Assignment 3

Solution 1: Panorama Stitching

(a) Detect, extract and match features using inbuilt functions allowed

Detect SURFFeatures for both the images, matched both images feature and find match points.

(b) Estimating Homography using RANSAC

Reference: Class notes Parameters

```
k = 4;                  %no. of correspondences
p=0.99;                 %probability that a point is an inlier
e = 0.5;                %outlier ratio
N_iteration = round(log10(1-p)/log10(1-(1-e)^k));
distThreshold = sqrt(5.99)*sigma;
```

H matrix

First combined Image 1 with Image 2

	1	2	3
1	1.2291	0.0654	-184.8945
2	0.0077	1.1321	4.1798
3	3.4656e-...	3.8337e-...	1

Second combined Image 3 with Image 4

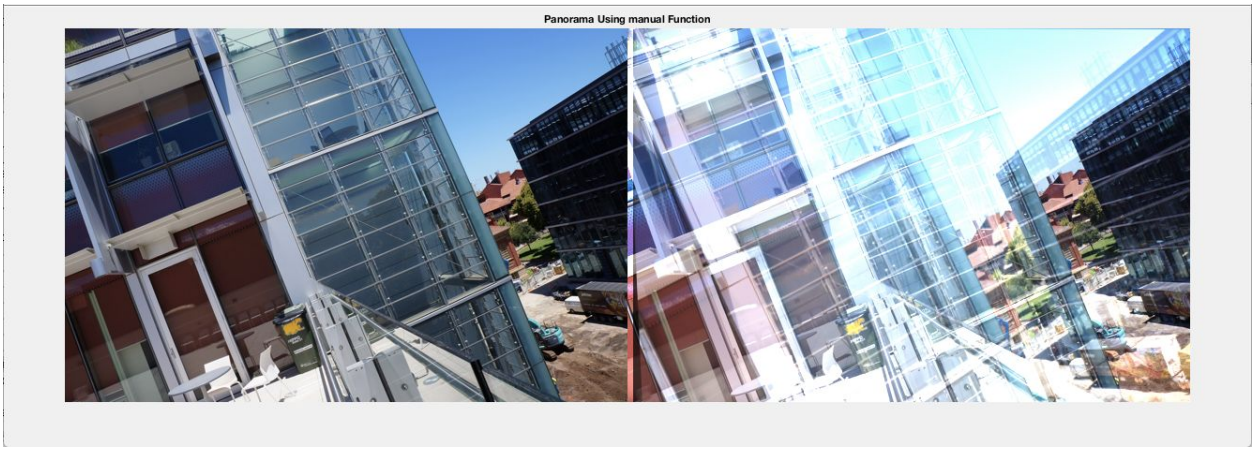
	1	2	3
1	1.2363	0.0502	-169.6651
2	0.0329	1.1535	-36.1259
3	3.7380e-...	6.5253e-...	1

Third combined First Output with Second Output

	1	2	3
1	2.1328	0.3608	-715.2623
2	0.0230	1.6755	-38.4235
3	0.0011	5.5072e-...	1

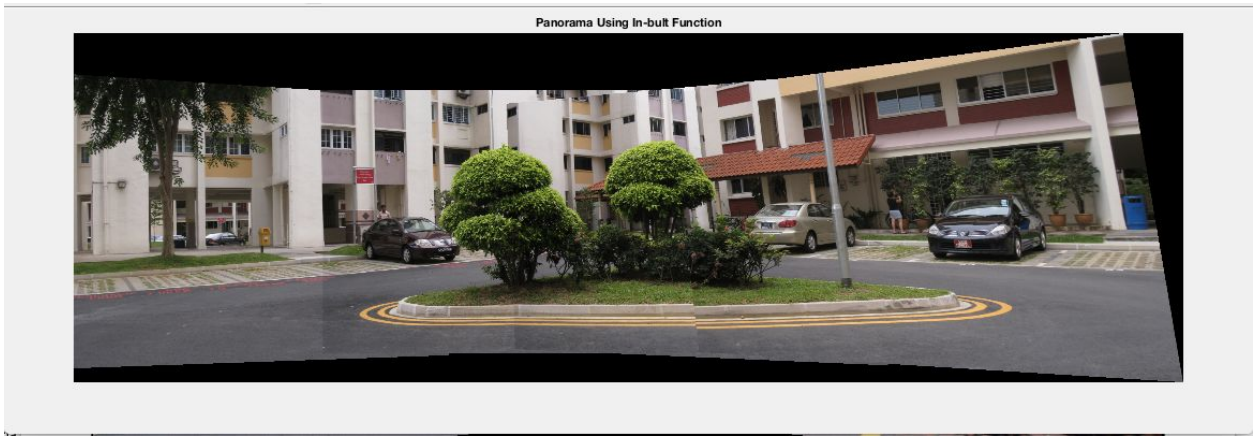
(c) Stitch at least 4 color images of a scene using the homography matrix estimated in (b) to create a panorama

