Hoang Ho
CSE 4310-001 Fundamentals of Computer Vision
Assignment 2 – 3.4 Testing
Due March 11, 2022, by 11:59 PM

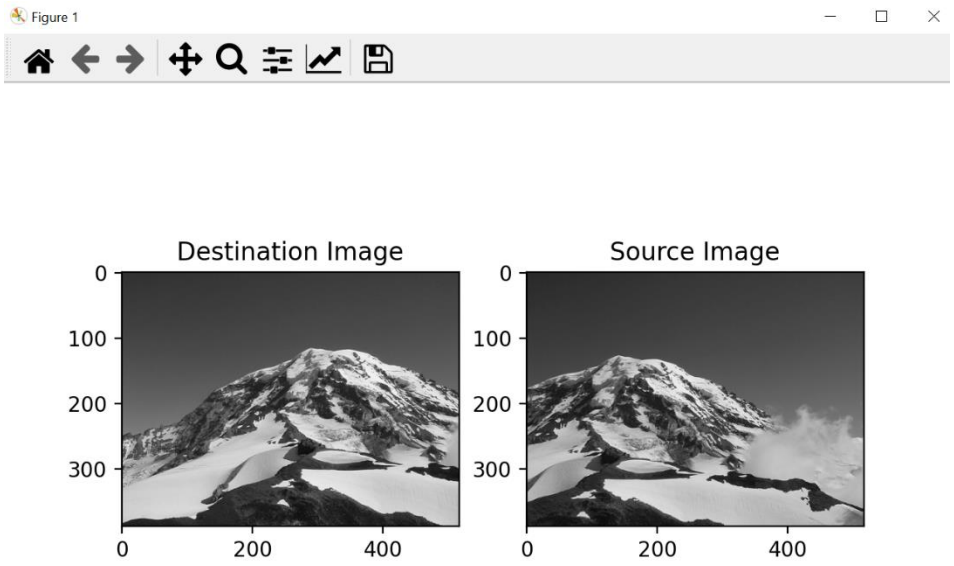
3.4 Testing Report

This report shows some of the samples I tried for two sets of images and their outcomes for my implementations for Assignment 2. The images I used are from the a2_images.zip

Image Set 1

For the following samples, I used the Rainier1.png and Rainier2.png files.

When the images are first loaded up, they are converted into a grayscale image and displayed.



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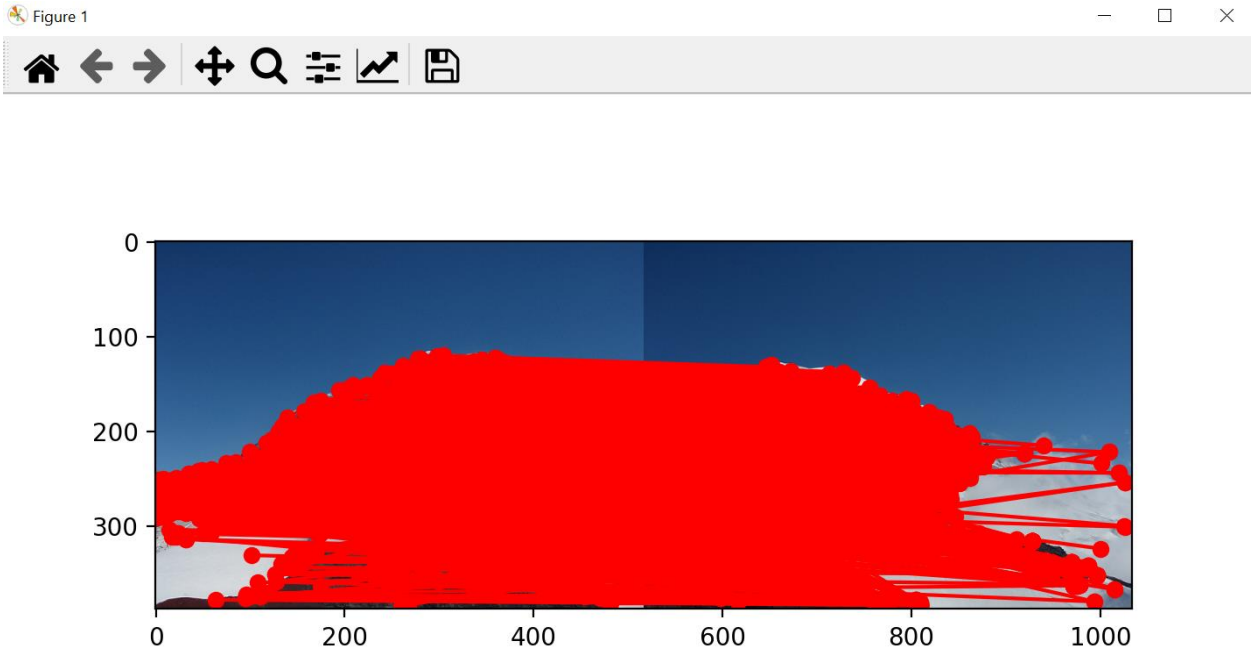
Before running RANSAC, these are all the matching key points found with the destination image being on the left and the source image being on the right. This is essentially all the feature key points detected with SIFT matched with all the feature key points detected for the other image. The matching function implement uses a brute force approach by finding the lowest Euclidean distances for the feature descriptors.



