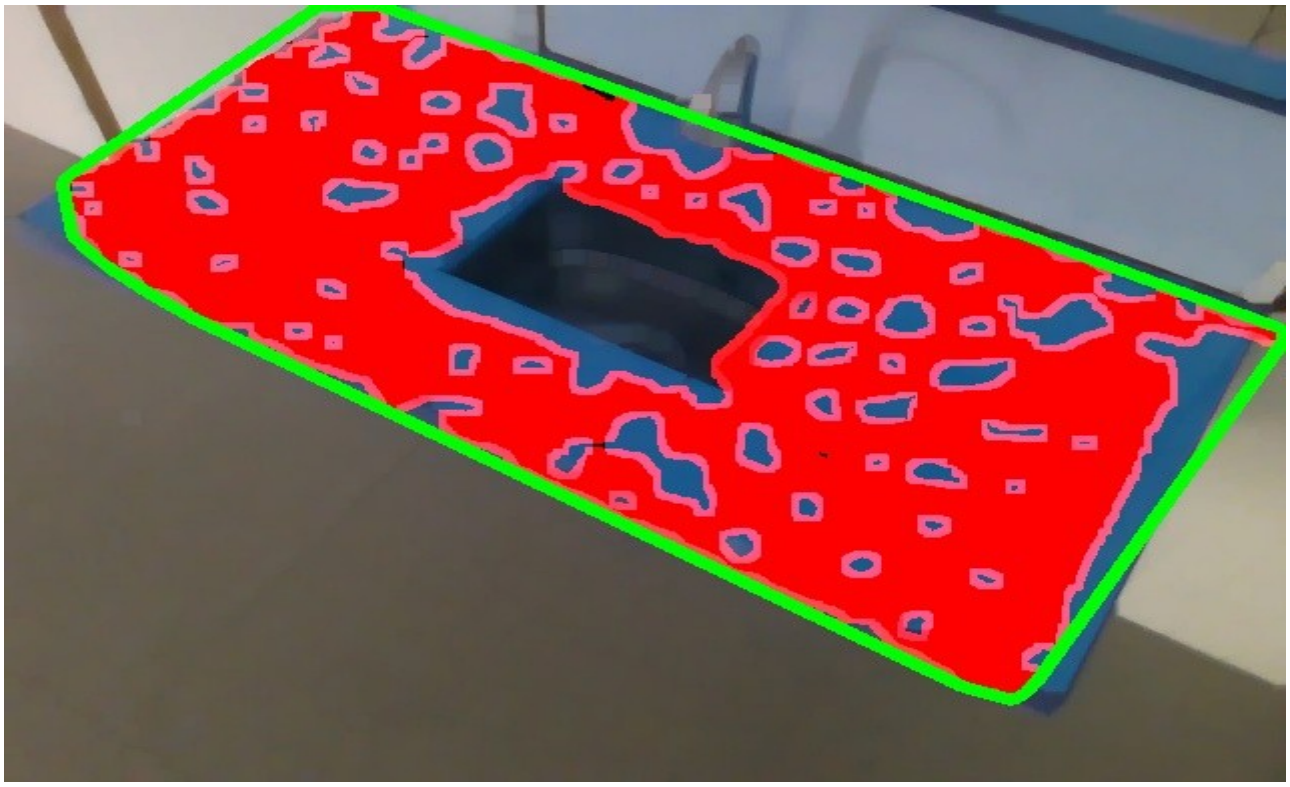
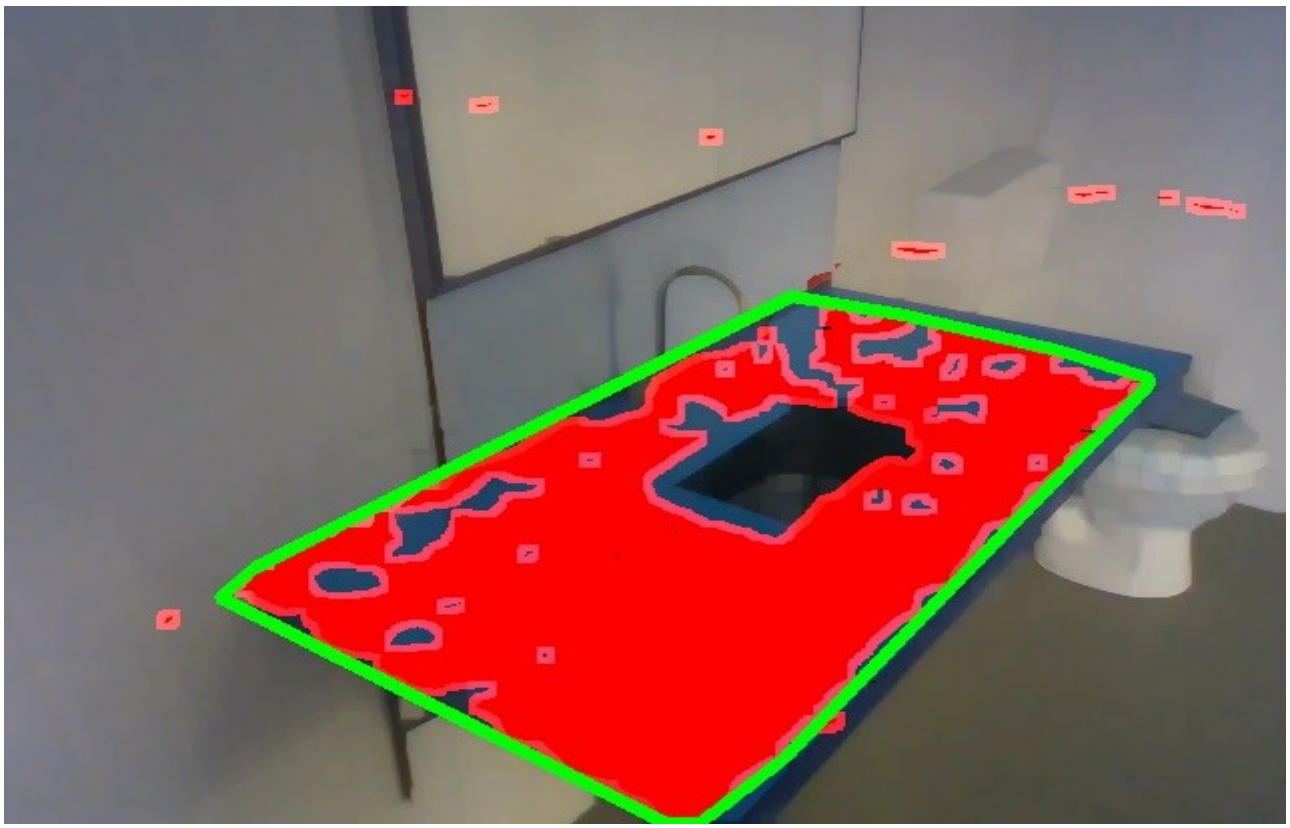