Panorama using First Data Set containing 4 images



Panorama using Third Data Set containing 4 images

(d) Stitch the images used as input in (c) using an in-built command for homography estimation and Compare it with the panorama obtained in (c).



Panorama using First Data Set containing 4 images

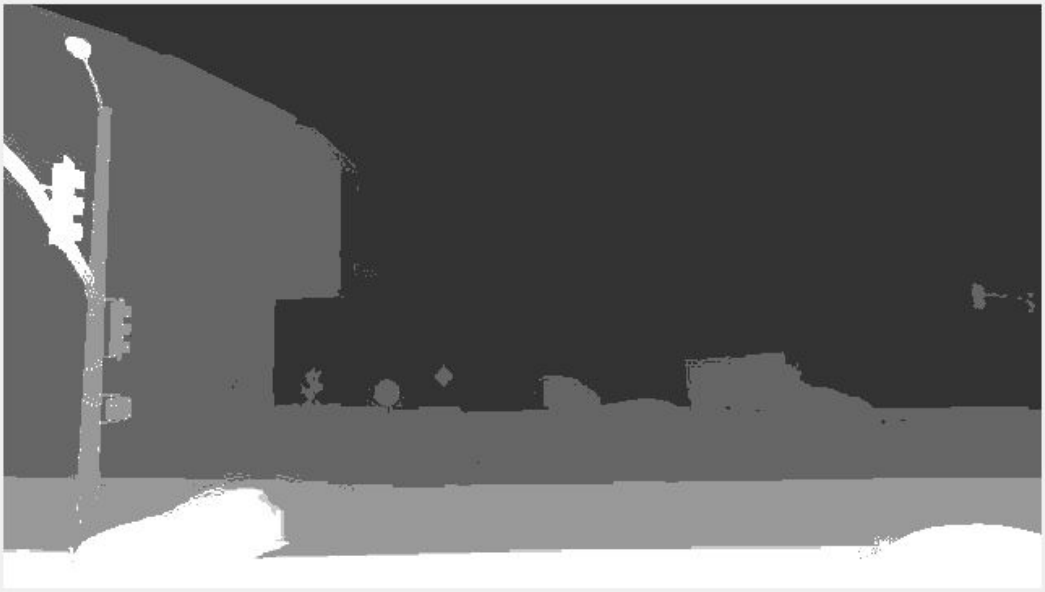
Panorama using Second Data Set containing 4 images

Panorama using Third Data Set containing 4 images

Solution 2: Image warping in RGB-D images

(a) Detect, extract and match features between a pair of RGB-D images.
Detect SURFFeatures for both the images, matched both images feature and find match points.

(c) Quantize the depth image corresponding to the reference image into m=5 levels.



(d) Estimate homography matrix for each depth level of the quantized reference depth image.

