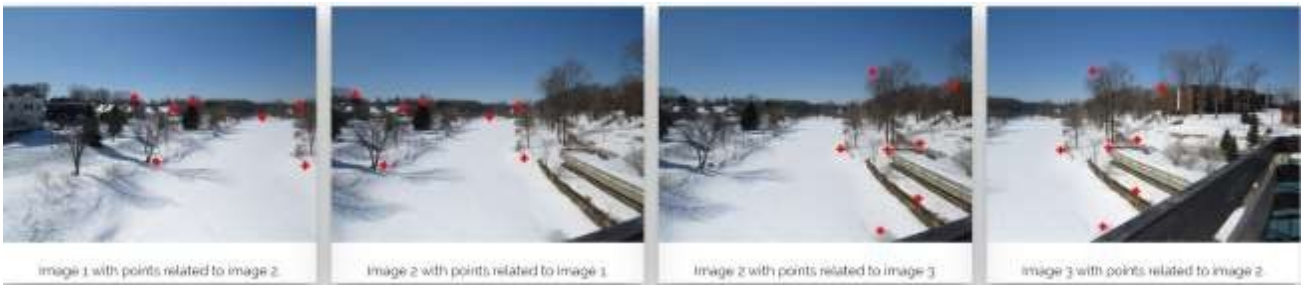
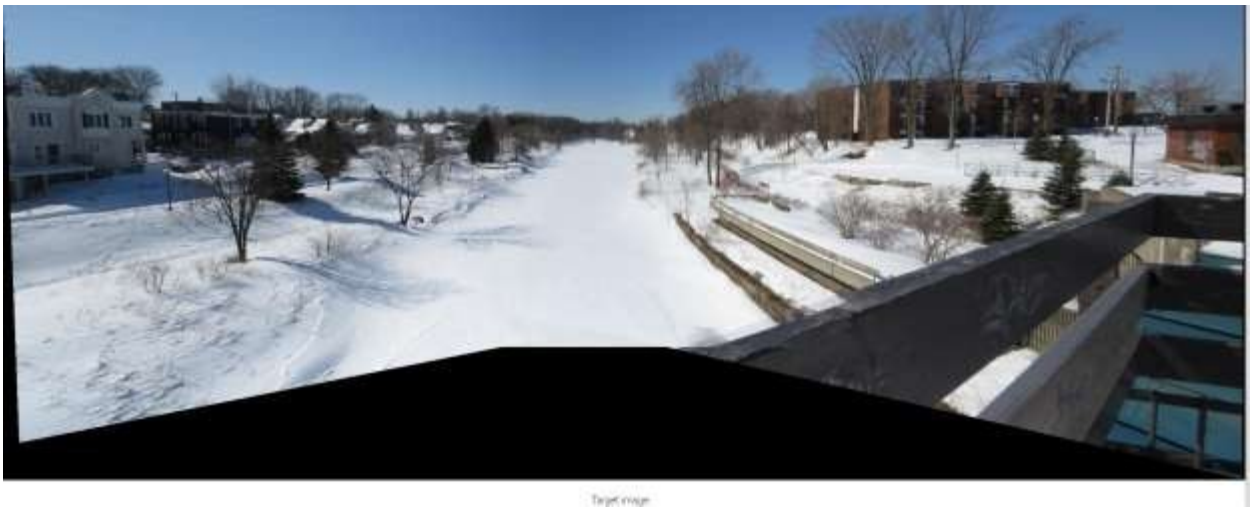
Assignment 6 : Stitching Images & Depth Estimation

Submission Date: November 21, 2024

In this assignment, you will implement code that will automatically stitch pairs of images . A popular application for image stitching is creation of panoramas. Generally speaking, there are two classes of methods for image stitching, direct methods and feature-based methods. An example of direct methods is Szeliski and Shum's SIGGRAPH 1997 paper. Brown and Lowe's ICCV2003 paper, Recognising Panoramas, is a cool example for feature-based methods.





How to do?

First capture a few images by rotating your mobile camera, such that there exist some scene overlapping.

Manual Method [20] marks

1. Apply Harris cornor or SIFT to extract feature points
2. Manually select some feature points on each image.
3. Find the homography matrix that align each pair of neighbor pictures.
4. Transform the source image so as to be in the same projective space as the target image.
5. Stitch images by taking the target image and placing it in the location given by the multiplication inverse of the homography matrix.

Automatic Method [10 marks]

1. Apply Harris cornor or SIFT to extract feature points
2. Match feature points to find their correspondences.
3. Find the homography matrix that align each pair of neighbor pictures.
4. Transform the source image so as to be in the same projective space as the target image.
5. Stitch images by taking the target image and placing it in the location given by the multiplication inverse of the homography matrix.

Q2. Depth Estimation

a. Take two images in epipolar view of your previous assignment. Rectifiy the images using cv.stereoRectifyUncalibrated lib function . Show slanted epipolar line ans parallel epipolar lines .
b. Estimate depth maps of the two images
c. Use multiple images of a scene to set a complete 3d depth models