COMPUTER VISION

Assignment-1

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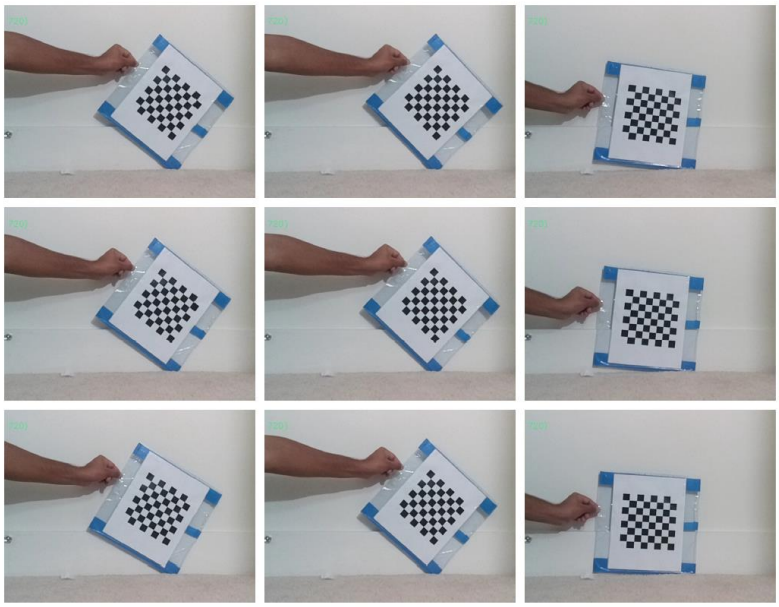
PART-A

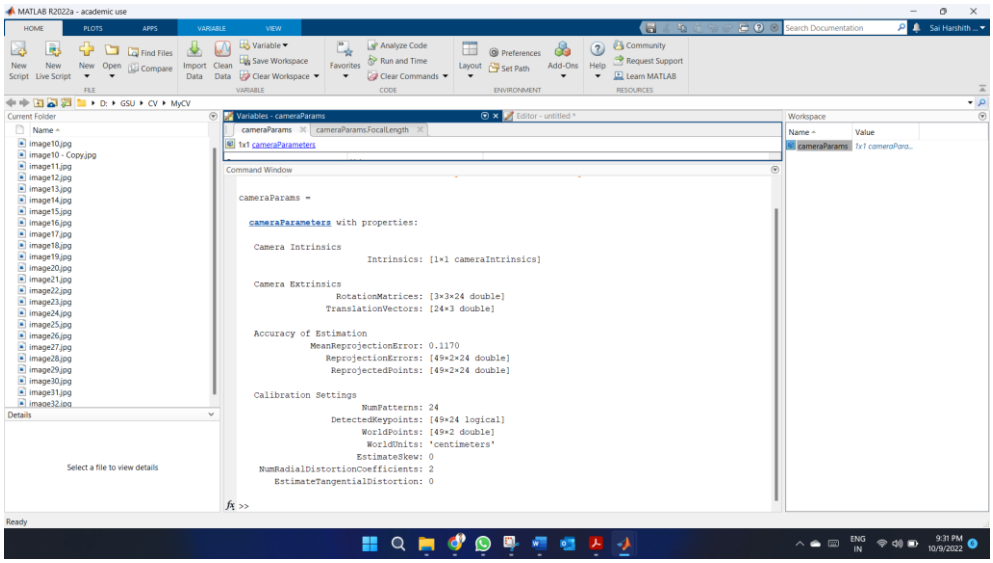
We are using Matlab for the calibration of the OAKD-Lite camera

