CSc 4980/6980: Computer Vision

Consolidated Assignment 4

Submission in Classroom:

Camera images of paper worksheets will NOT be accepted

Python: submit a jupyter notebook and the .py files associated

MATLAB: submit a MATLAB Live script (.mlx file) and also convert the .mlx file to PDF and append to PDF from Part A.

The MATLAB Live Script document must contain all the solutions, including graphs. The file must be saved as ".mlx" format. See here for live scripts:
https://www.mathworks.com/help/matlab/matlab_prog/create-live-scripts.html
Manage all your code in a github repo for each assignment. Provide a link to the repo in the documentation workspace (jupyter notebook or mlx file).
Create a working demonstration of your application and record a screen-recording or a properly captured footage of the working system. Upload the video in the Google classroom submission.

Hardware: Unless otherwise specified, CAMERA refers to the OAK-D Lite camera provided to you.

Software: MATLAB: Either of the following will work: Use MATLAB R2018b or later version as installed in your machine (installation instructions already provided) **OR** Use MATLAB Online (https://www.mathworks.com/products/matlab-online.html).

For OAK-D you can implement your solutions in either Python or C/C++:
https://docs.luxonis.com/en/latest/

Also submit a properly edited video of the demonstration of the applications. The video can be upto 2min long each. It has to have professional quality. Raw handheld footage with some broken audio overlay will not be considered.

NOTE:

Each team must come up with 3 different ways to solve the problem and must implement them. Each person will implement one. The number of ways is commensurate with the team size. If there are only 2 or you are alone then it is 2 and 1 respectively.

All three techniques must work for the team's submission to be considered. So make sure you work closely with your teammates.

All participants of the team MUST submit the files via classroom.

1. Implement an application using the stereo camera where it will recognize, track and estimate dimensions of an object within 3m distance and inside field-of-view to the camera. You can use barcodes or text recognition tools for identification. However, the entire object must be tracked (not just the barcode or text). Machine/Deep learning tools are allowed. Demonstrate it to work for one object at least. It can be a 2D object.

2. Design an eco-friendly (try your best: as reusable as possible) "smart" business/visiting card (actual hardware) and an associated computer vision application using the camera provided. You can leverage depth information in your design.