EE 645 3D Computer Vision
Assignment 1: Panorama Stitching [10 marks]

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Due date: 15.03.2021, 11:59 PM

1 Problem Statement

You must have come across the panorama mode in your smartphones for capturing wide-angle view of a physical scene. In this assignment, you will implement the same using the principles of feature matching, RANSAC, homography matrix, warping, and blending.

Take atleast 4 color images per scene in the dataset and perform the following steps. We will provide the dataset over which you need to show the results.

1. Detect, extract, and match features (inbuilt functions allowed). [**2 marks**]

2. Estimate homography matrix between two images using RANSAC (inbuilt functions are allowed except those functions which directly estimate the homograpy). [**2.5 marks**]

3. Stitch (atleast 4) color images per scene from the dataset using the homography matrix estimated in step (2) to create a panorama (inbuilt functions are allowed except for warping and blending). [**3 marks**]

4. Stitch the images used as input in step (3) using in-built command for homography estimation and compare it with the panorama obtained in step (3). [**2.5 marks** if both the results look the same]

Note: If results obtained in step (3) are seamless (refer to the results obtained in [1] in reference section below), then full marks will be awarded. Otherwise, marks will be awarded based on how all the students in the course have performed and relative grading will be done. 1 out of 3 marks if you stitch only two images in step (3).

2 Deliverables

- You are required to submit a report as per the following requirements.

  1. Show visual results over all the images in the dataset. The one with best stitching will be considered for evaluation.

  2. Describe (briefly) your procedure, assumptions or considerations that you have included while attempting the assignment.

- The code should be written in Python. Submit a well-commented code along with a README file containing instructions to run the code.

- Avoid any sort of malpractice and adhere to the institute's code of conduct.

3   References

[1]. Brown, Matthew, and David G. Lowe. "Automatic panoramic image stitching using invariant features." International journal of computer vision 74.1 (2007): 59-73.

[2]. Hartley, Richard, and Andrew Zisserman. Multiple view geometry in computer vision. Cambridge university press, 2003.

[3]. Szeliski, R. (2007). Image alignment and stitching A tutorial in Foundations and Trends® in Computer Graphics and Vision, 2(1), 1-104. https://www.microsoft.com/en-us/research/publication/image-alignment-and-stitching-a-tutorial/