ABSTRACT OF THE TUTORIAL 7

Acquisition and Automatic Characterization of Scenes - From Point Clouds to Features and Objects

Duration:
Full day - 11 July 2016

Conveners:
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Dipl.-Ing. Michael Weinmann
apl. Prof. Dr. techn, Franz Rottensteiner
PD Dr.-Ing. Boris Jutzi

Keywords:
Laserscanning, Range Imaging, Geometry Acquisition, Point Clouds, Reflectance Acquisition, Feature Extraction, Classification, Interpretation, Contextual Information

Target Group:
Beginner to intermediate. All students, researchers and practitioners interested in active optical sensing, point cloud acquisition and state-of-the-art analysis

Abstract:
The adequate acquisition and analysis of a scene are of great interest for photogrammetry, remote sensing and computer vision. In the scope of this tutorial, we will address four major issues in this regard.

- The first part of the tutorial will give an introduction on active optical sensing (laserscanning, range imaging) and processing techniques to gain a basic surface description by label 3D points.
- The second part of the tutorial will focus on geometry and reflectance acquisition and provide both fundamentals and recent advances in these domains with examples for various applications.
- The third part of the tutorial will focus on a semantic interpretation of point cloud data and thereby address all components of a typical processing workflow.
- The forth part of the tutorial will focus on a context-based classification of point cloud data and cover topics reaching from the fundamentals of graphical models to the adaptation of such graphical models to point cloud data.

Martin Weinmann's CV
Martin Weinmann received a Diploma in Electrical Engineering and Information Technology from the University of Karlsruhe (since October 2009: Karlsruhe Institute of Technology (KIT)), Germany. In 2009 and 2010, he was employed at the Karlsruhe Institute of Technology (KIT) and worked as research assistant at the Institute of Systems Optimization and the Institute of Photogrammetry and Remote Sensing. Since 2011, he is a PhD student at the Institute of Photogrammetry and Remote Sensing. His main research interests are in the fields of computer vision, pattern recognition, active 3D vision, image & point cloud processing, and scene analysis. He served several years as reviewer for the International Society for Photogrammetry & Remote Sensing (ISPRS) and for the Institute of Electrical and Electronics Engineers (IEEE).

Michael Weinmann's CV

Michael Weinmann studied Electrical Engineering and Information Technology at the University of Karlsruhe, Germany, where he received a Diploma (Dipl.-Ing.) in 2009. After being employed as a research assistant in 2009 and 2010 at the Karlsruhe Institute of Technology (KIT), he joined the computer graphics group of Prof. Dr. Reinhard Klein at the University of Bonn, Germany, in 2010 which is one of the leading institutes in the field of reflectance acquisition. His research interests include the acquisition of 3D geometry and reflectance, registration and material recognition where he published parts of his work on high-ranked conferences such as ICCV, ECCV and BMVC as well as reputable journals such as the ISPRS Journal of Photogrammetry and Remote Sensing, the Sensors Journal or the Journal on Cultural Heritage.

Franz Rottensteiner's CV

Franz Rottensteiner received the Dipl.-Ing. degree in surveying and the Ph.D. degree and venia docendi in photogrammetry, all from Vienna University of Technology, Vienna, Austria. He was a Postdoctoral Researcher with the Vienna University of Technology; the University of New South Wales, Kensington, N.S.W., Australia; and the University of Melbourne, Parkville, Vic., Australia. He is currently with the Institute of Photogrammetry and GeoInformation, Leibniz Universität Hannover, Hannover, Germany, where he is an Associate (apl.) Professor, leading the Photogrammetric Image Analysis Group. His research interests include photogrammetry, automated extraction of topographic objects, processing of lidar data, and sensor orientation.

Boris Jutzi's CV

Boris Jutzi received a Diploma in Electrical Engineering at University of Kaiserslautern, Germany, obtained his Ph.D. degree at Technische Universität München (TUM), Germany and the Venia Legendi at Karlsruhe Institute of Technology (KIT), Germany. Currently he is associate professor and head of the 'Active Sensors & Computer Vision' Department at the Institute for Photogrammetry and Remote Sensing at KIT. His main research interests are Computer Vision, LiDAR Remote Sensing, automatic Image Analysis, and optical Active Sensing with Full-waveform LIDAR and Time-of-Flight Imaging. He has published over 80 contributions, of which are about 50 peer-reviewed articles. According to Google Scholar 'Boris Jutzi' has been cited more than 600 times and his h-index is currently 15. He served several years for the International Society for Photogrammetry & Remote Sensing (ISPRS), since 2012 he is Vice President of the ISPRS Technical Commission I 'Sensors and Platforms for Remote Sensing'