CS 282
Programming Assignment 2 (Image Stitching)

Instructor: Pros Naval

Individual Submissions
Due: May 1, 2015

In this Programming Assignment, you are expected to write some OpenCV code for stitching together pairs of images. You will be working on the pair of images found in the folder named `imgpairs`.

Instructions

1. Load images `tower_left.jpg` and `tower_right.jpg` and convert to double and to grayscale.
2. Detect feature points in both images using a Harris Detector.
3. Extract fixed-size patches around every keypoint in both images, and form descriptors simply by "flattening" the pixel values in each patch to one-dimensional vectors. Experiment with different patch sizes to see which one works best.
4. Compute the Euclidean distances between every descriptor in one image and every descriptor in the other image.
5. Select the putative matches based on the matrix of pairwise descriptor distances obtained above. You can select all pairs whose descriptor distances are below a specified threshold, or select the top few hundred descriptor pairs with the smallest pairwise distances.
6. Run RANSAC to estimate (1) an affine transformation and (2) a homography mapping one image onto the other. For each transformation, report the inlier number and the average residual (squared distance between the point coordinates in one image and the transformed coordinates of the matching point in the other image). Also, display the locations of inlier matches in both images.
7. Warp one image onto the other using the estimated transformation.
8. Create a new image big enough to hold the panorama and composite the two images into it. You can composite by simply averaging the pixel values where the two images overlap. Write the composite image to a file called `stitched_output.jpg`.

Deliverables

- OpenCV source codes with comments
- Documentation
- Stitched Image `stitched_output.jpg`

The deadline for submission is **May 1, 2015**. Email source codes to `submit2pcnaval@gmail.com` with "[CS282: PA2 Submission] Your Name " on the subject line.