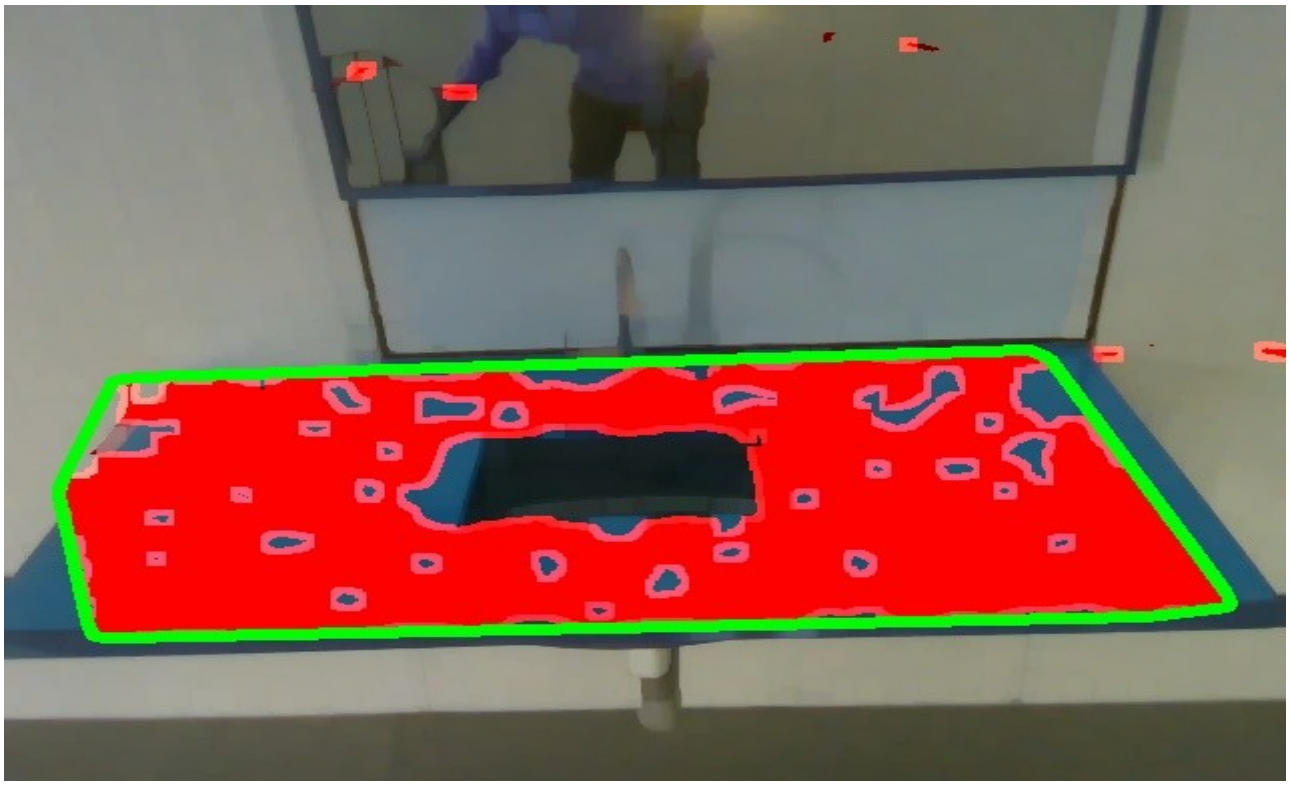
Part 1 : Repetition of previous experiments after installation of the opaque dark film

