

IMAGE PROCESSING PROJECT

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1. Background Stitching:

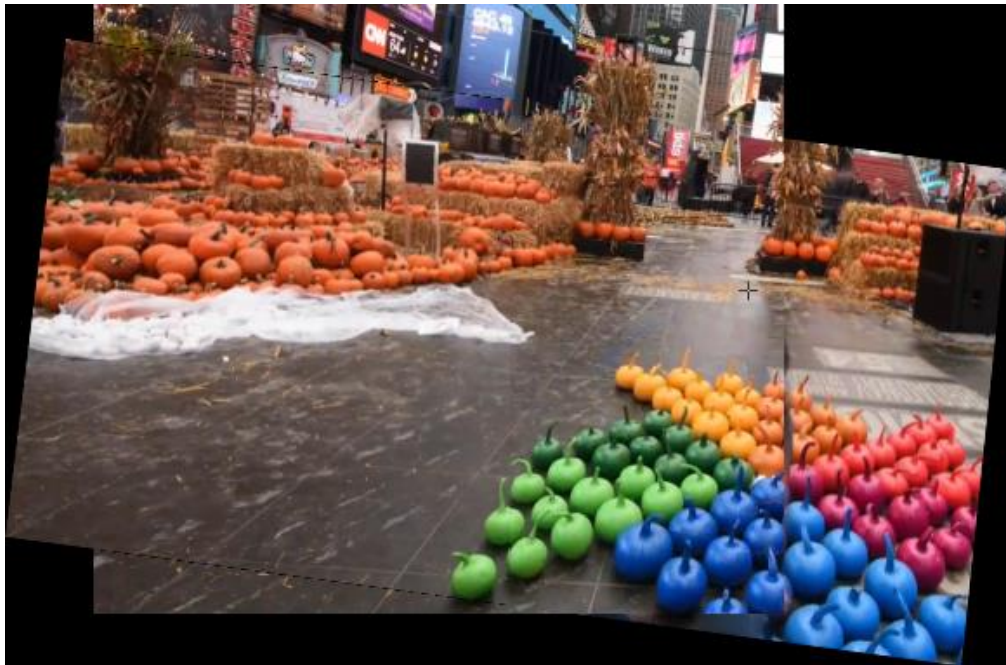
The objective of this task is to stitch together the two images shown below and remove the foreground in the process.



The first method in this task involves computing the SIFT keypoints and their descriptors for the two given images. This is done using cv2's `Sift_create` and `detectAndCompute` function. In order to compute the similarities between the keypoints of the two images, the Euclidean (L2 Norm) is calculated for each pair of keypoints and those with a value lesser than a certain threshold are considered as matching keypoints. These matching keypoints were used to compute the homography matrix using cv2's `findHomography` function with RANSAC. The homography matrix is then used to compute the warped perspective of the second image. Using the warped perspective of the second image and the original first image, the foreground area is identified as the white region showed in the image below and the background region is blended using the two images.



The pixels at these white regions are blended using the pixels from the first image or the second image based on their position to construct an image with the foreground removed as shown in the image below using padding to make sure no cropping occurs so that as much of the background is visible. The resulting image is showed below.



2. Image Panorama:

The objective of this task is to create a python script that can stitch together images and create a panorama. The first method in this task is similar to the first method in the previous task and involves identifying SIFT keypoints and their descriptors for all the images. After computing the keypoints of an image, it is then compared to the keypoints of every other image to find any possible matches. This comparison is done using the Euclidean distance (L2 norm) between the keypoints to identify whether two images should be stitched together. If two images have matching keypoints, then the homography matrix is computed using the same findHomography function as the task before. An overlap array is created based on which images have a significant number of matching keypoints. Finally, since information about images that overlap and the homography matrices are available, the final mosaic is stitched using the image with the largest overlaps as the target image. The script is run on two sets of images. The images and the resulting panoramas are shown below.

First set-





Second set –

