

SE 461 Computer Vision – Assignment 4

Dr. Nazar Khan

Jan 21, 2015

Due Date: Monday, 26th January, 2015 before class.

1 Programming

1. **(10 marks): Recovering Best Affine Transform.** Incomplete code for recovering best affine transform is available in the file **recover_affine_transform.m**. Wherever the file contains the following line

-----ADD_CODE_HERE-----

add the missing code.

2. **(10 marks): Image Warping.** Incomplete code for warping an image using a 3×3 transformation matrix is available in the file **warp_image.m**. Wherever the file contains the following line

-----ADD_CODE_HERE-----

add the missing code.

3. **BONUS (10 marks): Homography Estimation.** Write a program to recover the homography between two corresponding point sets P1 and P2. Generate results that verify the correctness of your program.

2 Generating Results

Then run the script **get_results.m** to generate all required results for this assignment. This script does 2 things:

1. Affine Recovery
 - (a) Generate random pixel locations **P1**.
 - (b) Setup a transformation matrix **T**.
 - (c) Transform **P1** by **T** to obtain new locations **P2**.
 - (d) Recover the affine transformation **estimatedT** from only **P1** and **P2**. (If your code is correct, then the recovered transformation **estimatedT** should be the same as the original transformation **T**).
 - (e) Store **P1**, **P2**, **T** and **estimatedT** in the file **affine_transformation.mat**.
2. Warp Image
 - (a) Read in image **illusory_square.jpg** and add a small white square to it.
 - (b) Generate a $2D$ affine transform A and a $2D$ projective transform (homography) H .
 - (c) Transform the image using A and store the resulting image in **illusory_square_affine_warped.png**.
 - (d) Transform the image using H and store the resulting image in **illusory_square_projective_warped.png**.

Submission

This assignment is to be done in groups of 3 students each. **It is highly recommended that you try this assignment individually at first and then combine your results.** Email your assignment to the TA Nausheen Qaiser at **phdcsf13m005@pucit.edu.pk** as a .zip file with the naming convention

`RollNumber1_RollNumber2_RollNumber3_YourName_Assignment4.zip`

For example, if roll numbers of your group members are BSEF11M997, BSEF11M998 and BSEF11M999, then the .zip file should be named

`BSEF11M997_BSEF11M998_BSEF11M999_Assignment4.zip`

The .zip file should contain

- completed **recover_affine_transform.m**
- completed **warp_image.m**

and the result files

- **affine_transformation.mat**,
- **illusory_square_affine_warped.png**, and
- **illusory_square_projective_warped.png**.

Please follow naming conventions. If conventions are not followed, you will not receive any credit.