A. Countertop Results







INFERENCE :

A substantial increase was seen in the number of inliers after the installation of the opaque film

B) DUSTBIN DISTANCE RESULTS

Comparing the results obtained through homography and through the depth map4

Actual Distance	Line 1		Line 2	
	Homography	**Depth map**	**Homography**	**Depth map**
130	130.9	119.3	130.8	130.5
150	151.2	160.6	151	152.7
170	171.4	176.3	170.1	175.5
190	191.5	197.2	190.5	194.6
210	211.6	215.0	210.9	218.5
230	231.7	235.7	230.4	238.9
250	251.8	253.1	251	264.1
270	272	266.6	269	285.7
290			288.2	299.7
310			308.8	312.7
330			329.3	344.7
350			350.6	369.4
370			369.5	378.0
RMS error	**0.54**	**2.49**	**0.25**	**2.89**

Homography avg RMS error : 0.395

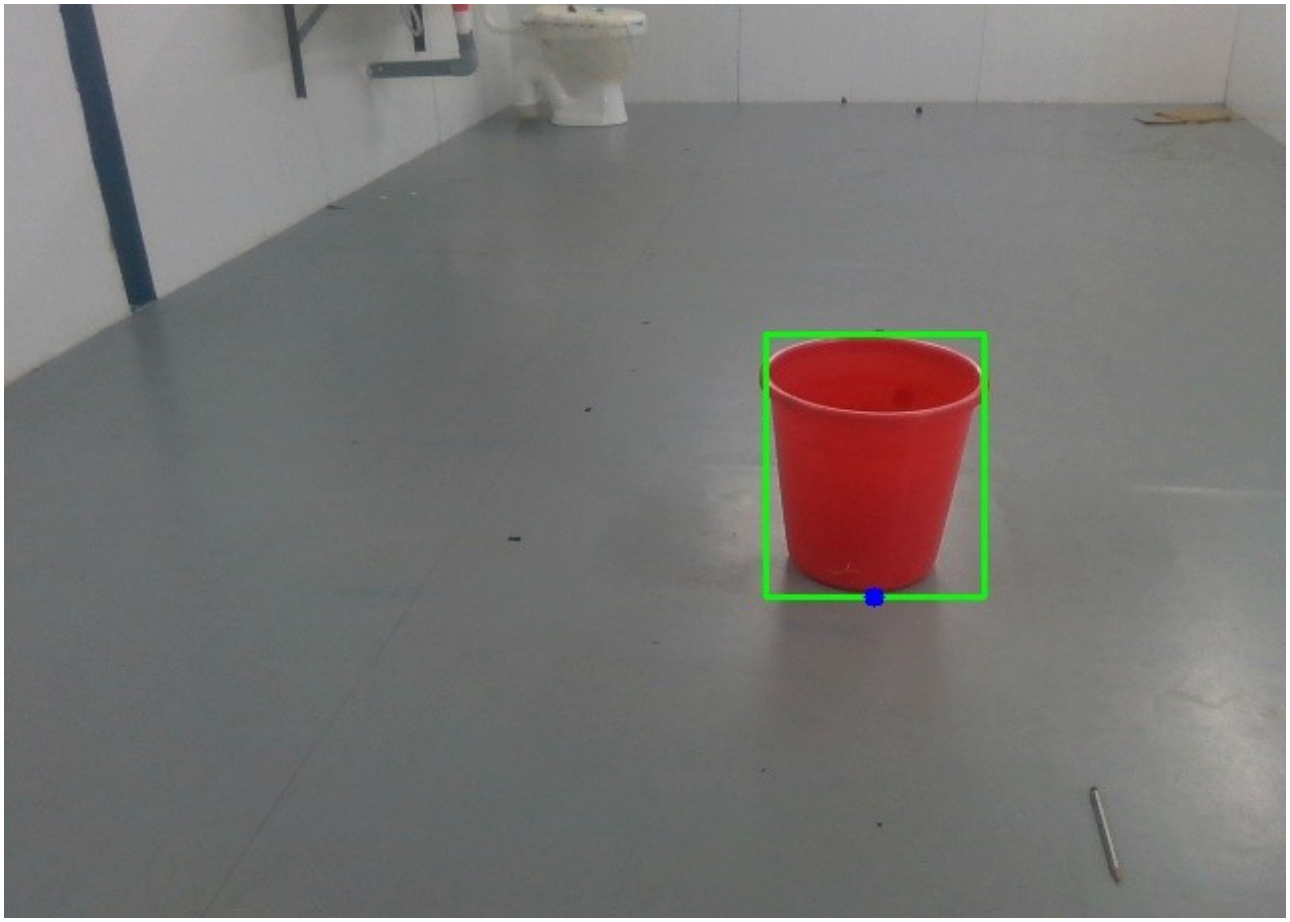
Depth map method avg RMS error : 2.69

Note : Earlier before the dark film was installed the avg RMS error in the Depth map method was 5.26, Now we see a decrease in error to 2.69

Part 2 : Estimation of the centre of the dustbin

A) Using the technique of homography :

The co ordinates of the bottom centre point of the dustbin is estimated using homograpy and since we know the physical dimensions of the dustbin we calculate the co ordinates of the centre of the dustbin.



Known :
1. Height of Camera - 90 cm
2. Radius of Dustbin – 9.5 cm

For example if (x,z) is the co ordinates of the bottom blue point obtained through homography
The coordinates of the centre of the dustbin is given by,

x_centre = x
y_centre = 90 cm
z_centre = z + 9.5

B) Using the Depth Frame Data:

The right most and the left most points of the segmented dustbin is calculated and there corresponding depths are calculated.