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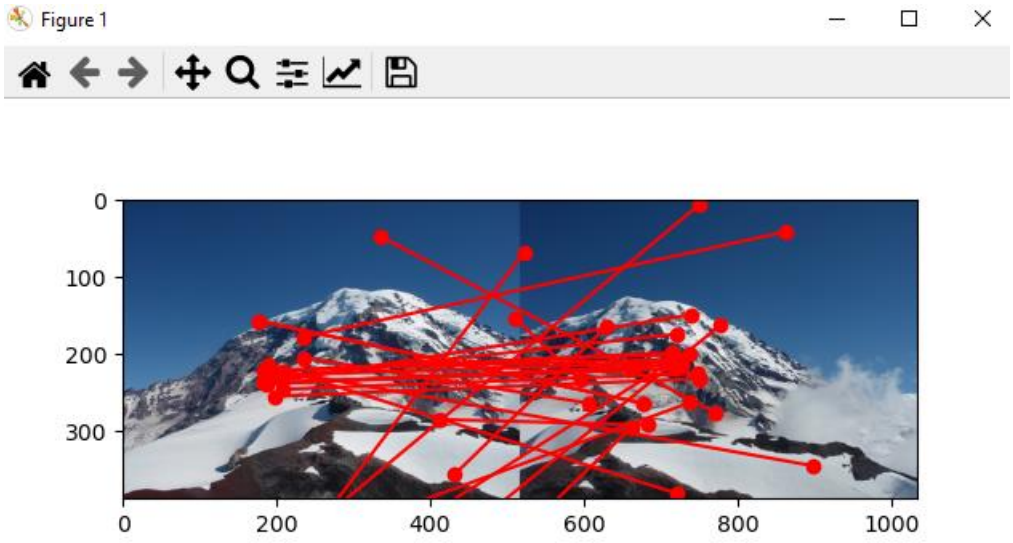
Using an affine model, the RANSAC function returns with these matching key points as the best fit as plotted:



The RANSAC function here was ran with the parameters:

- Matching key points for the destination image and source image as found by the match function
- Estimate affine matrix function (compute_affine_transform)
- 5 iterations
- 3 minimum samples
- A threshold boundary of 8
- d = 10 where d is the number of close data points that are required to assess that a model fits well to the data

This output appears to have many outliers and matching points that are not good or do not make sense. This may be due to the threshold boundary being a high number value, and only 5 iterations of the RANSAC loop.

