

CS 4391 Introduction to Computer Vision

Homework 3

Professor Yu Xiang

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Download the [homework3_programming.zip](#) file from eLearning, Assignments, Homework 3. Finish the following programming problems and submit your scripts to eLearning. You can zip all the data and files for submission. Our TA will run your scripts to verify them.

Install the Python packages needed by

- `pip install -r requirement.txt`

Here are some useful resources:

- Python basics <https://pythonbasics.org/>
- Numpy <https://numpy.org/doc/stable/user/basics.html>
- OpenCV https://docs.opencv.org/4.x/d6/d00/tutorial_py_root.html

Problem 1

(5 points) SIFT feature matching.

Implement the `sift_matching()` function in `sift_matching.py`. This script first extracts the SIFT keypoints and descriptors from two images with OpenCV. Then it calls the `sift_matching()` function to match the detected SIFT keypoints from the two images.

After your implementation, run the `sift_matching.py` in Python to verify it. Figure 1 shows an example of running the script.

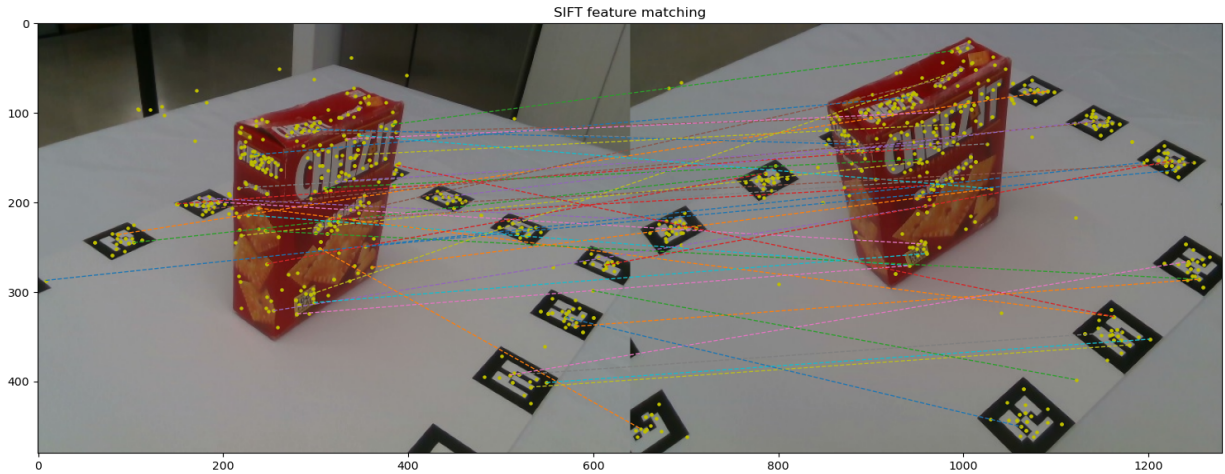


Figure 1: SIFT feature matching between two images. The yellow dots indicate the detected SIFT keypoints and the lines show the matching.

Problem 2

(5 points) 2D Transformations.

Implement the `transform()` function in `image_transformations.py`. The function takes an image and a 2D transformation T , a 3×3 matrix, as input, and outputs a transformed image according to the transformation T .

After your implementation, run the `image_transformations.py` in Python to verify it. Figure 2 shows an example of running the script.

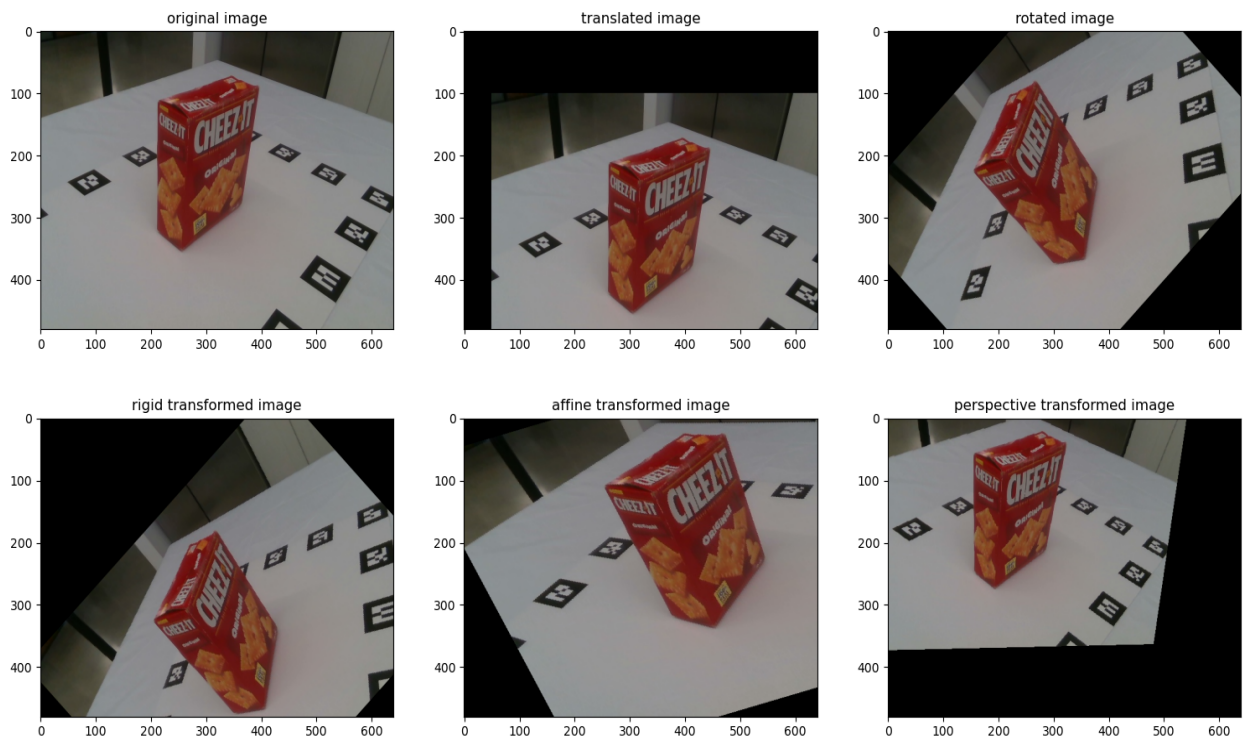


Figure 2: Image transformations.