Photogrammetry II

Introduction

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Module: Photogrammetry

Photogrammetry I (summer term)
- 3h VL + 2h Ü

Photogrammetry II (winter term)
- 2h VL + 1h Ü + 1h T

- **Exam:** at the end of the winter term

Expected Time To Be Invested

- Photo 1+2: 10 ETCS = 300h
- Semester = 13 weeks of teaching
- Photo 1: 3VL + 2Ü = 62.5%
- Photo 2: 2VL + 1Ü = 37.5%

Calculation

- Exam preparation: 60h (240h remain)
- Photo 1: 240h * 62.5% = 150h
- Photo 2: 240h * 37.5% = 90h
- **Photo 2:** 90h/13 weeks = **7h/week**

Tutorials

Louis Wiesmann

Module Exam

- Written exam at the end of the winter term after the Photo II course

- Exam admission (Studienleistung)
  - 50% of the points from the homework assignments of Photo I
  - 50% of the points from the homework assignments of Photo II
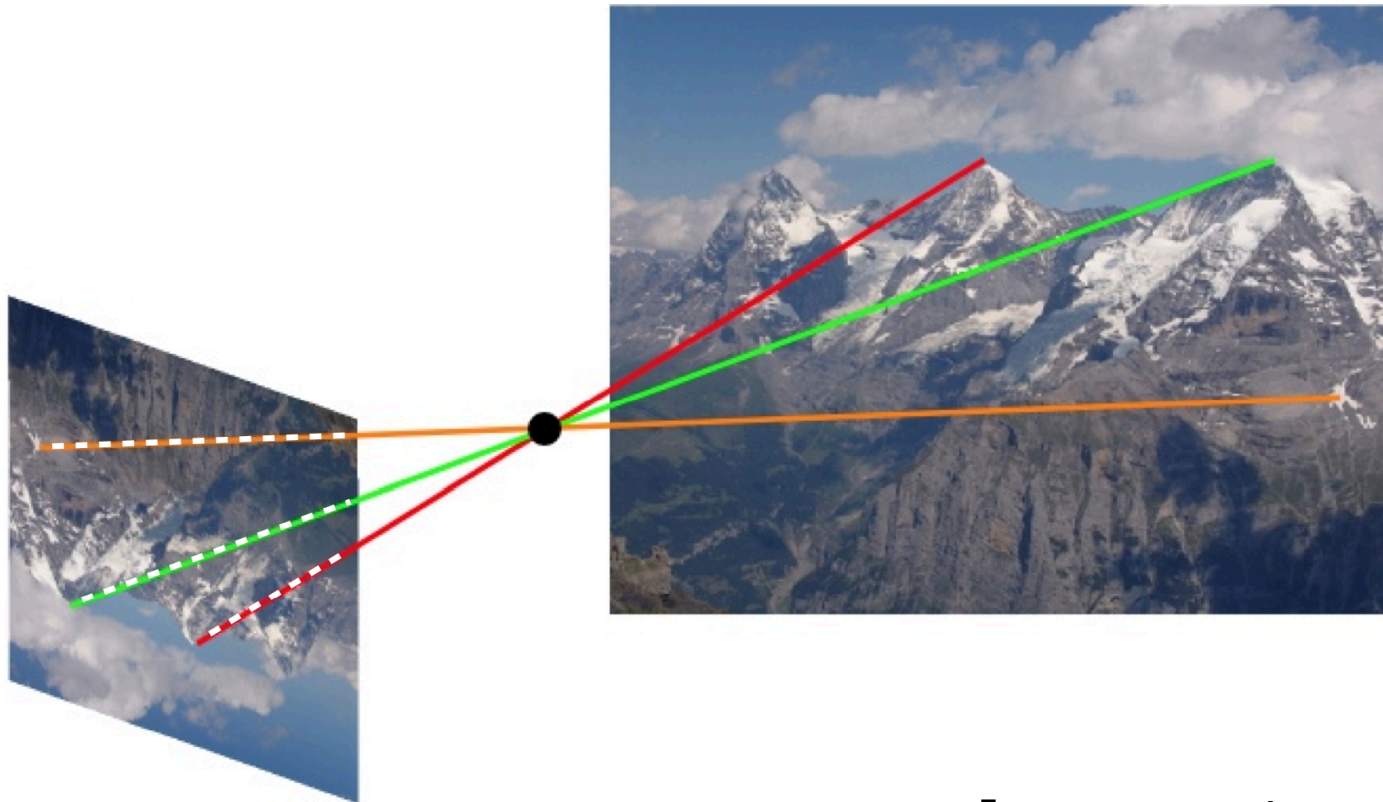
Homework Assignments

