CS 6384: Computer Vision Homework 3

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Download the homework3_programming.zip file from eLearning, Course Homepage, 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

(3 points) Harris Corner Detector.

Implement the harris_corner() function and the non_maximum_suppression() function in harris_corner.py. The script implements the Harris corner detection algorithm. Follow the steps in the script to implement it.

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

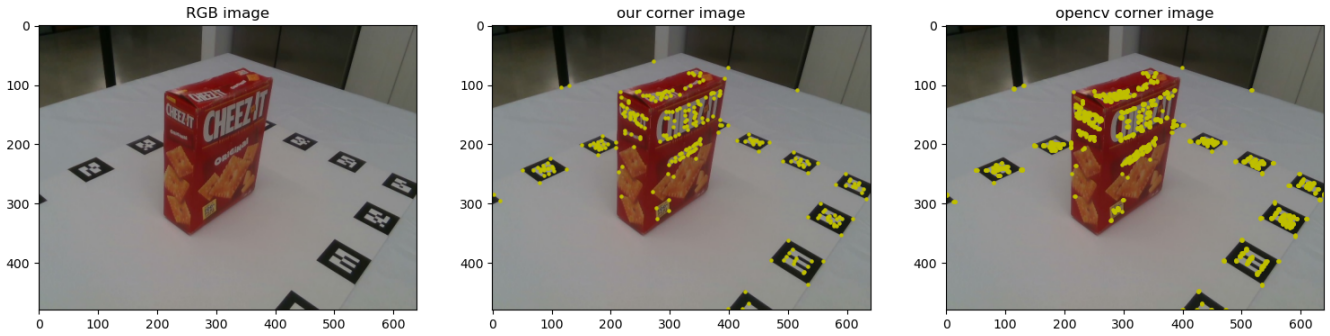

Figure 1: (Left) An input image. (Middle) Harris corner detection with our implementation. (Right) Harris corner detection using the provided function in OpenCV. The yellow dots indicate the detected corners.

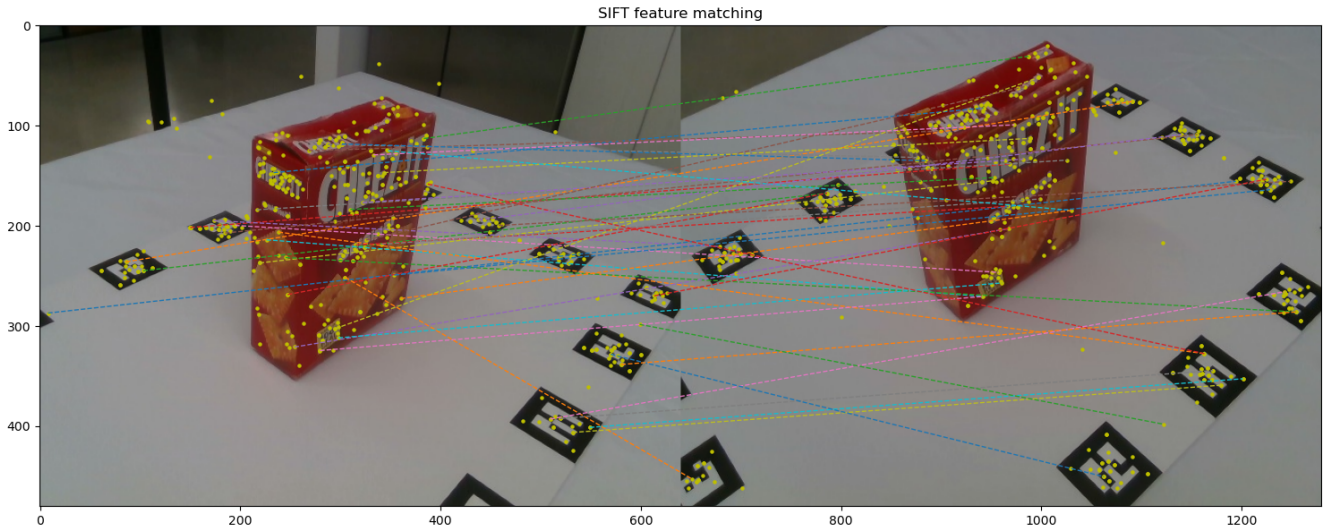

Figure 2: : SIFT feature matching between two images. The yellow dots indicate the detected SIFT keypoints and the lines show the matching.

Problem 2

(3 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 2 shows an example of running the script.