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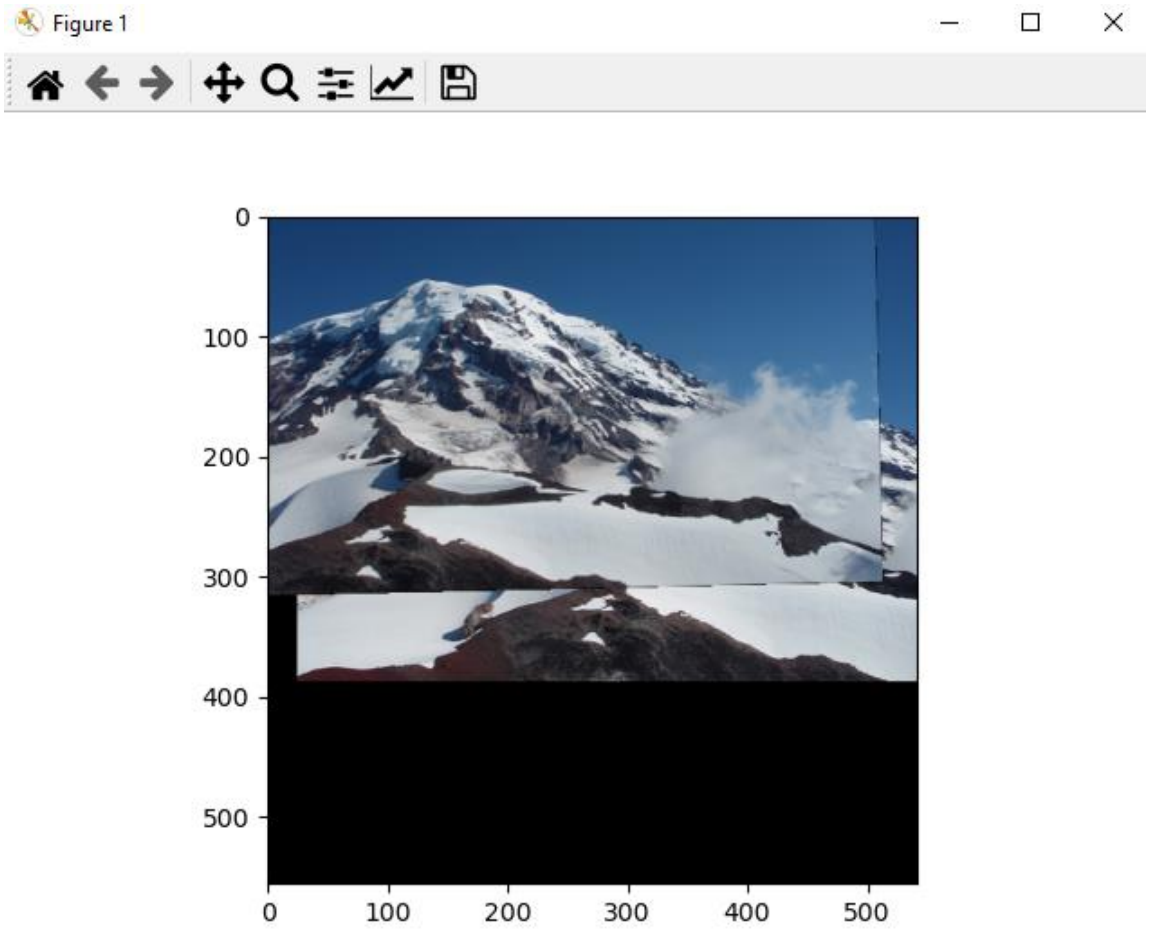
The output image stitch is shown like so after the RANSAC function was ran:



The stitching is a bit inaccurate, but major features such as the peak are pretty aligned with the destination image.

