

APG4011F Assignment 3

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1 Introduction

The purpose of this assignment is to gain an understanding into the principles of image restitution and bundle adjustment. A python program will be used to demonstrate and simulate how image restitution and bundle adjustment is performed.

2 Background

Bundle adjustment can be defined as the simultaneous refining of 3D coordinates describing a scene geometry as well as the parameters of the relative motion and optical characteristics of the cameras used to acquire images, according to an optimal criterion involving the corresponding image projections of all points.

3 Problem Statement

There are three main questions which will be addressed in this assignment. They are listed below:

3.1 Intersection

Given a set of object points which have homologous points in two separate images, with each image having unique exterior orientation parameters, set up a least squares adjustment using the collinearity equations to redetermine the object points from each pair of homologous points from each image. Thereafter, compare the new object coordinates to those original, pregenerated object coordinates.

3.2 Resection

Given a set of object points, which each have a homologous point in two separate images, set up a least squares adjustment to determine the exterior orientation parameters of each image

3.3 Bundle Adjustment

Treat 80%

- 4 Method
- 5 Results
- 6 Discussion
- 7 Conclusion