- Submission in groups of **2 students**
- **Limit** the collaboration between groups
- Assignment and submission via eCampus
- **50%** of the points of the homework assignments for exam admission

Zero Tolerance on Plagiarism

Photogrammetry II – Topics

Cameras to Measure Directions

An image point in a camera image defines a ray to the object point

3D Perception

Multiple observations from different directions allows for estimating the 3D location of points via triangulation
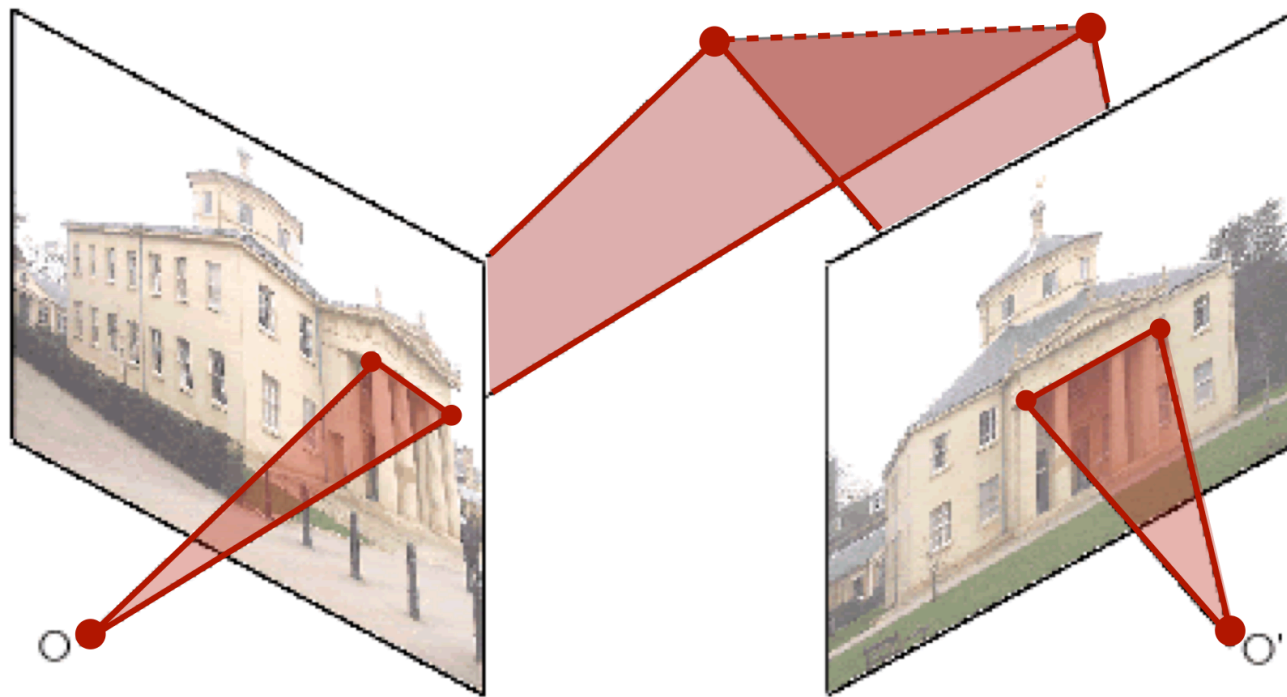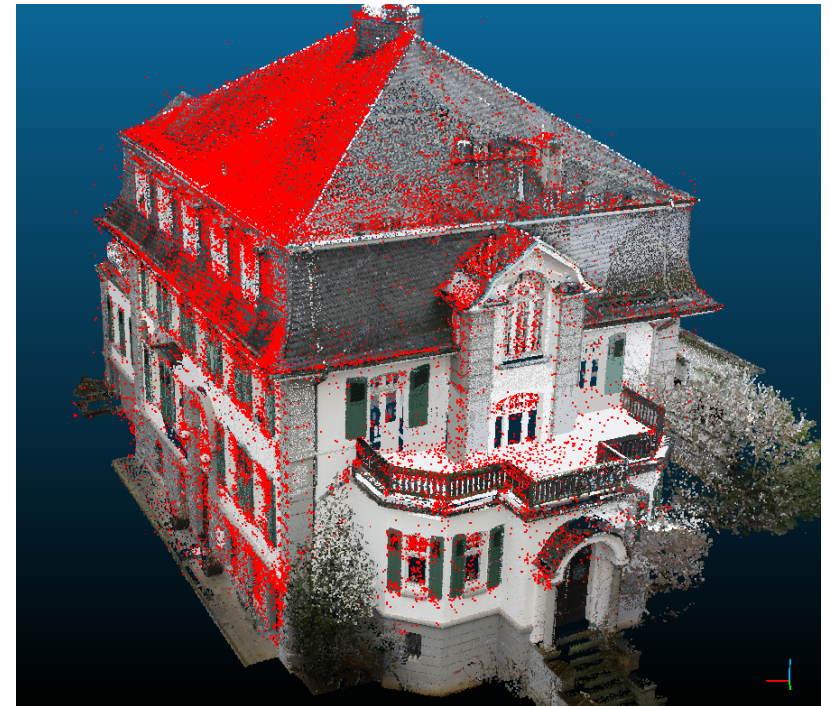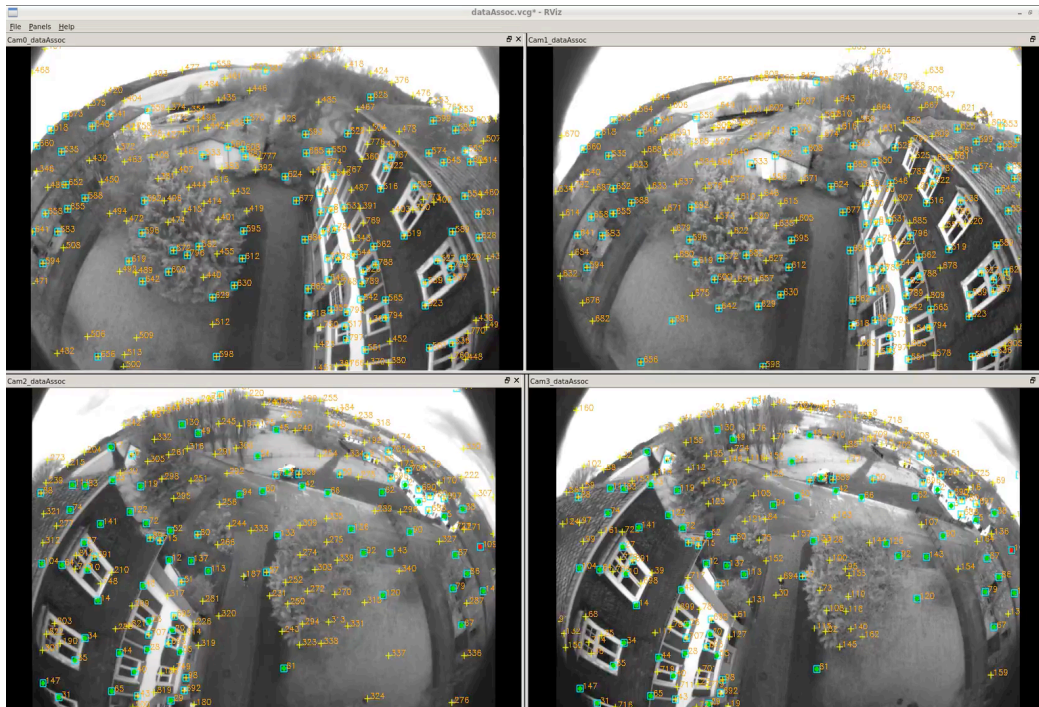
Camera Pose and Point Cloud Estimation

Orthophotos

Photo II: Stereo and Multi-Image Photogrammetry

- Relative orientation of two cameras
- Direct and iterative RO methods
- Triangulation
- Bundle Adjustment
- Orthophotos
- Correspondences & RANSAC
- Recursive state estimation (KF, EKF, UKF)
- Simultaneous localization and mapping

Literature

- **Förstner, Photogrammetrie II**
- **Förstner & Wrobel: Photogrammetric Computer Vision, 2015**
- **Thrun, Burgard, Fox: Probabilistic Robotics, 2005**
- Szeliski: Computer Vision: Algorithms and Applications. Springer, 2010
- Hartley & Zisserman: Multiple View Geometry in Computer Vision, 2004

Questions?