浙江大学实验报告

课程名称：　专题研讨　指导老师：　Ping TAN

实验项目名称：　Project 1: Photometric Stereo and Image Filtering

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1. Experiment Purpose and Task

1.1 Experiment Task

(1)Part 1: Photometric Stereo

- Estimation of normal
- Dealing with shadows and highlights

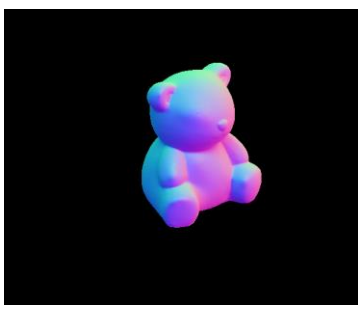
(2) Part 2: Image Filtering

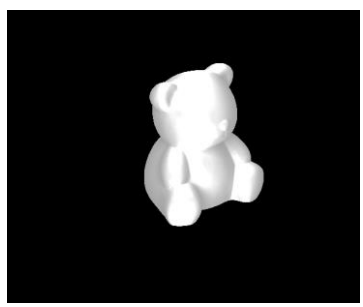
- Convolution
- Edge detection

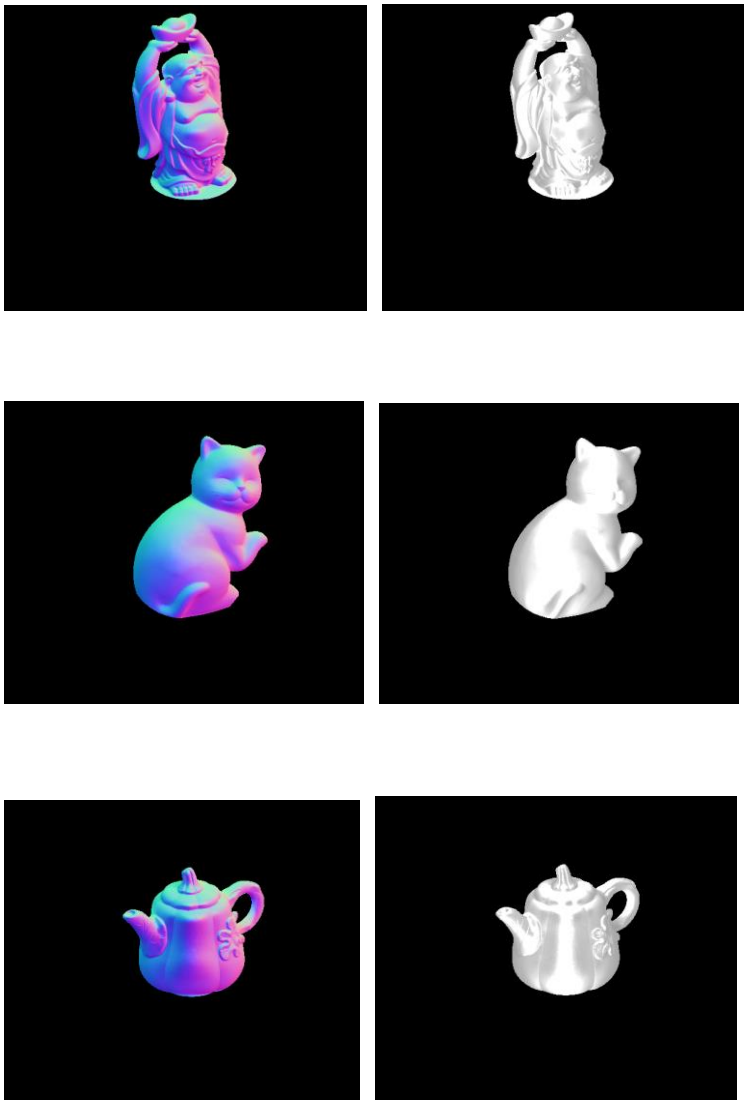
2. Experiment Results

Part 1: Photometric Stereo

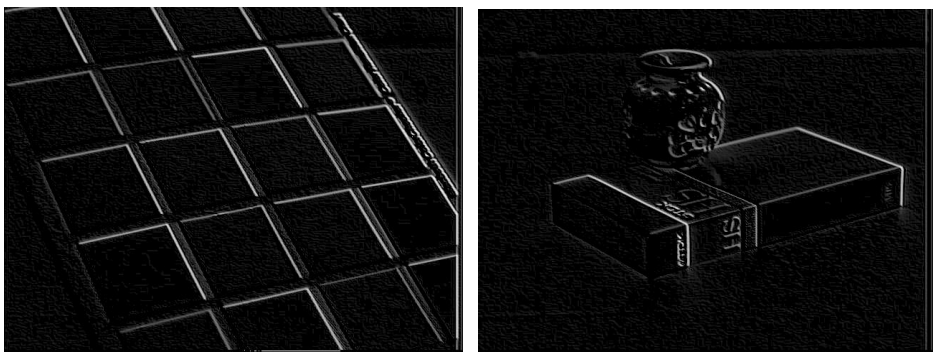
Normal　　**Albedo Map**

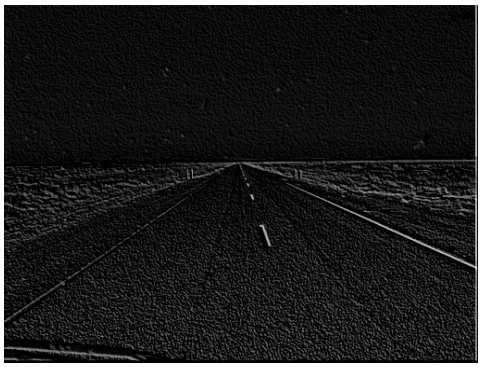


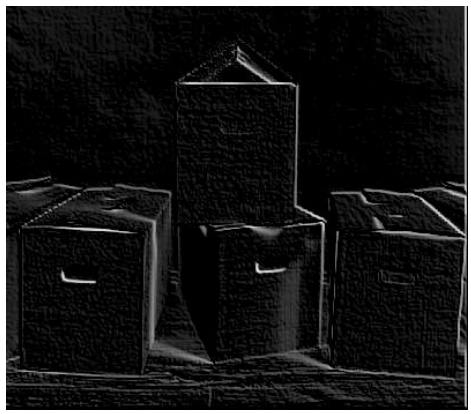




Part 2: Image Filtering





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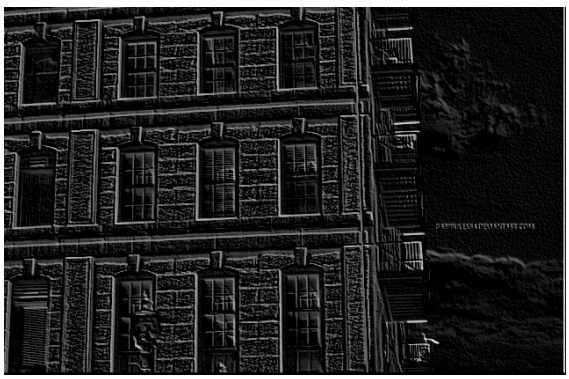

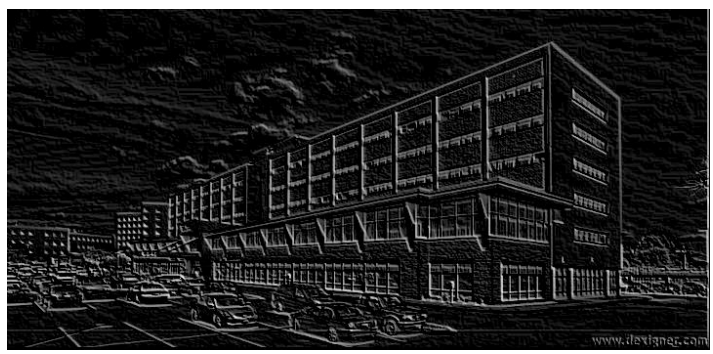
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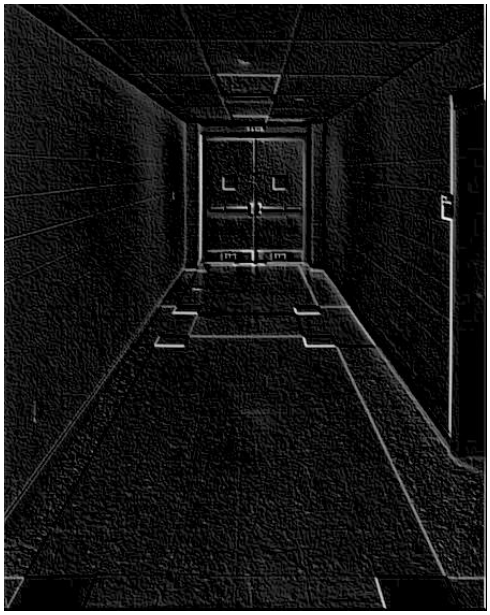

3. Process

Part 1:

(1) There are two functions in Photometric Stereo file.

-mPMS.m

-myAlbedo.m

(2) Increase three statements

```
%% Standard photometric stereo
Normal = myPMS(data, m);
Albedo = myAlbedo(data, m);
%% Save results "png"
imwrite(uint8((Normal+1)*128).*uint8(mask3), strcat(dataName, '_Normal.png'));
imwrite(uint8((Albedo+1)*128).*uint8(mask3), strcat(dataName, '_myAlbedo.png'));
%% Save results "mat"
save(strcat(dataName, '_Normal.mat'), 'Normal');
save(strcat(dataName, '_Albedo.mat'), 'Albedo')
```

(3) Run the mainBaseline

Part 2:

(1) There are two functions in Image Filtering file

-myEdgeFilter.m

-myImageFilter.m

(2) Run the filterScript

4. Discussion and Experience

This is my first time to learn about Matlab and computer vision. I have never use the Matlab before. Thus, in the beginning I spend lots of time to search how to use the Matlab and coding in skeleton language.

In part one, it's about to implement (a) a normal map linearly encoded in RGB, (b)an albedo map and (c) a re-render picture. However, in the first two requirements, I study the courseware and ask the classmates to understand the algorithm then I use two functions easily calculate the data and successfully output the results. The third requirement, I have some problems. I ask many friends and search on the internet but still don't know how to combine the first and second result to re-render picture.

In part two, it's about the image filtering, and the project ask to complete two functions myImageFilter and myEdgeFilter. Although I can output the similar results compare to the sample, but I think maybe I can use a better algorithm to decrease the noise and make the result more smooth.

All of all, this is my first time to use matlab to finish a project, actually I still not have a better understand about all the knowledge point. The process in this project that I search many relative knowledge on internet and try many algorithms and I just know a little what it's means then finally get the results.