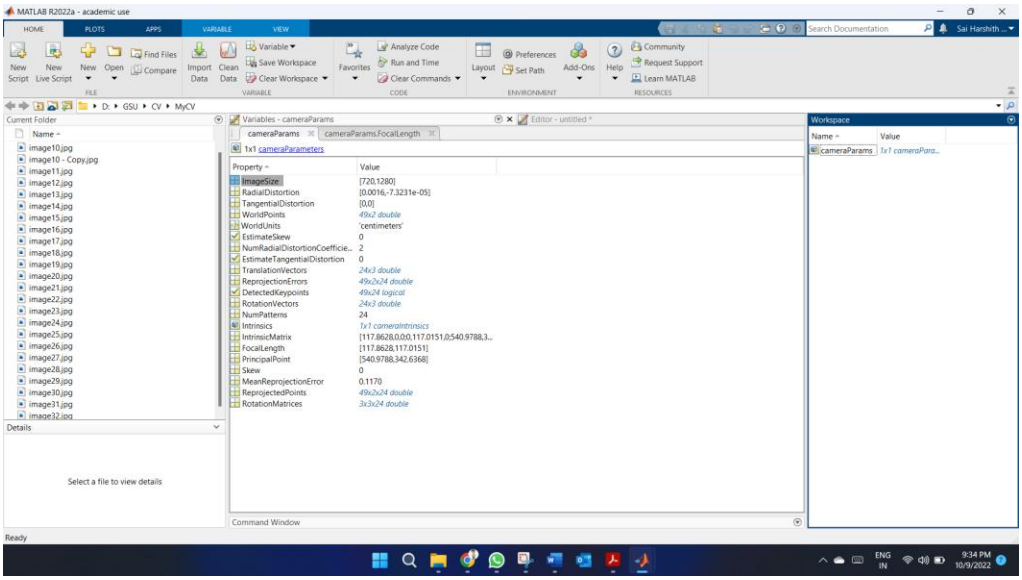
The capturing object is placed at a distance of 40.3 inches from the camera. The captured images are given to Matlab for calibration.

The sample images' angles are shown below.



After executing the code in MatLab we get parameters that are calculated based on the above image dataset.





Calibration means finding the Intrinsic and Extrinsic parameters from the known 2d and 3d points. The rotation and translation matrices are important for the conversion of the 3d coordinates to 2d coordinates. These are calculated here.
Also fx, and fy values are given in the intrinsic parameter.

PART-B

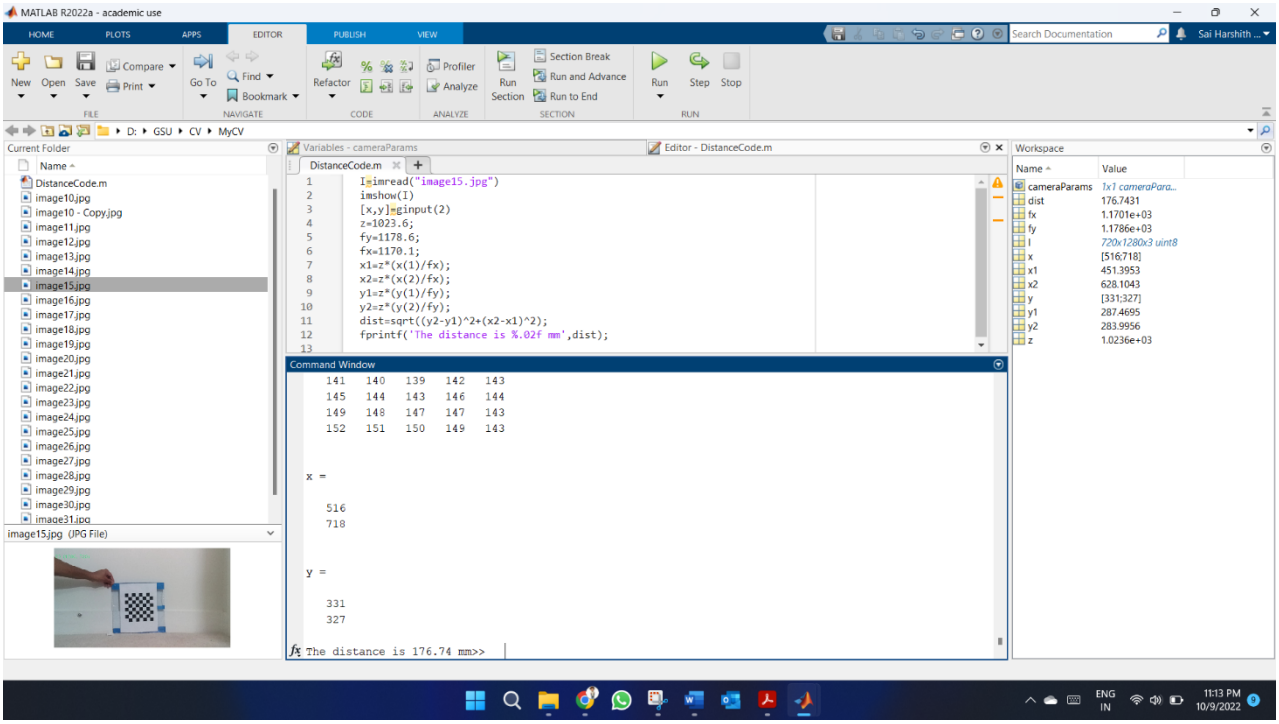
For finding the real-world dimensions of the object let us consider the given program below.

