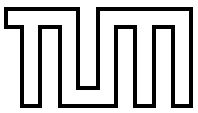
Final Program

PIA '03

ISPRS Conference on
PHOTOGRAMMETRIC IMAGE ANALYSIS



September 17 – 19, 2003
Technische Universität München, Germany

URL: http://www.remotesensing-tum.de/pia03

CONFERENCE CHAIR

Albert Baumgartner[1], **Heinrich Ebner**[1], **Konrad Eder**[1], **Christian Heipke**[2]
Olaf Hellwich[3], **Kian Pakzad**[2], **Helmut Mayer**[4], **Jürgen Peipe**[4]
Carsten Steger[5], **Christian Wiedemann**[5]

[1] Technische Universität München, [2] University of Hannover
[3] Technische Universität Berlin, [4] Bundeswehr University Munich
[5] MVTec Software GmbH, München

Cooperating ISPRS Working Groups

II/IV: Systems for automated geo-spatial data production and updating from imagery
III/4: Automated object extraction
III/5: Algorithms for industrial vision
III/6: Multi-source vision

INVITATION

We kindly invite you to our conference Photogrammetric Image Analysis (PIA), to be held September 17 – 19, 2003 at Technische Universität München, Munich, Germany. This International Society for Photogrammetry and Remote Sensing (ISPRS) single track conference will include four invited and 26 high-level oral presentations. The one-day tutorial "Statistical Methods in Projective Geometry for Image Analysis" will precede the conference on September 16, 2003.

The conference addresses researchers and practitioners from universities, research institutes, industry, government organizations, and engineering companies. It consists of high quality, previously unpublished papers. Contributions present recent research and applications focusing on, but not restricted to the following topics:

- Automatic and semi-automatic object extraction
- Models and strategies for object extraction from aerial images, satellite imagery, surface models, images from video cameras, and laser-scanner data
- Sensor and data fusion including the use of information from geographic information systems (GIS) and computer aided design (CAD)
- Generation of digital surface models and shape-from-X
- Automatic sensor orientation and calibration (off- and online, geometric and radiometric), image based rendering, and augmented reality
- Integration and interaction of digital systems for image analysis and GIS
- Industrial vision systems including real time object recognition
- Quality control and performance evaluation

All presented papers have undergone a rigorous review process. Of 38 submitted papers, 26 have been selected for presentation. Reviewing was carried out double blind with three reviewers per paper by the Program Committee:

Peggy Agouris, University of Maine, USA
Manos Baltsavias, ETH Zürich, Switzerland
Ismael Colomina, Institute Geomatics, Barcelona, Spain
Beata Csatho, The Ohio State University, USA
Sabry El-Hakim, National Research Council Canada
Wolfgang Förstner, Bonn University, Germany
Armin Grün, ETH Zürich, Switzerland
Eberhard Gülch, INPHO GmbH, Stuttgart, Germany

Amnon Krupnik, Technion - Israel Institute of Technology, Haifa, Israel
Franz Leberl, Graz University of Technology, Austria
Chris McGlone, Carnegie Mellon University, USA
David McKeown, Carnegie Mellon University, USA
Hans-Gerd Maas, Technische Universität Dresden, Germany
Ram Nevatia, University of Southern California, USA
Nicolas Paparoditis, Institut Géographique National, Saint-Mandé, France
Marc Pollefeys, University of North Carolina at Chapel Hill, USA
Michel Roux, École Nationale Supérieure des Télécommunications, Paris, France
Toni Schenk, The Ohio State University, USA
Seth Teller, Massachusetts Institute of Technology, USA
George Vosselman, Delft University of Technology, The Netherlands
Felicitas Willrich, University of Hannover, Germany

The proceedings of the conference are published in the International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XXXIV, Part 3-2W8.

The conference will be held at Technische Universität München, a 135 years old academic center of excellence. It is conveniently located near the city center.

Munich is a city of fascinating experiences. Historic buildings of every period, grand boulevards and squares, bear imposing witness to a culture centuries old. Art, in the museums and outside, lures millions of visitors to the city year after year. Unique are Munich‘s beer gardens. Both, locals and guests enjoy this special way of come together during the warm evenings in summer and autumn.

Munich is surrounded by some most splendid landscape including the Bavarian Alps and a number of pleasant lakes. Also, famous sights, including the castles of King Ludwig II are within easy reach of the city.

We are looking forward to seeing you at the conference in September 2003

The Conference Chair

CONFERENCE SITE

Technische Universität München, Main Building, Hall 1100
Entrance: Arcisstr. 21.

REGISTRATION FEES

Payment received	by July 31, 2003	after July 31, 2003
Conference	Euro 220,-	Euro 250,-
Tutorial	Euro 40,-	Euro 50,-

The registration fee for the conference includes a copy of the proceedings, coffee, the icebreaker party, and the conference dinner.

Students with funding problems please contact the organizers.

Students younger than 26 years pay 20 Euro for the tutorial.

If the number of participants for the tutorial is too low, we reserve the right to cancel the tutorial two weeks before September 16.

