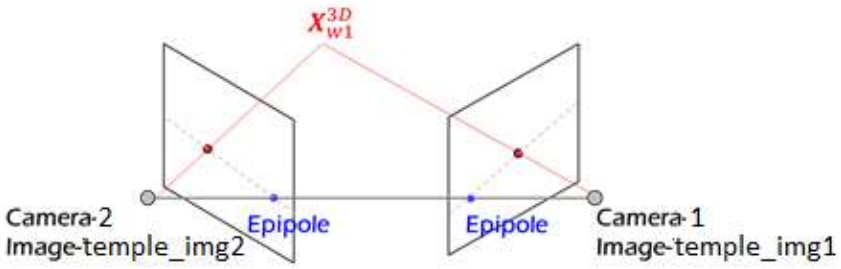
Question 3:

temple_im2(figure 3) aloung side temple_im1(figure2)



I believe the camera from figure 3 is to the left of the camera on figure 2. This can be intuitively determined first by examining the spacing of the 3rd and 4th pillar within the image but a more technical way of determining position is by examining the location of the epipole on the second image it can be clearly seen that the epipole of the second image lies on the far left side, while the epipole of the first image clearly lies to the right. Since the object being filmed is stationary and the camera used to take the photos are assumed to be identical the only change that can be inferred is that the camera position changed. The calculation of these epipolar lines is made by taking the intrinsic matrix F from both photos, the corresponding reference points to determine the movement scheme. In short if the epipole is to the left side of the image it can deduced that the other image that was used in the image calculation is to the left of the image.

Suppose the epipole of the first image is to the left of the camera image this tells me that the second camera is positioned to the left of the first camera. The inverse is true if the epipole is to the right then the second camera would need to be right of the first camera. Shown belown is a diagram of the camera placements for the given pictures



Epipole values

```
er =

    1.0e+03 *

   -4.8525
    0.1657
    0.0010


el =

    1.0e+05 *

    5.0156
   -0.0426
    0.0000
```