We will be giving an image input to the system with the acquired fx and fy data from the above.

We can select two points on the image which we can measure practically in the real world and can compare with the value from the code output.

```
I=imread('image.jpg')
imshow(I)
[x,y]=ginput(2)
z=1023.6;
fy=1178.6;
fx=1170.1;
x1=z*(x(1)/fx);
x2=z*(x(2)/fx);
y1=z*(y(1)/fy);
y2=z*(y(2)/fy);
dist=sqrt((y2-y1)^2+(x2-x1)^2);
fprintf('The distance is %.02f mm',dist);
```

Output:



The distance we got from the calibration is 176.7 mm

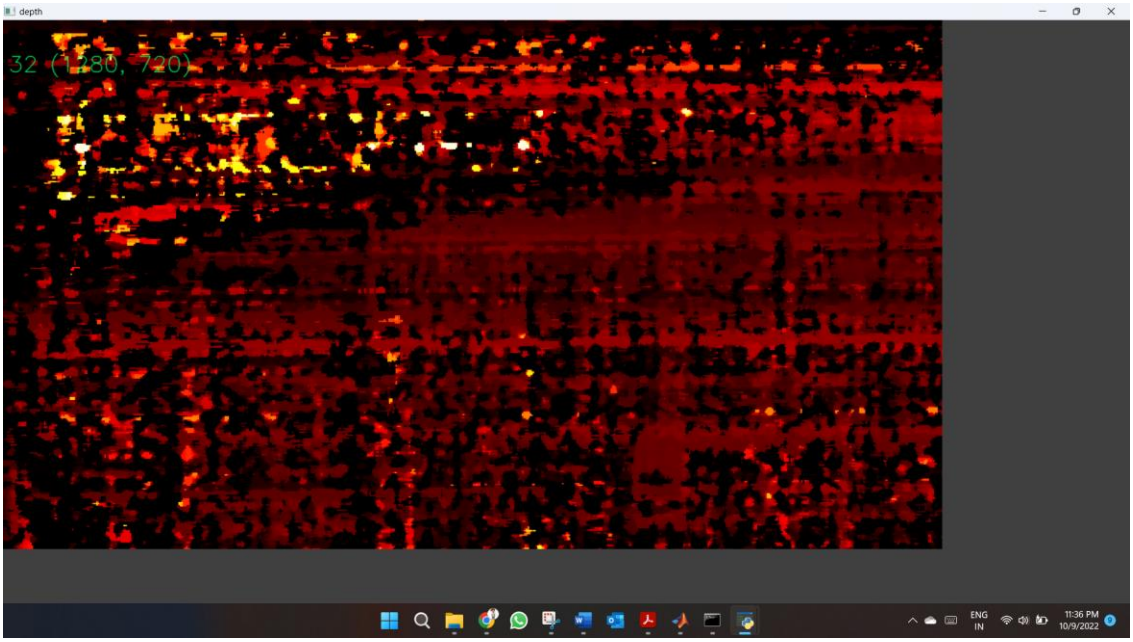
The real-world distance of the considered two points is 180.0 mm

Hence, approximate real-world dimensions can be calculated from the images.