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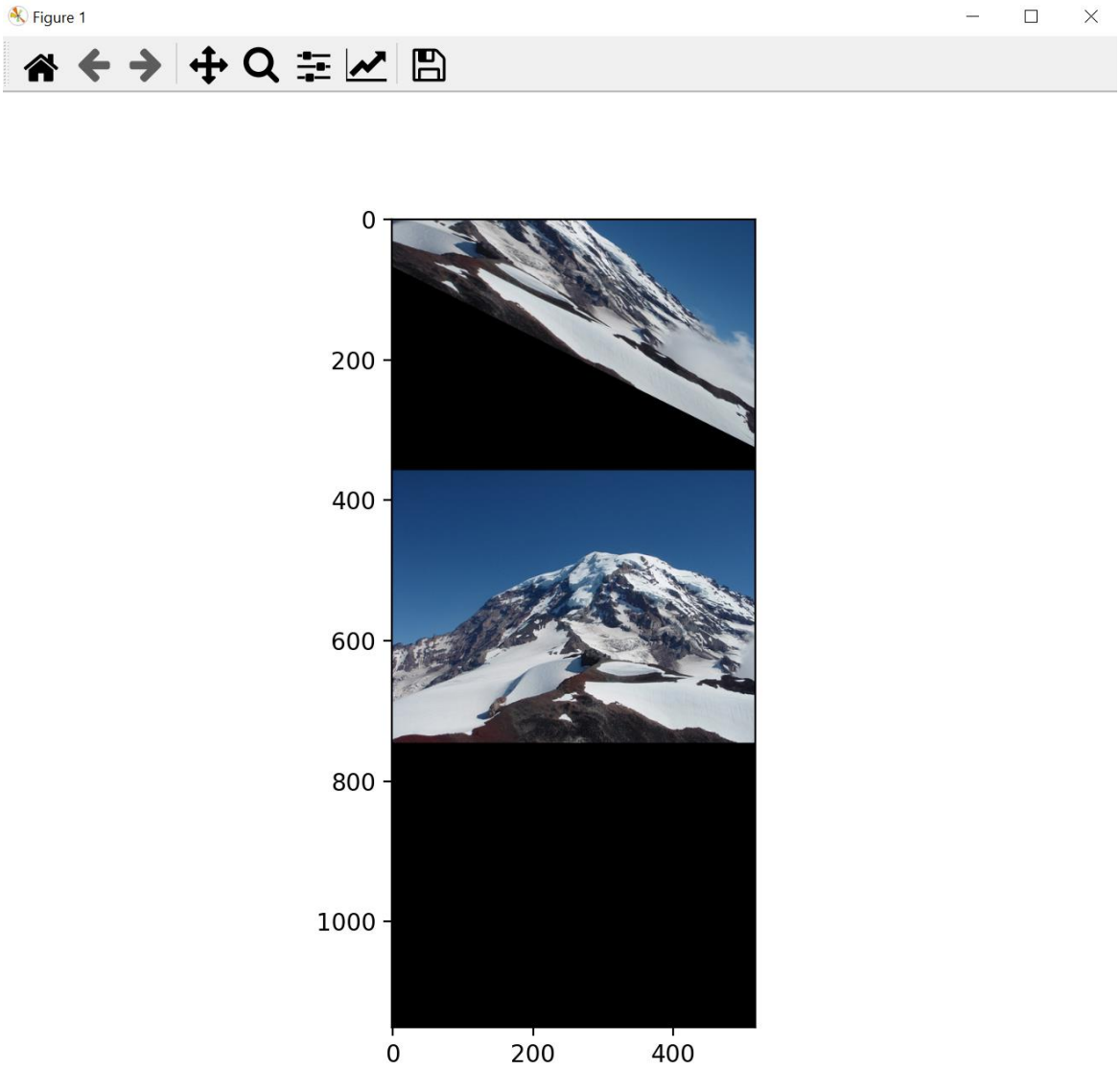
In a different instance of running RANSAC with the same parameters and images, the image stitching resulted in this:



Here the images did not stitch well at all, the random samples chosen may have been largely bad points.

