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A METHOD FOR THE REGISTRATION OF HEMISPHERICAL PHOTOGRAPHS AND TLS INTENSITY IMAGES

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Abstract. Terrestrial laser scanners generate dense and accurate 3D point clouds with minimal effort, which represent the geometry of real objects, while image data contains texture information of object surfaces. Based on the complementary characteristics of both data sets, a combination is very appealing for many applications, including forest-related tasks.

In the scope of our research project, independent data sets of a plain birch stand have been taken by a full-spherical laser scanner and a hemispherical digital camera. Previously, both kinds of data sets have been considered separately: Individual trees were successfully extracted from large 3D point clouds, and so-called forest inventory parameters could be determined. Additionally, a simplified tree topology representation was retrieved. From hemispherical images, leaf area index (LAI) values, as a very relevant parameter for describing a stand, have been computed.

The objective of our approach is to merge a 3D point cloud with image data in a way that RGB values are assigned to each 3D point. So far, segmentation and classification of TLS point clouds in forestry applications was mainly based on geometrical aspects of the data set. However, a 3D point cloud with colour information provides valuable cues exceeding simple statistical evaluation of geometrical object features and thus may facilitate the analysis of the scan data significantly.

[Conference Paper](#) (PDF, 840 KB)

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