Assignment 2 - Stitch Panorama

COL-780 Computer Vision

1 Problem Statement:

To generate a panoramic image by stitching together multiple images of a scene.

Example:

Figure 1: Input Images

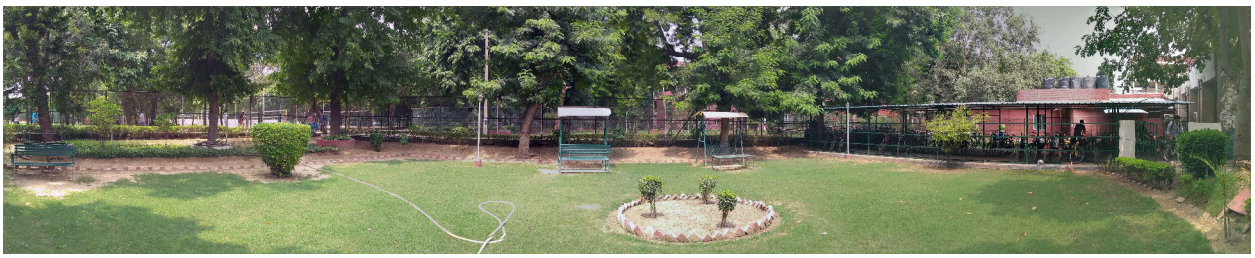

Figure 2: Output Image

2 Task:

2.1 Extracting Feature Points

- You may use any descriptor of your choice available in OpenCV.

2.2 Homography Estimation

- Compute the pair-wise image transformation matrix by applying RANSAC on the set of extracted feature points.
- Develop some notion for scoring mechanism to choose which transformation pairs to consider for the panorama construction.

2.3 Stitch and Blend images

- With the obtained transformations, first, estimate the size of the overall picture that would be formed upon stitching.
- For estimating the pixel values in regions where multiple images are superimposed, apply a blending technique of your choice. For a start, check out Alpha blending, Laplacian Pyramid Blending, 2-band blending, Graph cut blending.

2.4 Report

- Include a brief description of the approach followed.
- Include the panoramas generated on the in-sample data set provided.
- Re-construct the in-sample panoramas with the motion model as Affine instead of Perspective transform. Comment on the difference observed.
- Click 2 image sequences like the ones provided. One in which your stitching performs very well(1) and one where it fails miserably(2). Mention the reasons you think that are responsible for this variation. Include the panoramas in the report.

3 Evaluation:

The evaluation will be based on the following:

- Correctness of the computed transformations.
- Seamless blending between images.
- Exposure balancing to reduce brightness fluctuation in the panorama.
- Performance on out-sample images.
- Report.

Extra credit:

- Remove moving objects from appearing multiple times in the stitched image. Applicable in case of sequence 4,5.
- Stitching images with vertical as well as horizontal stitch pairs. Applicable in case of sequence 5.

I/O format:

- Your implementation must accept a string as input <folder_path>which specifies the path to the folder containing the input images.
- The output image must be generated in the directory containing your code.

Submission format:

- Your submission folder will contain the following items:
  - Your main cpp/python code which will be executed with the input path argument. Name this file assignment2.cpp/assignment2.py
  - A folder named "images" containing 2 sub-folders named "1" and "2" which have your image sequences.
  - Your report.
  - Any other code files/directories necessary.
- Zip this folder with the following naming format: <EntryNumber1>_<EntryNumber2>.zip or <EntryNumber>.zip in case you're making individually.