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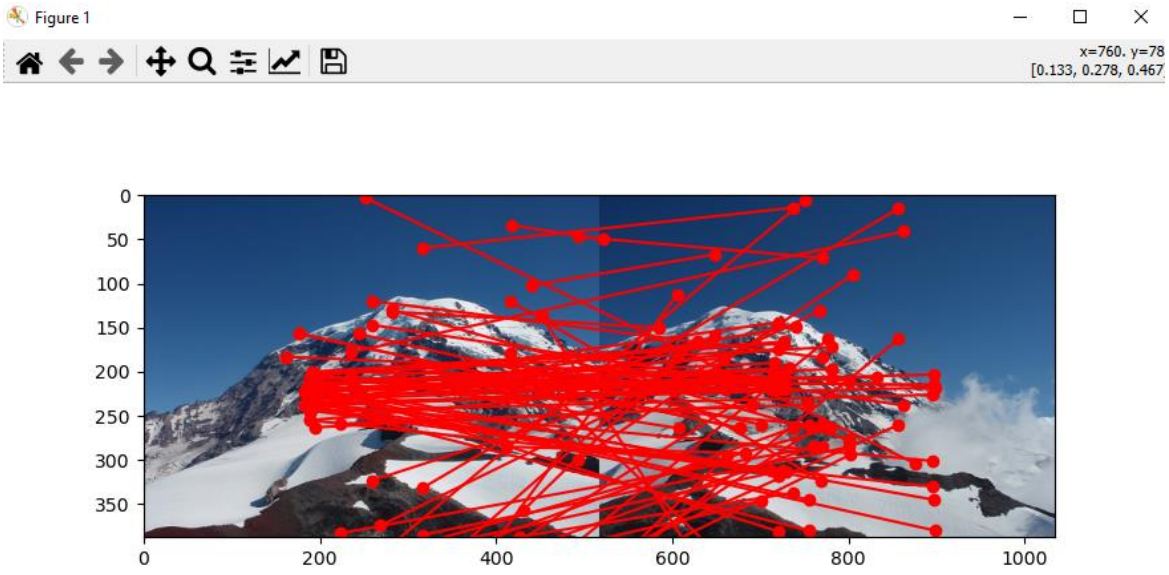
The RANSAC function was ran again using the same images and parameters, except a projective transform model was used instead of affine and the minimum number of samples was set to be 4. A best fit model was not found. In this case, random samples chosen may have largely been bad points.

In another trial of using the projective model, the number of iterations of the loop in RANSAC to find the best fit is increased to 100 and the d is changed to 40. The outcomes are shown below:



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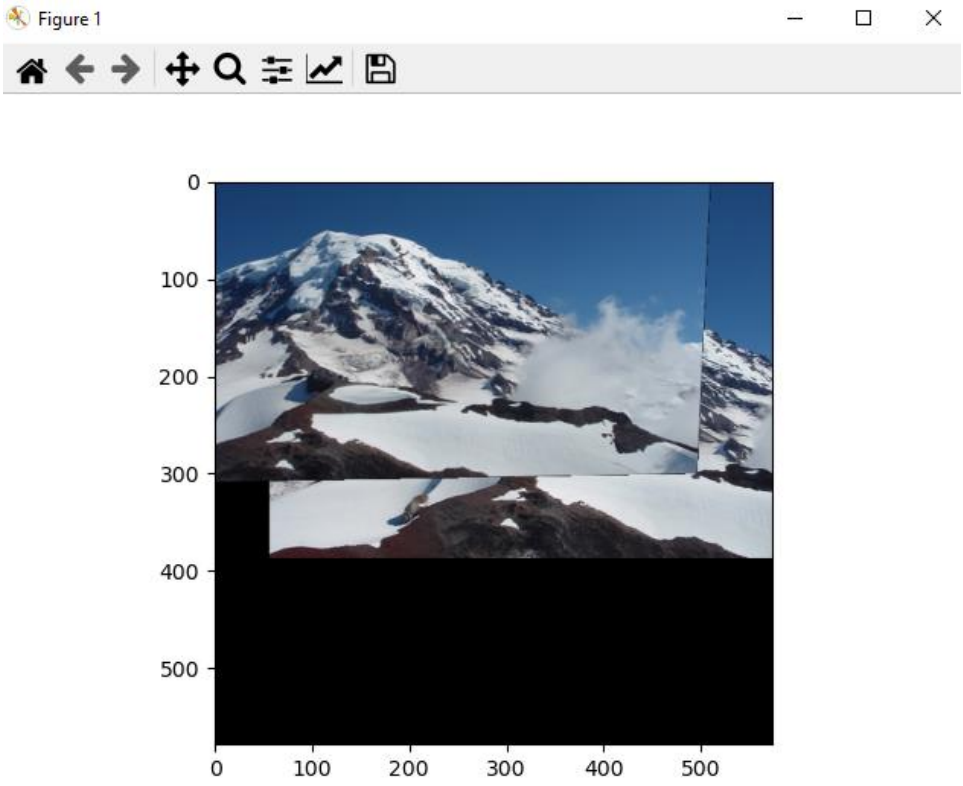