	1	2	3
1	0.7611	-0.1493	27.1468
2	0.0103	0.4095	191.3485
3	-2.2713e...	-8.4749e...	1

	1	2	3
1	0.7698	-0.1268	21.1933
2	-0.0463	0.5308	181.5902
3	-2.1839e...	-6.3991e...	1

	1	2	3
1	-1.7442	0.0661	420.0357
2	-1.3501	-0.2589	336.3533
3	-0.0046	3.3576e-...	1

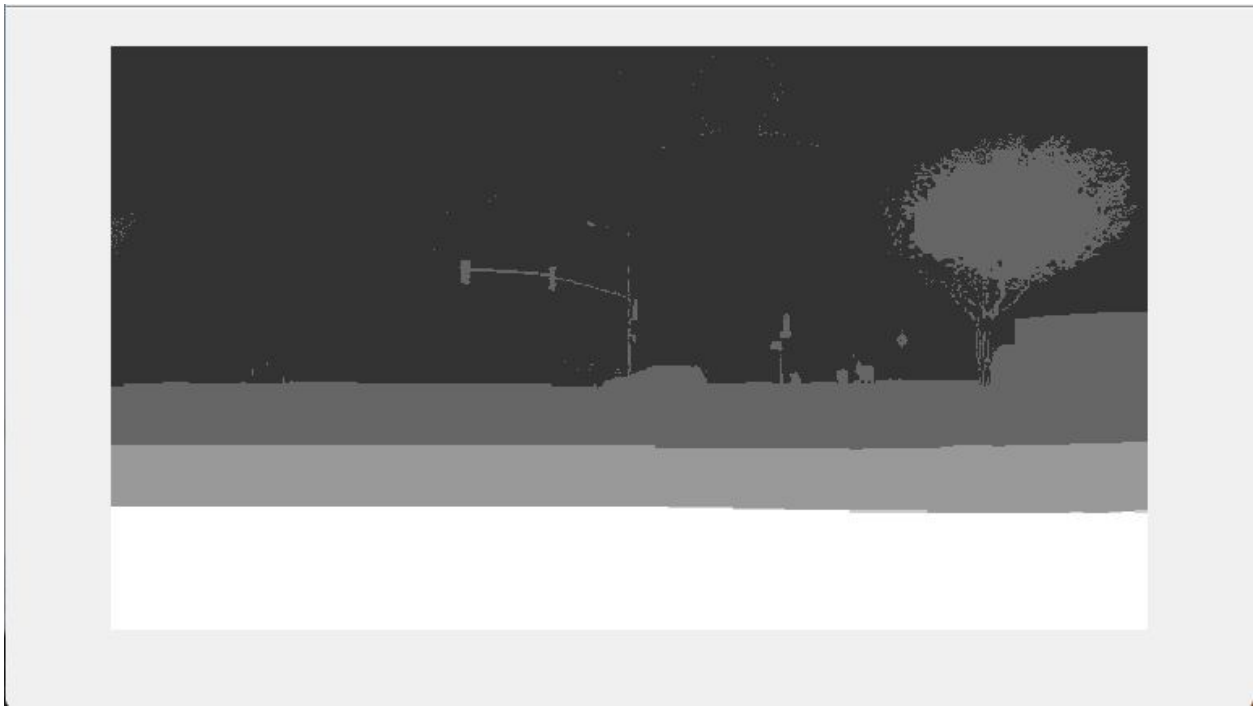
	1	2	3
1	1	0	0
2	0	1	0
3	0	0	1

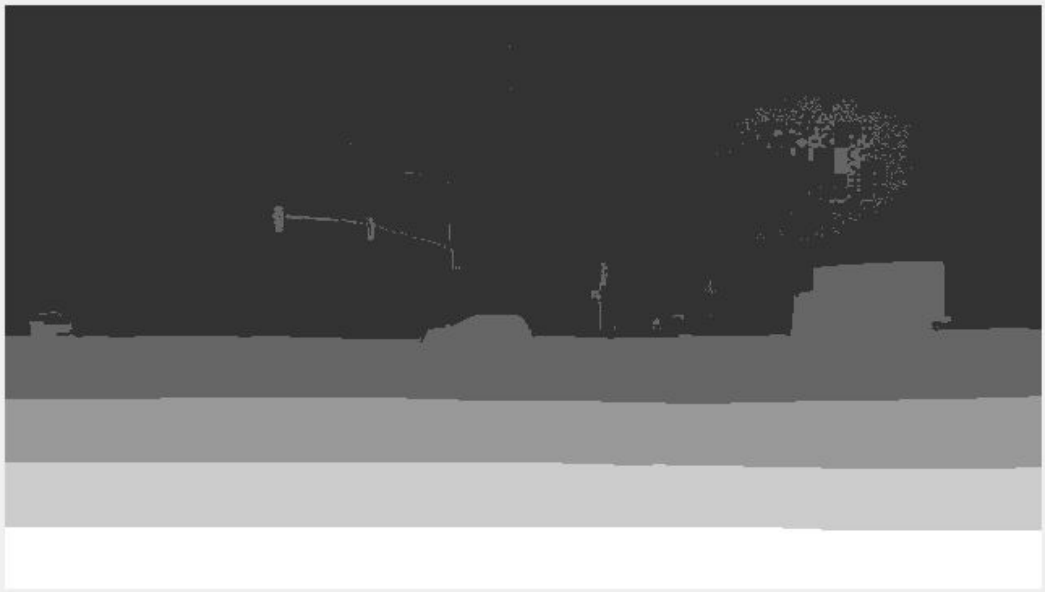
1	2	3
-1.2537	-0.3067	368.3173
-1.0495	-0.4870	324.6657
-0.0035	-9.9732e...	1

(e). Warp each portion of the reference RGB image corresponding to each depth level using the corresponding homography matrix to obtain an image similar to the source image.

(f) Estimate a single homography matrix for the image pair and warp reference image to obtain an image similar to the source image.

