Exercise on Image Stiching

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This is the first larger exercises 02504, combining some of the tasks you have learned in the previous exercises.

1 Question 1

Make a function `Hest`, which from two point pairs can estimate a homoraphy via the linear algorithm of section 2.91. in the lecture notes. Remember to normalize the points as described in ”Exercise in Estimating View Geometry”.

To test `Hest` make a test data set via: `q1=rand(3,10);`

```
Htrue=[10 0 -1;1 10 20;0.01 0 3];
q2=Htrue*q1
```

- Demonstrate that `Hest` can estimate `Htrue` from `q1` and `q2`.
- Do the same for `Htrue=[10 0 -1;1 10 20;0.02 0 3];`

2 Question 2

Load the images ImL.jpg and ImR.jpg, and match them via the following code:

```
   [fa, da] = vl_sift(single(rgb2gray(ImL)));
[fb, db] = vl_sift(single(rgb2gray(ImR)));
[matches, scores] = vl_ubcmatch(da, db);
nMatch=size(matches,2);
```

After having initialized vl_feat via `vl_setup`, see ”Exercise in Geometry Constrained Feature Matching”.

Devise away of illustrating the result and apply it.

3 Question 3

Use Ransac to fit a homography to the matches from Question 2, using the homography estimator from Question 1. Use equation (2.45) from the lecture notes as a distance measure, with a distance threshold corresponding to $\sigma = 3$.[1]

Find the inlier matches and illustrate/document the result.

[1] Note: Using equation (2.41) in the lecture notes assumes that the the coordinates have been normalized.

4 Question 4

Improve the estimate by fitting a homography to all the inliers via the algorithm from Question 1. Warp ImL vi this homography, e.g. using the code:

```
T = maketform('projective',H');
ImH=imtransform(ImL,T);
imagesc(ImH)
axis image
```

5 Question 5

Use the supplied function `WarpNView(H,ImL,ImR)`, which warps image ImL via H and merges the result with ImR. Comment on the result, in particular what this imples about the quality of your estimate of the homography H. Note that the image input to `WarpNView` should be RGB images.