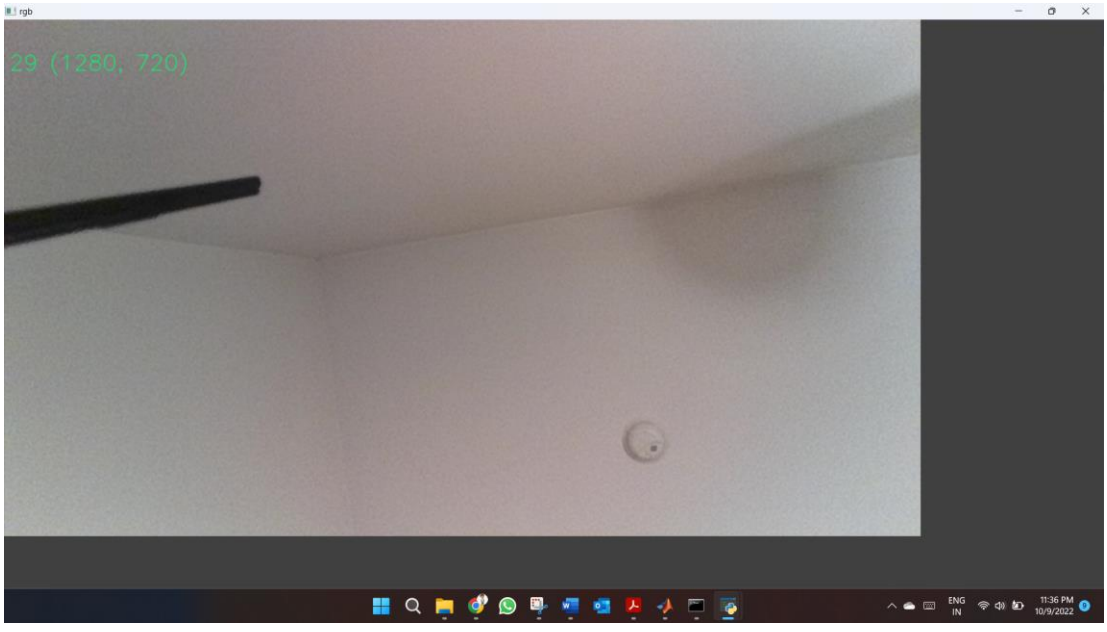
PART-C

Here we will be producing a RGB stream from the OKAD lite camera. The fps and maximum resolution can be calculated associated with the camera.

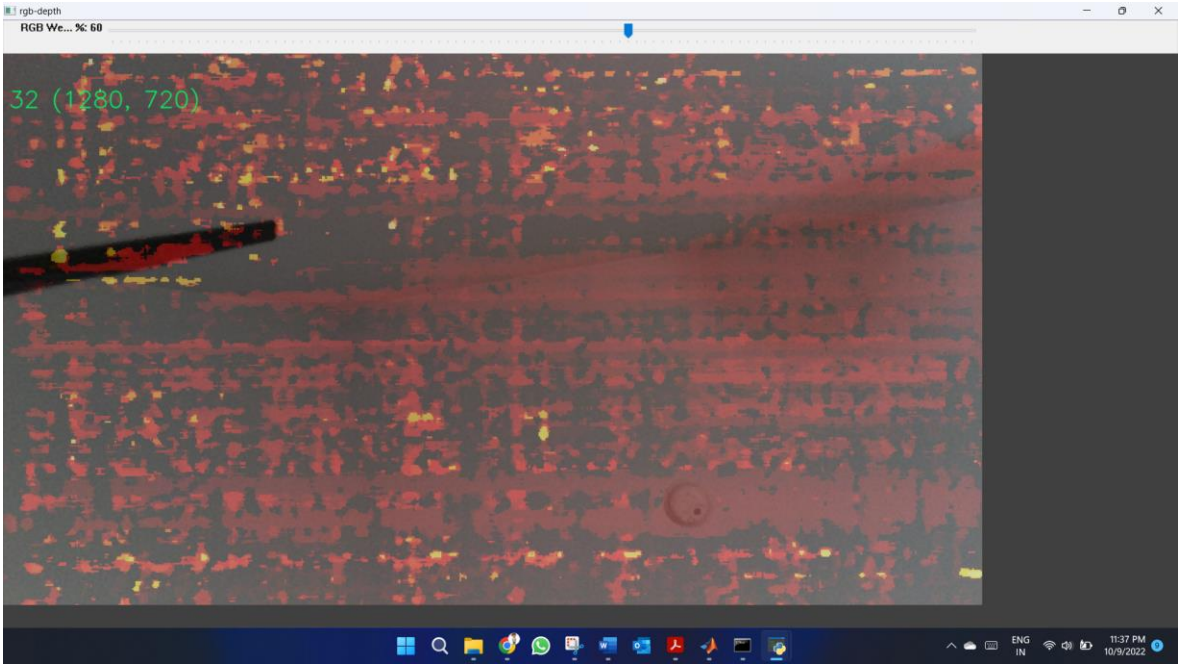
1)Depth Stream



2)RGB Stream



3) RGB-Depth Stream



Therefore from the above we can achieve a maximum Resolution of 720p and 34 Fps.

Drive video Link: https://drive.google.com/file/d/1IfXnVZi-jcnX4OOHm08OJJAdPVII-VqV/view?usp=sharing

Github Repo Link: https://github.com/AshAkkena/ComputerVision