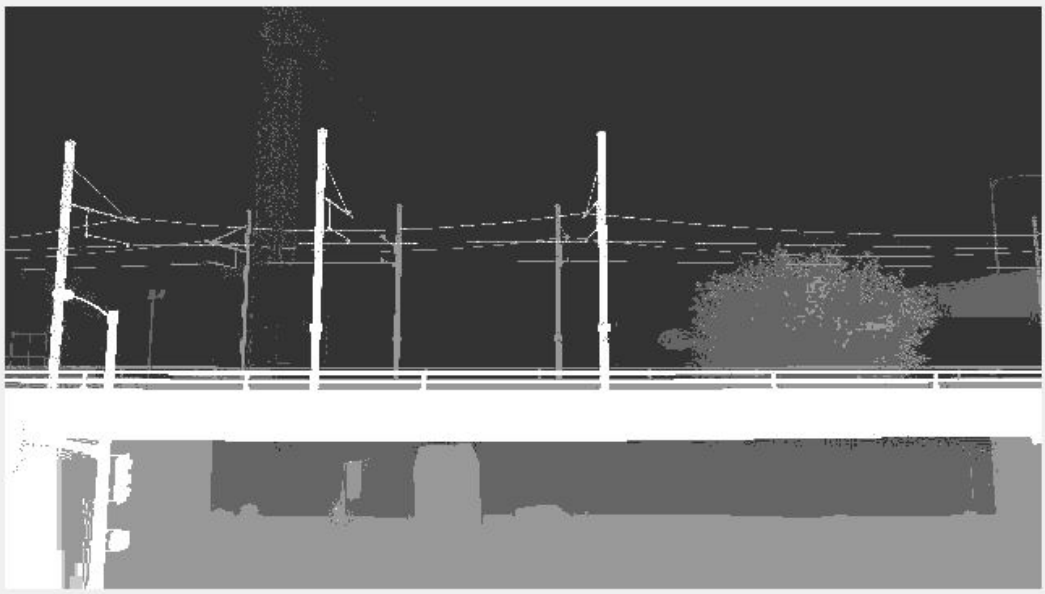
For Other Datasets

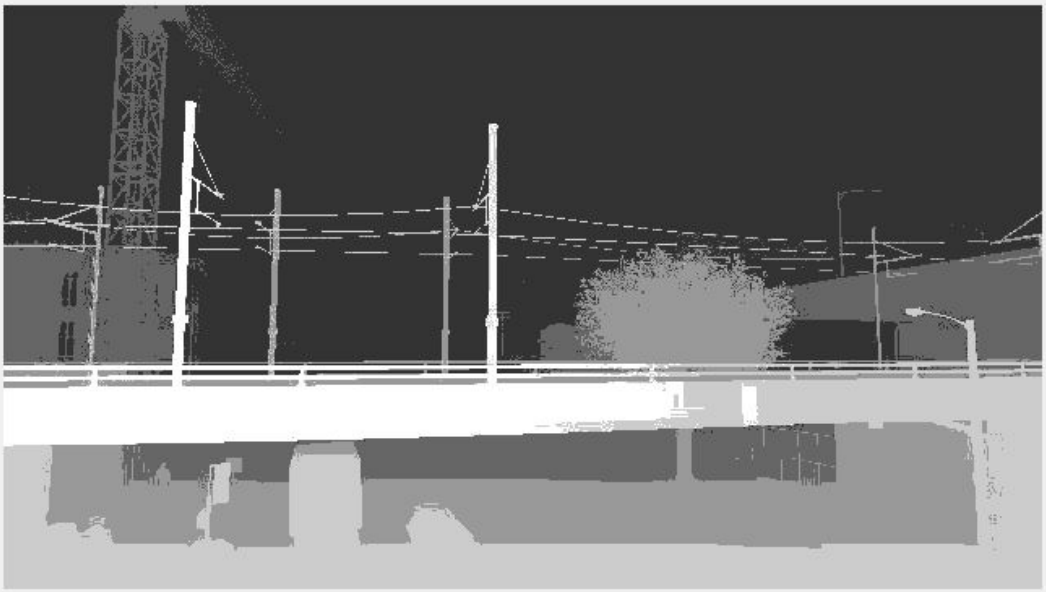




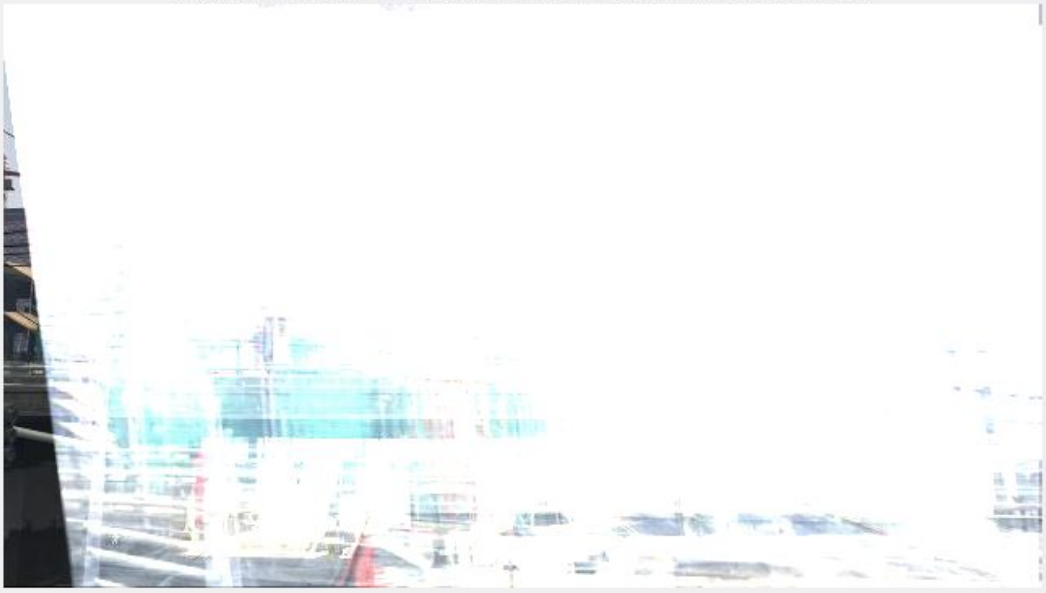
Warp each portion of the reference RGB image corresponding to each depth level

warp reference image to obtain an image similar to the source image





Warp each portion of the reference RGB image corresponding to each depth level



warp reference image to obtain an image similar to the source image