

Panorama Stitching

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This is an assignment regarding stitching multiple images (taken from different perspectives) to create a panorama. The concepts of inverse homography, warping, RANSAC and Laplacian Blending to solve the problem statement.

Flow of the Code:

1. SIFT to detect and extract features from an image.
2. The images are fed such that the middle image is taken as the main image and the rest of images are transformed according to the middle image.
3. Matching features using K nearest neighbours.
4. Finding the homography matrix i.e., the mapping from one image plane to another. This is an iterative procedure. I used RANSAC to get the best homographic matrix. Out of the matching points found using KNN, 4 random points are selected to get a homography matrix. Using the homography matrix obtained, we try transforming all the points. If the error between the transformed and current points are less than a threshold, the homography matrix is rewarded. This loop is iterated again and again. The matrix with the best score is taken to be the ideal homography matrix.
5. Warping the images using the inverse of homography matrix to ensure no distortion/blank spaces remain in the transformed image.
6. Black and white masks are made of the warped images and both masks and the images are passed through a Laplacian Blending Function. The function iterates through all the images and with help of the mask, one by one stitches all the images using Laplacian pyramid.

Assumptions:

1. Images are input such that successive images have a common intersection.

Limitations:

1. The Laplacian blending can be applied only in one direction i.e., joining images between two Laplacian pyramids can occur either in x or in y direction. This is due to the fact that the Laplacian of the images have thick white border created due to sudden gradient and thus giving unwanted outcomes.

My Submission :



