CV Assignment 5: 3D Reconstruction

Due Date: June 11, 2017

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1 Introduction

In this assigment, you will compile three softwares for 3D reconstruction and compare the performance of different softwares by using specified evaluation methodology.

The whole framework of the implementation for 3D reconstruction is shown in Figure 1, it may serve as a reference for your assignment.
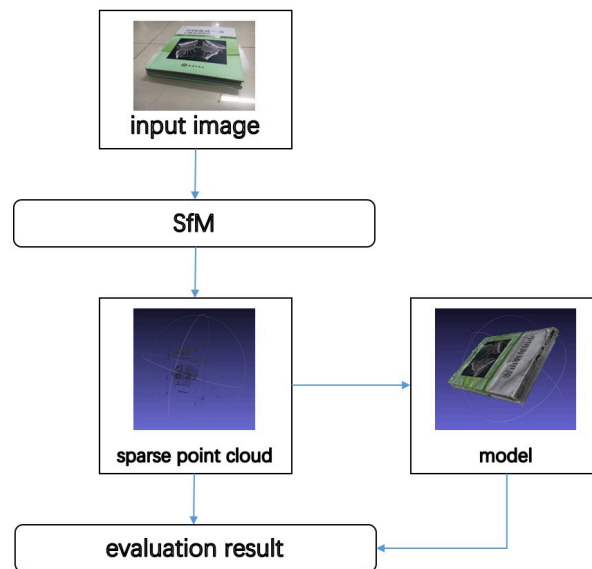

Figure 1: The framework of this assignment

To get started with the assignment, you will need to download the

dataset from the attachment.

The details of this assignment are given below in the following sections.

2 Structure from Motion

In this part, you will implement three methods of structure from motion on supplied dataset to get different sparse point clouds.

- Bundler (`http://www.cs.cornell.edu/~snavely/bundler/`)

- openMVG (`https://github.com/openMVG/openMVG/`)

- colmap (`https://github.com/colmap/colmap`)

3 Modeling

In this part, you will generate 3D model by sparse point clouds you get above. You can use PMVS2 (`http://www.di.ens.fr/pmvs/`) and Meshlab (`http://www.meshlab.net`) to finish this part.

4 Evaluation

In this part, you will compare the quality of different sparse point clouds and models using specified evaluation methodology.

The specified evaluation methodology comes from:

- Koutsoudis A, Vidmar B, Ioannakis G, *et al.* Multi-image 3D reconstruction data evaluation. Journal of Cultural Heritage, 2014.

We will evaluate the three methods from the following aspects at least.

- efficiency of the software (run time, complexity)

- shape of the result (by human eye)

- completeness of the result (by human eye)

- matching degree between the result and ground truth (by CloudCompare software)

5 Submission

1. Your code.

2. Your results.

3. A report with your methods and results of explanation and analysis.

Zip all your files and submit your assignment to ouceecv@163.com with the subject: YourName_Assignment3.zip. The name of your zip file should be the same as the email subject.