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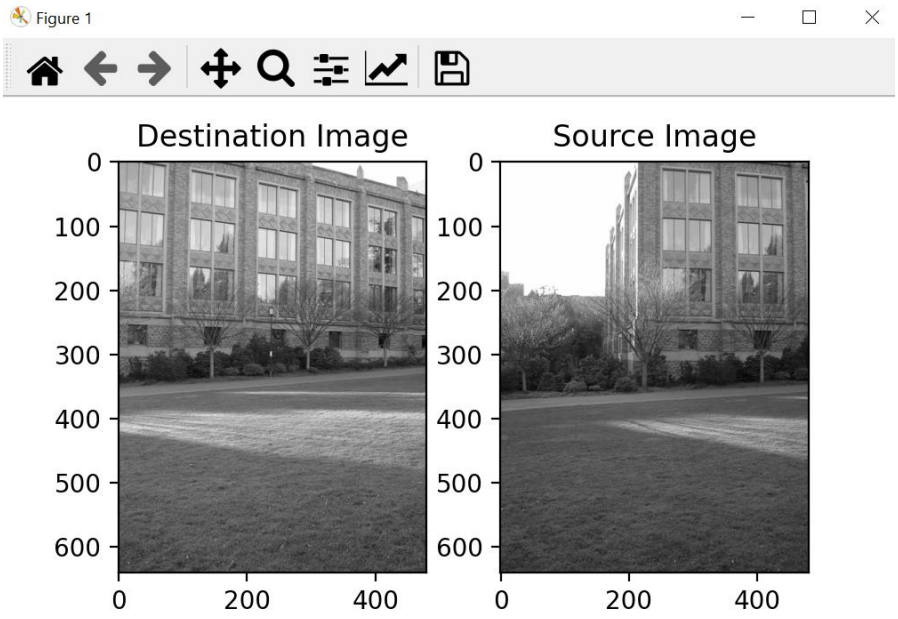
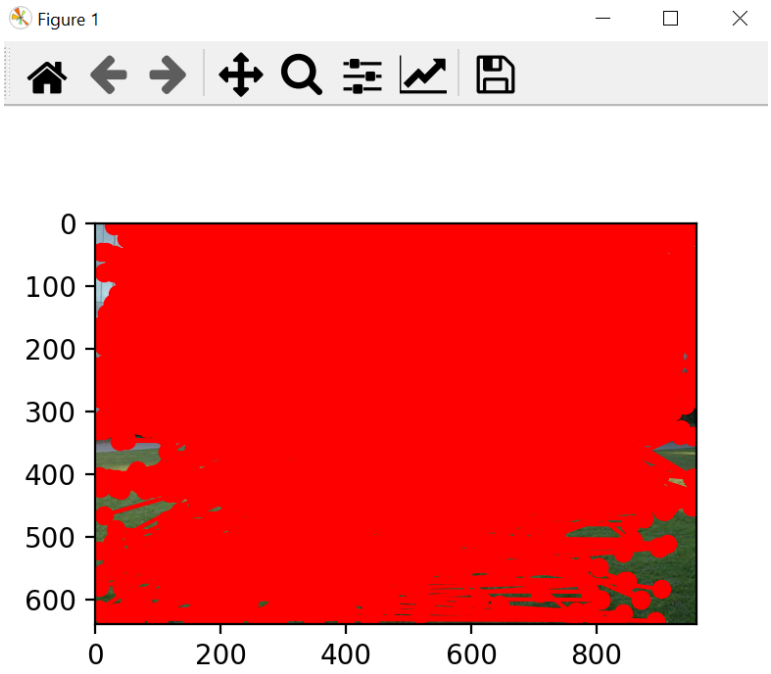
Image Set 2

