

**University at Buffalo**  
**Department of Computer Science and and Engineering**  
**CSE 473/573 - Computer Vision and Image Processing**

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## Image Stitching and Panorama

Image stitching or photo stitching or Panorama is the process of combining multiple photographic images with overlapping fields of view to produce a segmented panorama or high-resolution image.

### **TASK 1: Background Stitching:**

**Dataset:** We are provided with two images to be stitched and remove foreground.

**Images:**

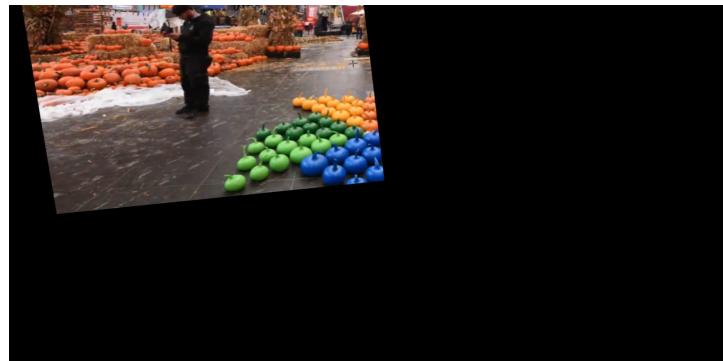


**Feature Matching:** For feature extraction we are using SIFT but for matching we are using no inbuilt function. We are doing manual matching by SSD(Sum of Square Distance). After feature extraction and matching we are finding a homography matrix.

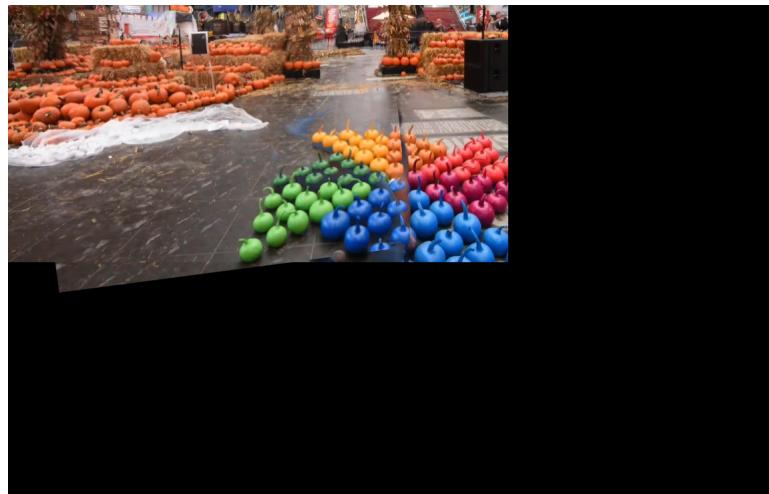


**Homography:** A homography is a perspective transformation of a plane, that is, a reprojection of a plane from one camera into a different camera view, subject to change in the translation (position) and rotation (orientation) of the camera.

Then we are using perspective transformation before the final stitch so that the image overlaps perfectly and warps.



After warping we are doing final stitch:



**Final Output:** task1.png

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## TASK 2: Image Panorama

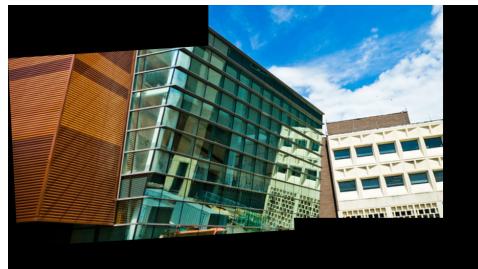
Panoramic photography is a technique of photography, using specialized equipment or software, that captures images with horizontally elongated fields of view. It is sometimes known as wide format photography.

**Dataset:** We are provided with a set of 4 images to make a panorama.



**Images:**

We are doing the same process first by doing feature extraction of first two images and then SSD feature matching like the previous task. After that Homography, warping and stitching. Once the result of the first two images is obtained we are using the resulting image to stitch with the third image and so on...



After doing the same process with the resulting image and next image we get the final output image. We are also calculating the **Overlapping Matrix** by checking if one image overlaps another image by 20% or more:

```
[[1, 1, 0, 1],  
 [1, 1, 1, 1],  
 [0, 1, 1, 0],  
 [1, 1, 0, 1]]
```

**Output :** task2.png, t2\_overlap.txt



### **TASK 3: Panorama of Buffalo or UB related images!**

**Dataset:** For task 3 we have to take photos of anything from Buffalo or UB related. Am taking images of **Abbott Library, University at Buffalo**. The **Abbott Library** is located on the South Campus in **Abbott Hall**.



#### **Image Dataset:**



**Output : task3.png**



**T3\_overlap.txt:** [1, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 0, 0, 0, 0, 1]