Computer Vision Assignment 4

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1 Image Alignment

We first performed the David Lowes SIFT from the Andrea Verdaldi implementation. This gave us the list of matches from which we chose 3 to perform RANSAC. 3 points are the minimum required number of matches one would need to transform a plane. We also increased the threshold for uniqueness in the `vl_ubcmatch(da, db, 3)` method. This variable determines that a match is only a match if it doesn't match with anything else too much. A descriptor is only matched to another descriptor if the distance multiplied by the threshold is smaller than the distance of descriptor 1 to all other descriptors. This results in more accurate descriptors but it also decreased the total amount of descriptors.

Usually a good match is found within 5 iterations if the uniqueness threshold is set to 3, if the threshold value is unchanged (1.5 by default) it will find a good match within 10 iterations.

figure 1, 2 and 3 show the results.

In this assignment we used the built-in image transform function. In the second assignment (stitching) we implemented our own to be able to compare the two methods. In our implementation some black dots appear, this is probably because the rounding doesn't work perfectly.

2 Image Stitching

In order to stitch an image to another we used the best transformation and projected the pixels of image 2 on image 1. This results in a stitched image shown in figure 4. To stitch the images together we first created an image which consisted of the first image, with on the right side a square of the same size filled with black pixels. Next, we transformed each pixel in the original image using our best transformation parameters. This was simply done by using the transformed pixel coordinates to copy the pixel in the previously created image.

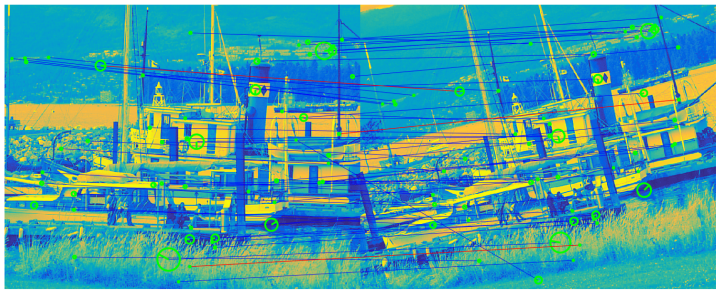

Figure 1: Blue: 50 matches Red: best matches to create best transformation parameters

Figure 2: Transformation 1

Figure 3: Transformation 2

Figure 4: The stitched image