CPSC 643 Introduction to Robot and Computer Vision on Multiple View Geometry Project #5

We have learned the concept of fundamental matrix and reconstruction in two-view geometry in the class. This purpose of this project is to test your knowledge in real problems.

1.Use the images in the project 1. Select a set of corresponding wall and floor points (>20) in both first image and the second image. Please classify the points into two groups: those belong to wall plane and those belong to floor plane.

2. Compute fundamental matrix F using any algorithm that we learned from the class. However, it has to use all points that you have. Note that we do have a lot noise in the system.

3. Identify plane at infinity and reconstruct the wall plane and the floor plane up to affinity in 3D.

You need to submit a project report that includes the following items,

- The original images with marked corresponding points (I do not care whether they are color or grayscale images.) [10pts]
- The methods you used to compute F and to reconstruct the two planes. [30pts]
- The plane at infinity and the homography matrix used for transformation to affinity. [10pts]
- The camera matrices P and P'. [10pts]
- The 3D floor plane and the wall plane in both numerical and graphical illustration (no rendering is required.) [20pts]
- Discussions about pros and cons of your approach.[10pts]
- Source code. [10pts]