HOTEL RESERVATION

Room reservations can be made through:

Fremdenverkehrsamt München	Phone: +49-89-233-30-235 or 236 or 237
Code Word: PIA 03	Fax: +49-89-233-30-233
URL: http://www.munich-tourist.de	

ON-SITE REGISTRATION

The registration and information desk will open on Tuesday September 16, 8:00 for the tutorial “Statistical Methods in Projective Geometry for Image Analysis” and on Wednesday September 17, 9:00 for the conference.

SOCIAL PROGRAM

Wednesday, September 17, 19:00 – : Icebreaker Party

Thursday, September 18, 19:00 – : Conference Dinner

CONTACT ADDRESSES

For further details and information please contact:

Conference Secretariat ISPRS-PIA03
Institute for Photogrammetry and Cartography
Bundeswehr University Munich
85577 Neubiberg, Germany
Phone: +49-89-6004-3455
Fax: +49-89-6004-4090

Local Organization Office (during conference only)
Chair for Photogrammetry and Remote Sensing
Technische Universität München
Arcisstr. 21
80333 München, Germany
Phone: +49-89-289-22671
Fax: +49-89-280-9573

OVERVIEW

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<tr><th></th><th>Tuesday, Sept. 16</th><th>Wednesday, Sept. 17</th><th>Thursday, Sept. 18</th><th>Friday, Sept. 19</th></tr>
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Tutorial (Part 1)

Statistical Methods in Projective Geometry for Image Analysis

W. Förstner
Bonn University,
Germany</td><td>09:00 – 11:00

Registration</td><td>09:00 – 10:30
Session 3:
Image Sequences</td><td>09:00 – 10:30
Session 7:
Close Range and Industrial Vision</td></tr>
<tr><td>10:30</td><td colspan="2">10:30 – 11:00 Coffee Break</td><td></td></tr>
<tr><td>11:00</td><td>11:00 – 12:40
Welcome and Keynote</td><td>11:00 – 12:40
Session 4:
Road Extraction</td><td>11:00 – 12:40
Session 8:
Object Representation and Closing</td></tr>
<tr><td>12:40</td><td colspan="3">12:40 – 14:00 Lunch Break</td></tr>
<tr><td>14:00</td><td rowspan="4">14:00 – 17:50
Tutorial (Part 2)</td><td>14:00 – 15:40
Session 1:
Surface Reconstruction and 3D Feature Extraction</td><td>14:00 – 15:40
Session 5:
Roads, Cars, and Navigation</td><td rowspan="4"></td></tr>
<tr><td>15:40</td><td colspan="2">15:40 – 16:10 Coffee Break</td></tr>
<tr><td>16:10</td><td>16:10 – 17:50
Session 2:
Building Extraction</td><td>16:10 – 17:50
Session 6:
Remote Sensing, Laser, and Vegetation</td></tr>
<tr><td>19:00</td><td>19:00 – :
Icebreaker Party</td><td>19:00 – :
Conference Dinner incl. Dinner Talk</td></tr>
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Tuesday, September 16

9:00 – 12:40 Tutorial (Part 1)

14:00 – 17:50 Tutorial (Part 2)

Statistical Methods in Projective Geometry for Image Analysis

W. Förstner, Bonn University, Germany

Projective geometry has been a successful research area in computer vision within the last decade and has shown to play an important role in image analysis. It provides not only a consistent and easy representation of geometric entities such as points, lines, and planes, but also for the camera geometry of single and multiple views.
In this tutorial we will give an introduction into projective geometry, present a toolbox for uncertain geometric reasoning as a basis for new orientation procedures in photogrammetry. These cover explicitly the orientation of one, two, and three cameras.They refer to calibrated, to straight line preserving, and to general camera models and can also be used for analyzing laser range data to advantage. They cover points and lines as basic observations and finally handle uncertain geometric entities including orientation parameters.
The goal is to show that projective geometry eases the setup of quite complex geometric estimation procedures without loosing the rigor and experience of classical photogrammetric orientation procedures. We concentrate our presentation on the following topics:

- Representation of points, lines, and planes in 2D and 3D by homogeneous vectors and matrices
- Euclidean interpretation of homogeneous entities
- Direct Construction of new geometric elements
- Testing geometric relations between elements
- Projections for points and lines and inverse projection
- Orientation of one and two images

The introductory tutorial is meant for all researchers and developers who are interested in the analysis of uncertain geometric entities in 2D and 3D, especially in the context of photogrammetric orientation and calibration. Basic knowledge in linear algebra and statistics is recommended.

