

HW3

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October 26, 2024

Matlab code:

https://github.com/lixit/CV_3D/tree/main/HW3

This report online:

<https://www.overleaf.com/read/tbxxyrvfqdtk#99abcf>

Question 1. Obtain an image sequence

Solution. I use my phone to capture the image sequence.

I tried to capture the room with arm stretched. That didn't work. Then I keep the phone center fixed, and rotate the phone to capture the scene far away. It works pretty good. I guess the focal length of my phone is very short so I can just rotate the phone to keep camera center fixed.

□

Question 2. feature point correspondence

Solution. I use Speeded Up Robust Features (SURF) rather than Scale-Invariant Feature Transform (SIFT) to speed up the feature detection.

I use RANSAC with 'Confidence' = 99.9 and 'MaxDistance' = 320 to remove the outliers.

□

Question 3. compute the infinite homography

I implemented a normalized version of the DLT algorithm. Normalizing the coordinates by function normalize_points() before apply DLT algorithm. Then make a correction to the result.

Problem 4. Warp each image

I use imwrap to wrap each images to the panoramaView and AlphaBlender to combine two images.

Problem 5. panoramic image

To calculate the final panoramic image size. I first use outputLimits to calculate the min max coordinates of all transformed images. Then I can create a 2-D spatial reference object defining the size of the panorama. Thus all transformed images can be inside this panorama

Result 1.



