CSE 573: Project 2 Image Stitching

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1. Objective

The main objective of this project was to experiment with image stitching methods. Given a set of photos (max of 3), I had to program to be able to stitch them into a panoramic photos.There were no restrictions imposed on the method that I could choose to stitch photos into a panoramic photo.

2. Problem Statement

Given a Folder Path as input, we had to fetch the images from the given source folder and stitch them together to form a Panorama. We were also informed that the folder can have maximum of three images. Stitching two images and three images are quite different. So I developed two ALgorithms one for Stitching two Images and another for Stitching three Images, which are as follows.

3. Algorithm

3.1 Stitch two Images

(Given two Images img1 and img2)

Procedure:

1. Compute the Gaussian Pyramid of img1 and img2 and compute their difference
2. Compute Key Point and descriptors using Brief features
3. Match the corresponding descriptor
4. Find the best fit Homography matrix for the two Images using RANSAC method
5. Stitch the Two Images together without clipping by finding the warp perspective with help of the Homography Matrix
6. Write the resultant image to the desired folder as panorama.jpg
7. stop

3.2 Stitch Three Images

Procedure(Given Three Images img1, img2 and img 3):

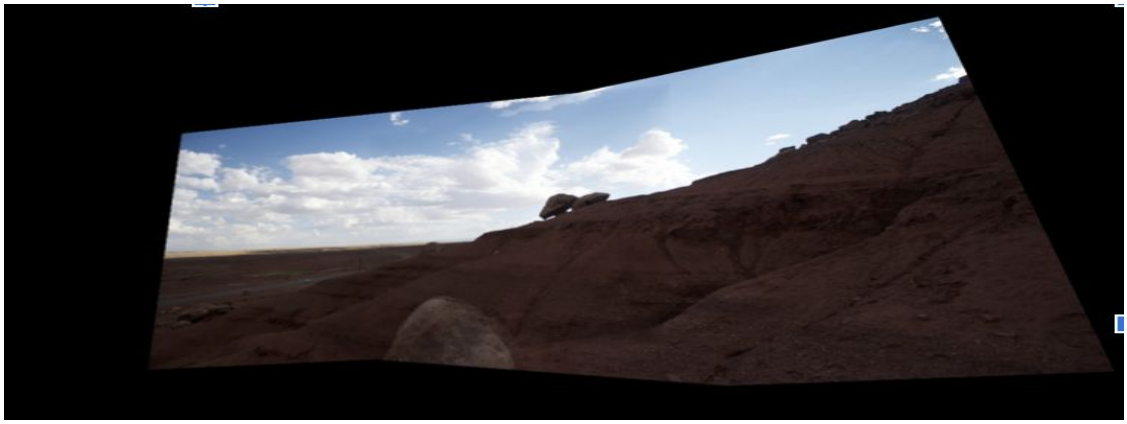
1. Follow Steps 1-5 from above to find the Homography matrix between img1 and img2, Homo_12.
2. Similarly, Homography between img2 and img3, call it Homo_23
3. Stitch img2 and img3 using Homo_23, call it pano23
4. Compute Homography Composition of Homo_12 and Homo_23, call it Homo_123
5. Use Homo_123 to warp img1, call it warpedImg
6. Stitch the warpedImg with Pano23
7. Write the result to the desired folder as panorama.jpg

4. Results

4.1.1 Three Image Stitch Example



4.1.2 Output - Nevada



4.2.1 Two Image Stitch Example (BONUS - UB Data)(HSL Library)

4.2.2 Output

Inference

Clearly, the algorithm stitches two images better than three images. Also when the two images are facing the object from the same angle, like the above example, it performs a really good job. Future goals for the project could be to improvise three image stitch.