The centre point joining the line is calculated
Since the centre point is an imaginary line, Its depth is assumed to be the average of the depth at the 2 extreme points.

Using this information the world co ordinates are calculated.

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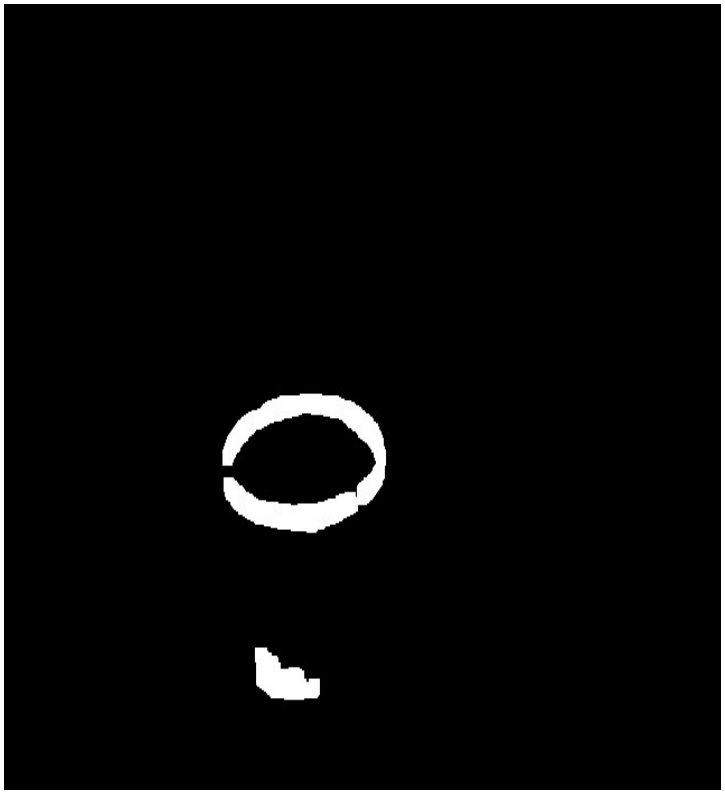
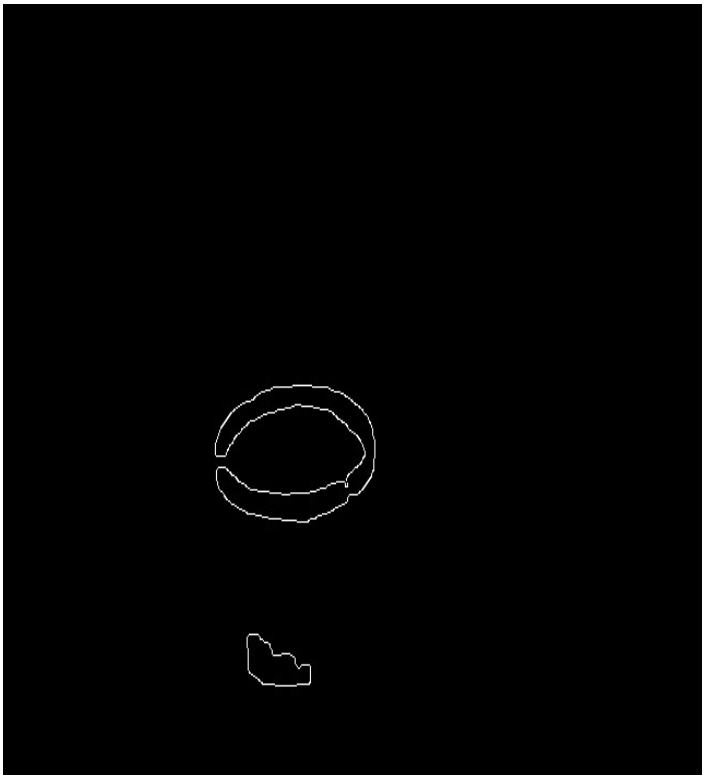
The real world co ordinates is calculated by the below formula

- z = d / depth_scale
- x = (u - cx) * z / fx
- y = (v - cy) * z / fy

Original Image



Colour Segmented region



Canny edges