

Lecture 6 Report Requirement

The report only needs to answer the questions below.

Send your report in PDF format to 1430090453@qq.com, named as "report6_[first name][last name].pdf" (e.g., report6_ZhangChen.pdf). Please also include your name (both English and Chinese) in the report. The report is due on 10 am, China Standard Time, April 9, 2020.

Report Questions:

"FlatCam: Thin, Lensless Cameras Using Coded Aperture and Computation"

1. What is the relationship between pinhole camera and FlatCam? What is the improvement from pinhole camera to coded aperture camera and finally FlatCam?
2. What factors should be concerned about when choosing a mask pattern?
3. What is the disadvantage of the linear model with single transfer matrix Φ ? How to improve it?
4. Why do we use separable scene X when calibrating?
5. Express image reconstruction problem as a least-squares problem and a regularized least-squares problem. What is the solution to such problems? Express image reconstruction problem as a least-squares problem with total variation regularizing. Is this problem convex?

"DiffuserCam: Lensless Single-exposure 3D Imaging"

6. What is the improvement of DiffuserCam compared with existing lensless camera, light field camera and scattering imaging camera?
7. What is the benefit of cropped convolution model?
8. What is the complexity of algorithm to the inverse problem? Which step is the computation cost mainly from?
9. Compared with traditional cameras, what is the unique factor that determines the performance of computational camera?
10. Simply explain why the distance between sources will affect the performance of DiffuserCam?