

ITE4052 Computer Vision (Spring 2024)

Programming Assignment 1

- Deadline: **April 18th 11:59 PM.**
- Submit the **Matlab code** and a **report** summarizing the results (pdf or docx) **on the LMS.**
- You can use either English or Korean for the report.
- Late submission will get the **half score.**
- If you use ChatGPT, you can be caught for a plagiarism (immediate F). Don't use it.

1. Projective Image Transformation [1pt]

Load an image with the `imread("peppers.png")`. Implement the 2D projective transform given a 3X3 transformation matrix using `imwarp()` and `projective2d()` functions. By changing the transformation matrix, perform a (1) Scaling, (2) Rotation, (3) Similarity transform, (4) Affine transform, and (5) Projective transform with your own parameters. Use `image()` function to show the results on your own image. Indicate what transformation matrices you used in your report. Finally, for your own image, repeat the whole process again.

2. Color Space [3pt]

For an example image from `imread("peppers.png")`, (1) display color components R, G, and B, respectively. Also, transform color coordinates RGB to YCbCr and HSI, respectively. Display each component of the (2) YCbCr coordinates, and each component of the (3) HSI coordinates, respectively. Instead of using Matlab functions, implement the color transformation by your self using the formulations in the lecture slides (Also, refer to the formulations in [1, 2]). If you use Matlab function such as `rgb2hsv()`, the result will be different, so don't use them. Display each component of the HSI coordinates, and each component of the YCbCr coordinates, respectively. From the displayed results, compare the characteristics of the coordinates HSI, YCbCr, and RGB. Moreover, show (4) the modified images in the RGB space by manipulating each component of the HSI coordinates. Finally, for your own image, repeat the whole process again.

[1] https://en.wikipedia.org/wiki/HSL_and_HSV

[2] <https://en.wikipedia.org/wiki/YCbCr>