

Programming Assignment 1

In this assignment, we were asked to stitch a series of images to create a panorama. In order to do so, various algorithms were implemented with the help of open cv libraries. These are the basic steps to stitch multiple images together:

1. Sort the images to line from left to right and resize them for consistency.
2. Apply SIFT to detect keypoints and features.
3. Find the homogeneous matrix by matching the keypoints using the minimum distance between points.
4. Run RANSAC routine for outlier filtering.
5. Apply the homogeneous matrix with necessary transformation to perspective warp the train image to query image.
6. Trim/adjust the size of the image if required.

In addition to these steps, for optimization, the reference image (the image that is not warped) is chosen to be the center image. For left images from the center, they are stitched on the left side of the reference image and for right images on the right side. Two separate functions are used for these two sides to find the homogeneous matrix transformations.

Here is the final image of panorama using image sets personally taken:



The image set contains 10 images lined from left to right.

References:

<https://www.youtube.com/@firstprinciplesofcomputerv3258>

<https://kushalvyas.github.io/stitching.html>

<https://www.youtube.com/watch?v=ToldvnUtBh0>

<https://www.youtube.com/watch?v=uMABRY8QPe0>