For the following samples, I used campus_000.jpg and campus_001.jpg files.



Key point matches before RANSAC:



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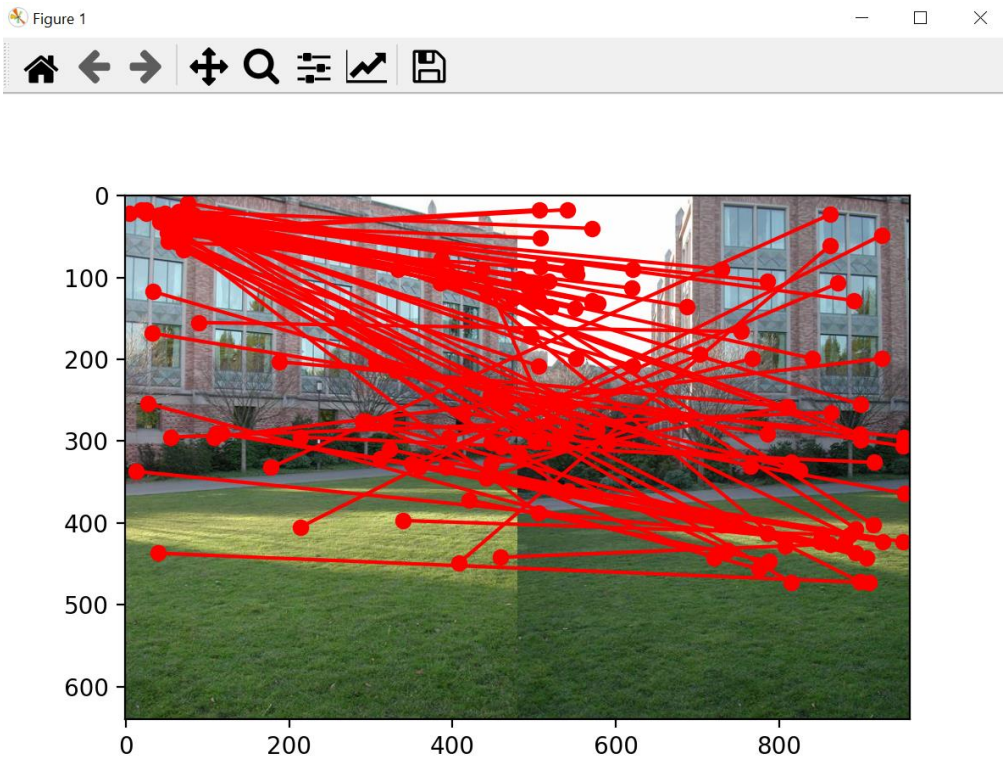
Parameters used for RANSAC function for an affine transform model:

- Matching key points for the destination image and source image as found by the match function
- Estimate affine matrix function (compute_affine_transform)
- Iterations = 300
- Minimum samples = 3
- Threshold boundary = 1 (a stricter threshold than samples using image set 1)
- d = 40

Output after RANSAC with an affine model:



