CENG 391 Introduction to Image Understanding

7 December, 2016

Homework 4

Due Date: 20 December 2016, 23:55

Programming Assignment — Object Detection with RANSAC and keypoints

In this assignment, you should write C++/Python code for object detection with keypoints by using RANSAC algorithm.

1. Read two given input images.
2. Determine keypoint detector and descriptor extractor algorithm.(ORB or SIFT)
   — **Hint:** Use detectAndCompute() method of OpenCV.
3. As a first, detect keypoints and compute their descriptors in both images.
4. Find correspondences between images based on descriptors by assigning the nearest neighbour as a correspondence.
5. Implement RANSAC algorithm manually which is explained in LAB-9 (Step[3-10]) and find the homography and its inliers.
6. Then with these inliers, by applying normalized Direct Linear Transform(DLT) estimate homography again and update the inliers.

7. Run step 6 until the number of inliers converges.

8. Transform corners of the object to the second image by converged homography and draw red rectangle that belongs to transformed corners and save the output image as "object_detection.png".