Wednesday, September 17

9:00 – 11:00 Registration

11:00 – 12:40 Welcome and Keynote

Opening by Conference Chair
H. Mayer

Welcome Address by the First Vicepresident of Technische Universität München
E. Rank

Welcome Address by the President of ISPRS
J. Trinder

Keynote
Photogrammetric Image Analysis - Quo Vadis?
F. Leberl
Graz University of Technology, Austria

14:00 – 15:40 Session 1: Surface Reconstruction and 3D Feature Extraction

Chairperson: R. Koch

Production of Urban DEMS Combining 3D Vector Data and Stereo Aerial Imagery
C. Baillard
SIRADEL, France

Analysis of Means to Improve Cooperative Disparity Estimation
H. Mayer
Bundeswehr University Munich, Germany

Height Estimation Using Aerial Side Looking Image Sequences
M. Sanfourche, L. Besnerais, P. Foliguet
O.N.E.R.A., France

Extracting 3D Free-Form Surface Boundaries of Man-Made Objects from Multiple Calibrated Images: A Robust, Accurate and High Resolving Power Edgel Matching and Chaining Approach
F. Jung, N. Paparoditis
IGN, France

16:10 – 17:50 Session 2: Building Extraction

Chairperson: C. Baillard

Performance Evaluation of a System for Semi-Automatic Building Extraction
F. Rottensteiner, M. Schulze
Vienna University of Technology, Austria

3D City Models: An Operational Approach using Aerial Images and Cadastral Maps
D. Flamanc, G. Maillet, H. Jibrini
IGN, France

Reconstruction of Building from Interferometric SAR Data of Built-Up Areas
U. Sörgel, U. Thoennessen, U. Stilla
FGAN-FOM, Germany

Statistical Snakes for Building Extraction from Stereoscopic Aerial Images
H. Oriot
O.N.E.R.A., France

19:00 – Icebreaker Party

Thursday, September 18

9:00 – 10:30 Session 3: Image Sequences

Chairperson: C. Steger

Invited Paper

Scene Modeling from Image Sequences
R. Koch
Kiel University, Germany

Orientation and Auto-Calibration of Image Triplets and Sequences
X. Hao[1], H. Mayer[2]
[1] Zhengzhou Institute of Surveying and Mapping, China
[2] Bundeswehr University Munich, Germany

Restitution Automation for Close-Range Applications
A. Valanis, A. Georgopoulos
National Technical University Athens, Greece

11:00 – 12:40 Session 4: Road Extraction

Chairperson: U. Stilla

Dynamic Programming Approach for Semi-Automated Road Extraction from Medium- and High-Resolution Images
A.P. Dal Poz, G.M. do Vale
São Paulo State University, Brazil

External Evaluation of Road Networks
C. Wiedemann
Technische Universität München, Germany

Automated Update of Road Databases Using Aerial Imagery and Road Construction Data
M. Gerke, M. Butenuth, C. Heipke
University of Hannover, Germany

Analysis of Automatic Road Extraction Results from SAR Imagery
B. Wessel, C. Wiedemann
Technische Universität München, Germany

14:00 – 15:40 Session 5: Roads, Cars, and Navigation

Chairperson: C. Wiedemann

Detecting Road Junctions Using Neural Networks

A. Barsi[1], C. Heipke[2]
[1] Budapest University of Technology, Hungary
[2] University of Hannover, Germany

Integrating Local and Global Features for Vehicle Detection in High Resolution Aerial Imagery

S. Hinz
Technische Universität München, Germany

Good Sample Consensus Estimation of 2D-Homographies for Vehicle Movement Detection from Thermal Videos

E. Michaelsen, U. Stilla
FGAN-FOM, Germany

Extracting Landmarks for Car Navigation Systems using Existing GIS Databases and Laser Scanning

C. Brenner, B. Elias
University of Hannover, Germany

16:10 – 17:50 Session 6: Remote Sensing, Laser, and Vegetation

Chairperson: R. Kalliany

Color Image Segmentation Using the Dempster-Shafer Theory of Evidence for the Fusion of Texture

J.B. Mena, J.A. Malpica
Alcalá de Henares University, Spain

Registration of Remote Sensing Image Data Based on Wavelet Transform

M. Tomiya, A. Ageishi
Seikei University, Japan

Laser Pulse Analysis for Reconstruction and Classification of Urban Objects

B. Jutzi, U. Stilla
FGAN-FOM, Germany

Automatic Extraction of Trees from Aerial Images and Surface Models

B.-M. Straub
University of Hannover, Germany

19:00 – Conference Dinner incl. Dinner Talk

Introduction

H. Ebner

Relegation or Reconstruction - The Fateful Life of the Great Buddha of Bamiyan

A. Grün
ETH Zürich, Switzerland

Friday, September 19

9:00 – 10:30 Session 7: Close Range and Industrial Vision

Chairperson: A. Krupnik

Invited Paper

Automation in Industrial Photogrammetric Applications - What Works and What Doesn't
C.-T. Schneider
AICON, Germany

Numerical Simulation on Evaluating Calibration Results of Non-Metric Digital Camera
R. Matsuoka, K. Fukue, K. Cho, H. Shimoda, Y. Matsumae
Tokai University, Japan

Calibration of Curvature of Field for Depth from Focus
G. Blahusch, W. Eckstein, C. Steger
MVTec Software GmbH, Germany

11:00 – 12:40 Session 8: Object Representation and Closing

Chairperson: K. Pakzad

Hierarchical Object Representation - Comparative Multi-Scale Mapping of Anthropogenic and Natural Features
S. Lang, T. Blaschke
University of Salzburg, Austria

Automatic Quality Surveillance of GIS Data with GeoAIDA
S. Müller, M. Weis, C.-E. Liedtke, M. Pahl
University of Hannover, Germany

Closing

C. Heipke