

Computer Vision AI – Assignment 7

Final Project

December 10, 2012

This assignment combines all the previous steps that students have implemented and add more steps to finalize the project. This is the last guideline regarding your project. **Model_castle** images will be used in the project. Students are expected to submit their projects to S.Karaoglu@uva.nl before 1st of January, 2013, 23:59 (Amsterdam time).

1 Components of the Project and Grading

1. **(1 pt)** Feature point detection, and the extraction of SIFT descriptors.
2. **(1 pt)** Apply normalized 8-point Ransac algorithm to find best matches.
3. **(2 pts) Chaining:** Create point-view matrix to represent point correspondences for different camera views.
4. **(3 pts) Sticking:**
 - (a) Find matching points between consecutive castle images.
 - (b) Estimate 3D coordinates of the points using affine structure from motion.
 - (c) Repeat (a) and (b) for each image set which are composed of three and four consecutive images.

Then you will have different 3D point sets. By an iterative manner, stitch each 3D point set to the main view using the point correspondences. Transformation between different sets can be found using Procrustes analysis. Matlab's `procrustes` function can be used in the project but students are expected to implement Procrustes analysis module (1 pt of 3 pts Sticking).

5. **(1 pt)** Apply bundle adjustment.
6. **(1 pt)** Eliminate affine ambiguity.

7. **(1 pt) 3D Model Plotting:** When you have the 3D point cloud of the castle, use built-in `surf` function for the 3D surface plot. Then include RGB (texture) color of the related points on surf visualization (interpolate color values for the filled areas on the surface using the known points). Students are supposed to implement this in a clever way (by using built-in Matlab functions).