

CONDITIONAL RANDOM FIELDS FOR URBAN SCENE CLASSIFICATION WITH FULL WAVEFORM LIDAR DATA

J. Niemeyer¹, J.D. Wegner¹, C. Mallet², F. Rottensteiner¹, U. Soergel¹

¹ Institute of Photogrammetry and GeoInformation, Leibniz Universitaet Hannover, Nienburger Str. 1, 30167 Hannover, Germany – (niemeyer, wegner, rottensteiner, soergel)@ipi.uni-hannover.de

² Laboratoire MATIS, Institut Geographique National, Universite Paris Est, 73 avenue de Paris, 94165 Saint-Mandé, France – clement.mallet@ign.fr

Working Groups I/2, III/1, III/4, III/5

KEY WORDS: conditional random fields, 3D point cloud, full waveform LiDAR, urban, classification

ABSTRACT:

We propose a context-based classification method for point clouds acquired by full waveform airborne laser scanners. As these devices provide a higher point density and additional information like echo width or type of return, an accurate distinction of several object classes is possible. However, especially in dense urban areas correct labelling is a challenging task. Therefore, we incorporate context knowledge by using Conditional Random Fields. Typical object structures are learned in a training step and improve the results of the point-based classification process. We validate our approach with two real-world datasets and by a comparison to Support Vector Machines and Markov Random Fields.

This contribution was selected in a double blind review process to be published within the *Lecture Notes in Computer Science* series (Springer-Verlag, Heidelberg).

Photogrammetric Image Analysis

Volume Editors: Stilla U, Rottensteiner F, Mayer H, Jutzi B, Butenuth M

LNCS Volume: 6952

Series Editors: Hutchison D, Kanade T, Kittler J, Kleinberg JM, Kobsa A, Mattern F, Mitchell JC, Naor M, Nierstrasz O, Pandu Rangan C, Steffen B, Sudan M, Terzopoulos D, Tygar D, Weikum G

ISSN: 0302-9743

The article is accessible online through www.springerlink.com.