CET CPET-563 Embedded Systems Design II **Dr. Kaputa**
Lab 1

Introduction:

The first step in finding a tennis ball in 3D space is to determine its Z position relative to your stereo camera. For this lab you will provide the tennis ball centroid locations for both the left and right camera and you will compute and display the Z position of the ball. Your module:

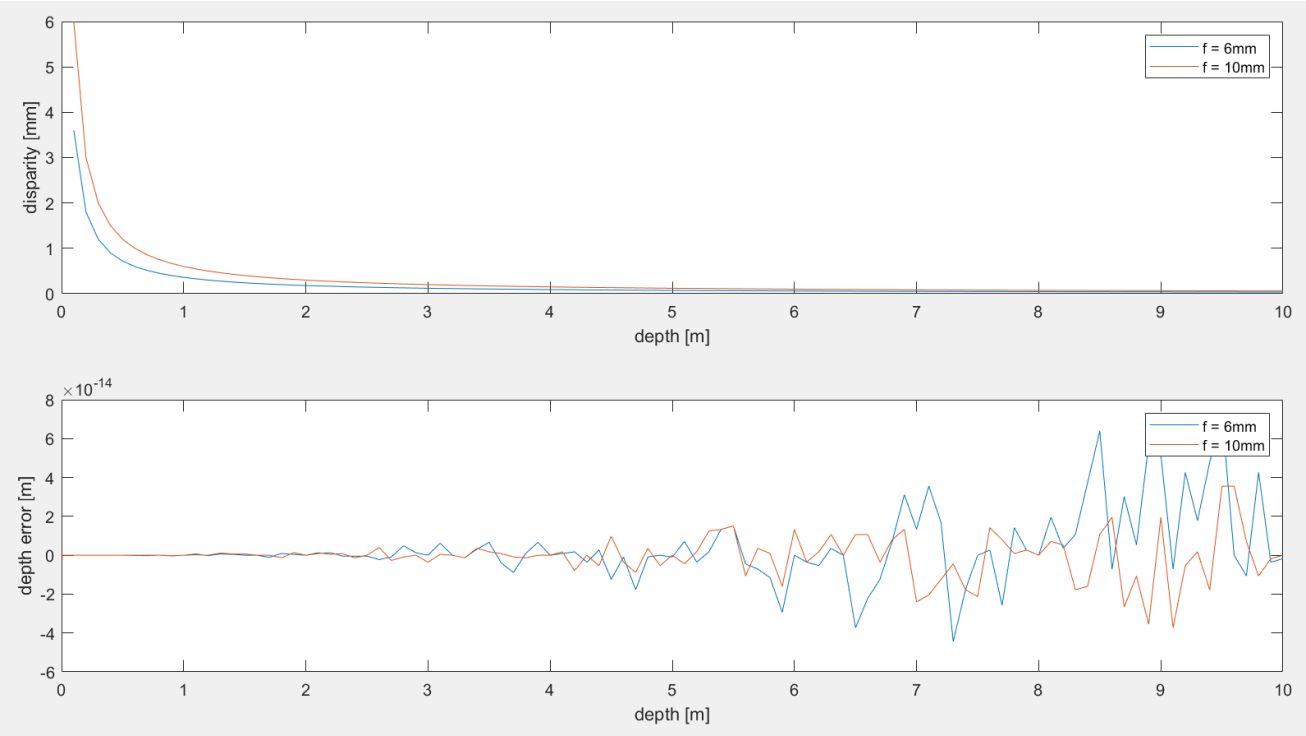
- shall use Peter Corke's toolbox to generate the position of the ball in the left and right images for varying depths
- shall compute and display the Z distance of the ball in meters
- shall use Matlab
- shall output a plot similar to the one below where a parameter such as baseline or focal length is changed

You can hard code the below parameters:

```
b = 60;                 % baseline [mm]
f = 6;                  % focal length [mm]
ps = .006;              % pixel size [mm]
xNumPix = 752;          % total number of pixels in x direction of the sensor [px]
cxLeft = xNumPix/2;     % left camera x center [px]
cxRight = xNumPix/2;    % right camera x center [px]
```

Use the below equations to find depth:

```
d = (abs((xLeft-cxLeft)-(xRight-cxRight))*ps)  % disparity [mm]
Z = (b * f)/d                                  % depth [mm]
```



Due Date:

You have exactly 7 days [168 hrs] till you need to submit the lab.

Lab Submission:

There are two ways to submit the lab:

1] Demonstrate functionality in lab and receive a signoff

2] Submit a video or a simple image of your plot to demonstrate functionality to the below link:

https://u.pcloud.com/#page=puplink&code=2HpXZVPkzdBXJDpBnXlRLooDF5ua9KuFk

Grading:

Labs will be graded against the below rubric. Late labs will get a 0.

Grade	Description
0	Lab handed in late, or not handed in
1	Poor quality
2	Good quality