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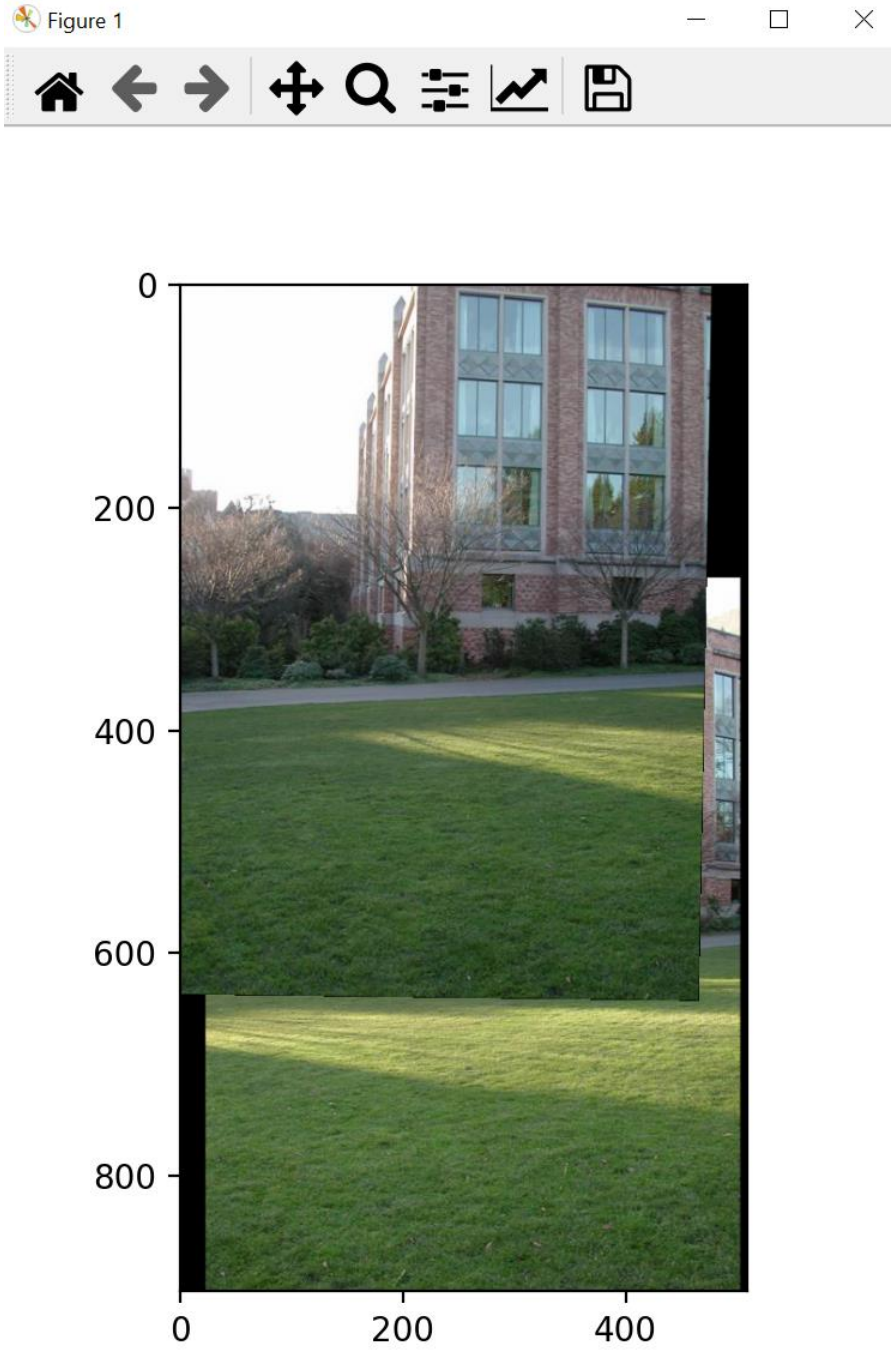

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Parameters used for RANSAC function for a projective transform model:

- Matching key points for the destination image and source image as found by the match function
- Estimate projective matrix function (compute_projective_transform)
- Iterations = 300
- Minimum samples = 4
- Threshold boundary = 1
- d = 40

Output after RANSAC with a projective model:

A best fit was not found.

For another trial with the projective transform model, the threshold boundary was changed to 8.

Output:

A best fit was not found.