

Project 2 Report

Task1:

First, we register the two images to be blend. We convert the images into gray scale. Then, we extract the SIFT feature from the images described by the key points. Then the SIFT features are matched using the Euclidean distance between the features. We use Lowe's criteria to identify the match of the two features which is given by

$$\frac{\text{minimum distance}}{\text{second minimum distance}} \leq 0.8$$

After the matches of the key points, the area of the source image which matches with the area of the destination image is identified as a bounding box. Then the image transformation is carried out from the source image to the destination image to have the images agree on the scale, rotation and perspective. The foreground is then identified as the regions where, there are very less key points. That is, the foreground region has similar intensity all over it. We removed the foreground. Then, the two images are stitched. First, the unmatched portion of the first image is copied. Then, the matched part of the images are copied. Finally, the unmatched remaining part of the second image is stitched together to form a final image. This is done using *warping()*. To avoid cropping of the images while warping, translation is performed. Finally, the image is stored.

Task2:

For the panorama creation, first a list of images is taken as input. Then, for each pair of the images in the list of images, the features are extracted. We considered the SIFT features in this case too. After extracting the features, we compute the matches between the pair of the images. We identify the binding box of the matched area between the images. Let the area of the binding box is a , and the area of the source image is A , then there is a match iff, $\frac{a}{A} \geq 0.2$. Using this logic, the *Onehotarray* is created.

After the *Onehotarray* is done, then we check if there is a row in the array, where all the elements are 0. If there is such a row, then the corresponding image is not considered any further as it indicates, the image doesn't match with any any image. The with the final set of images with match, we proceed. In this set of images, we find the matched parts. Then we perform the transformation and the homography matrix. Finally iteratively we stitch all these images into a final panorama.