

Computer Vision – Homework #3

Image Formation & 3D Reconstruction

1. Question 1



Figure 1. Image captured by first camera



Figure 2. Image captured by second camera

2. Question 2

(a) A point-epipolar line pair



Fig 3. A point-epipolar line pair obtained using the essential matrix

(b) An epipolar line pair



Fig 4. An epipolar line pair obtained using the essential matrix

(c) 3D reconstruction result

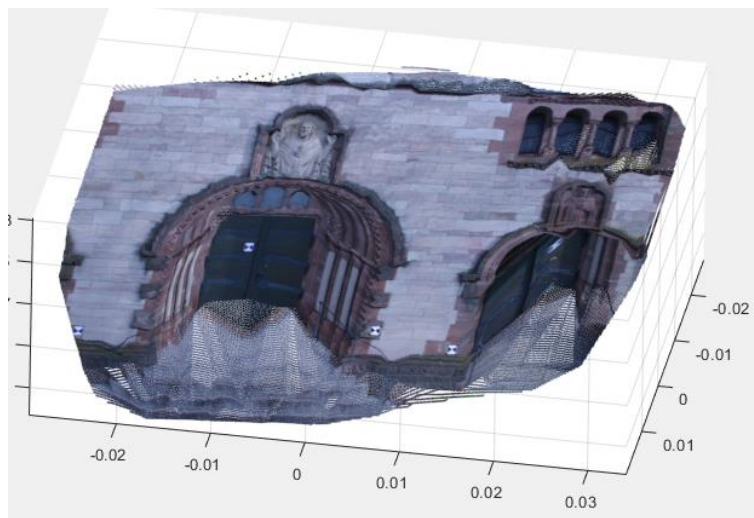


Fig 5. 3D reconstruction result

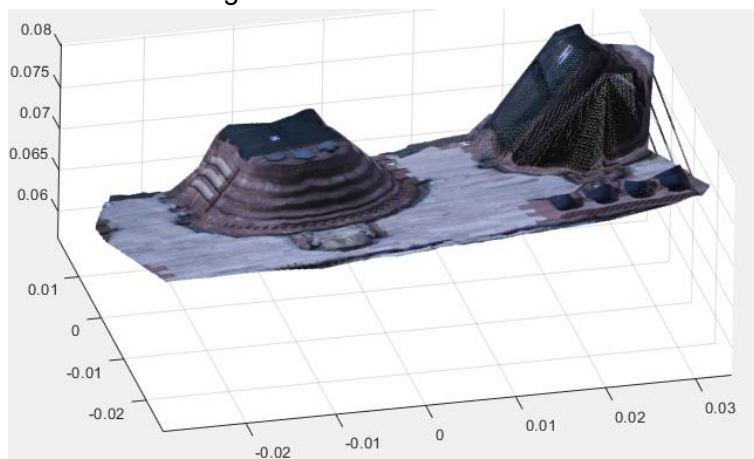


Fig 6. 3D reconstruction result

(d) Possible causes of the gaps of regions obtained in the 3D reconstruction

1. The grid is sampled down to get a faster computational time, in this case, only 1/16 information was preserved, When the grid(in pixel) was reprojected back to world coordinate, the missing information may lead to the void.
2. In this approach, I just solve for p_{ho} and used that p_{ho} to calculate the world coordinate. It's not accurate enough, some pixels may be reprojected to wrong world coordinate so that the void is left.