Figure 1: mov2_all

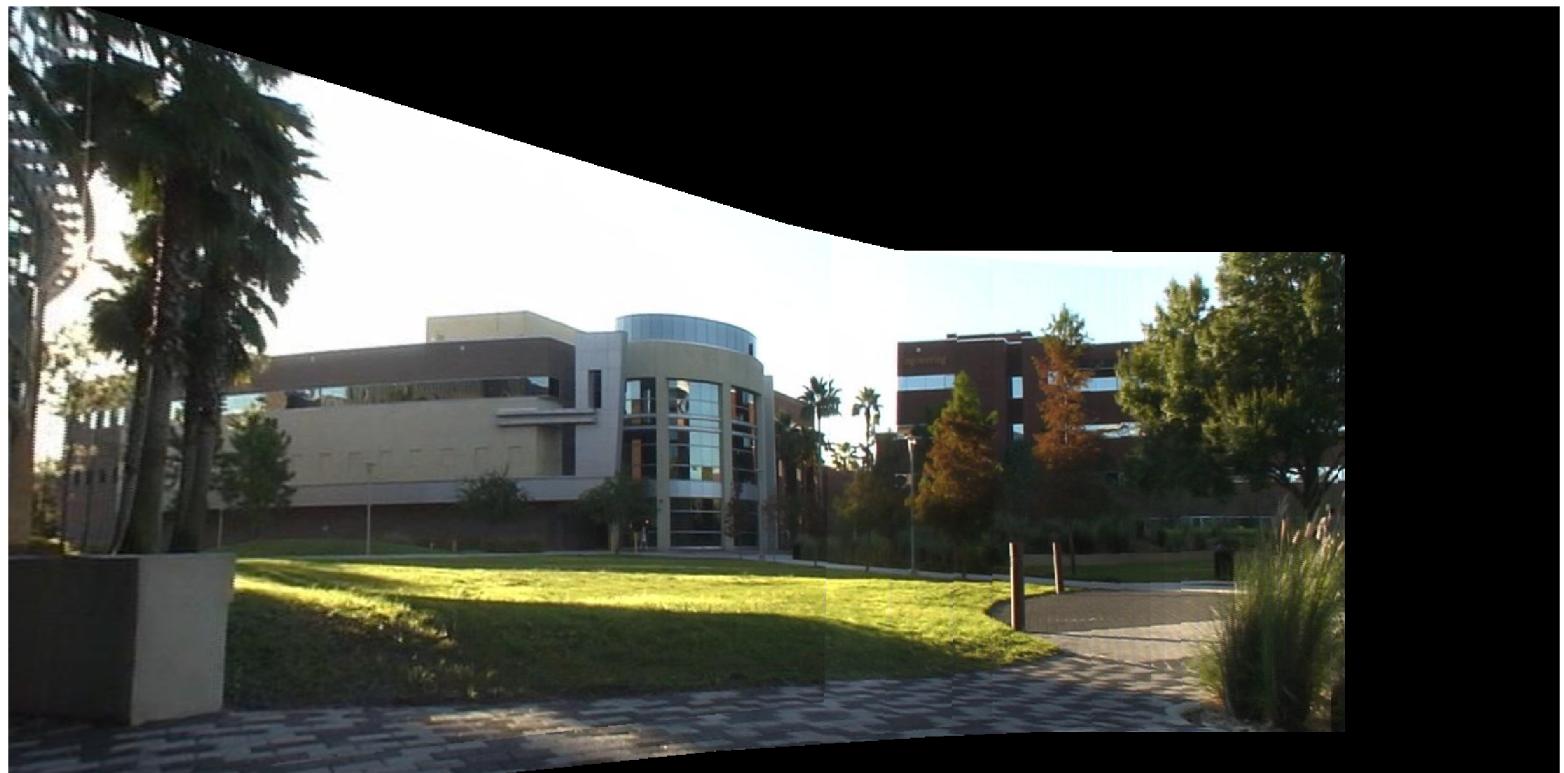


Figure 2: mov2_result.png



Figure 3: mov3_all

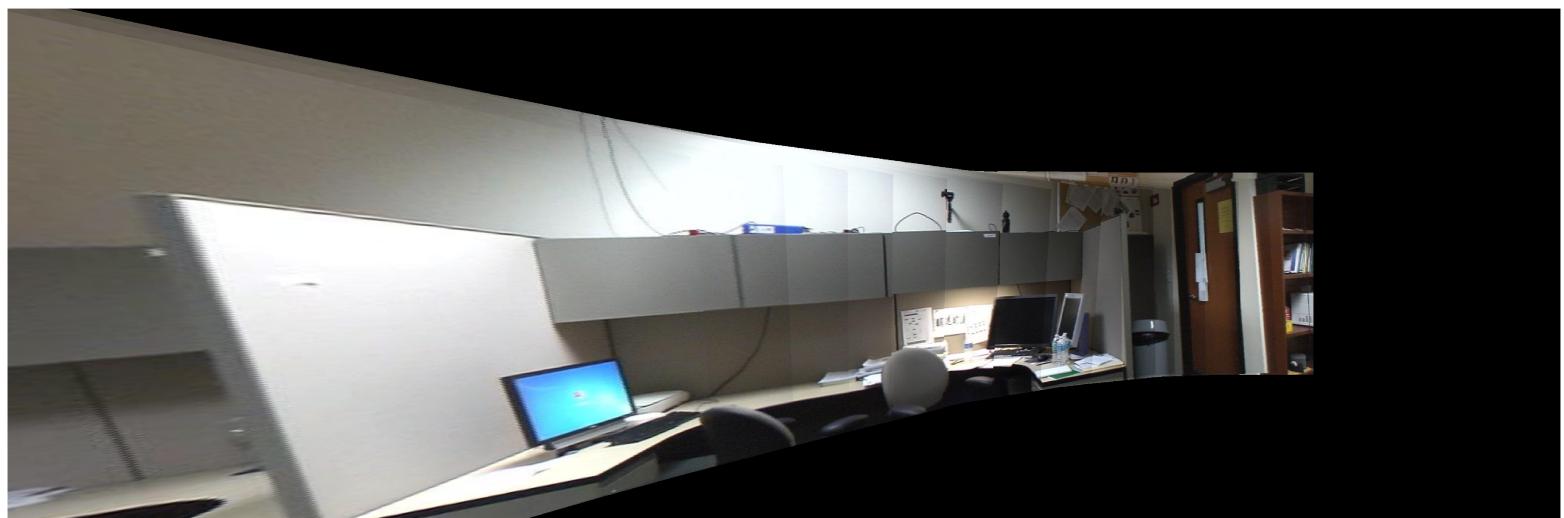


Figure 4: mov3_result.png



Figure 5: ultra_all



Figure 6: ultra_result.png



Figure 7: Example matched points