Assignment 1:

Homography & Panorama

Part A: Homography computation

1. A system of equations of the form , for projective transformation:

Since we have matching points in 2 images, and we want to find the projective transformation between the two images- we want to find the Homography matrix corresponding for both images.

As we learned in class:

Therefore we get two linear equations per pair of patching feature points:

We have system of linear equations,, Where is a vector of unknowns

We need at least 8 equations, because is up-to scale, but the more the better.

With more than 8 equations, the system is over constrained, thus solving using least squares:

For each pair of matching points, we get 2 equations.

For n pairs of matching points, we will receive the following system:

Since h is only defined up-to scale, we will solve for unit vector .

The solution is = eigenvector of with the smallest eigenvalue.

Once we’ve found , we can find the conversion matrix H with re-ordering its shape.

1. Coded
2. Result for matches\_perfect.mat:

4. The source image after a projective transformation, using the Forward Mapping transform:

5. The problems with Forward Mapping …

In out image,

6. Result for matches.mat:

The source image after a projective transformation, using the Forward Mapping transform: