



[Volume XXXIX-B3](#)

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B3, 179-182, 2012
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXIX-B3/179/2012/
doi: 10.5194/isprsarchives-XXXIX-B3-179-2012
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A COMPARISON OF TWO DIFFERENT APPROACHES OF POINT CLOUD CLASSIFICATION BASED ON FULL-WAVEFORM LIDAR DATA

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Keywords: full-waveform LiDAR, Decomposition, Unsupervised classification, point cloud, space transform, EM algorithm

Abstract. In this paper, two different point cloud classification approaches were applied based on the full-waveform LiDAR data. At the beginning, based on the full-waveform LiDAR data, we decomposed the backscattered pulse waveform and abstracted each component in the waveform after the pre-processing of noise detection and waveform smoothing. And by the time flag of each component acquired in the decomposition procedure we calculated the three dimension coordination of the component. Then the components' waveform properties, including amplitude, width and cross-section, were uniformed respectively and formed the Amplitude/Width/Section space. Then two different approaches were applied to classify the points. First, we selected certain targets and trained the parameters, after that, by the supervised classification way we segmented the study area point. On the other hand, we apply the IHSL colour transform to the above space to find a new space, RGB colour space, which has a uniform distinguishability among the parameters and contains the whole information of each component in Amplitude/Width/Section space. Then the fuzzy C-means algorithm is applied to the derived RGB space to complete the LiDAR point classification procedure. By comparing the two different segmentation results, which may of substantial importance for further targets detection and identification, a brief discussion and conclusion were brought out for further research and study.

[Conference Paper](#) (PDF, 536 KB)

Citation: Wang, J.-H., Li, C.-R., Tang, L.-L., Zhou, M., and Li, J.-M.: A COMPARISON OF TWO DIFFERENT APPROACHES OF POINT CLOUD CLASSIFICATION BASED ON FULL-WAVEFORM LIDAR DATA, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B3, 179-182, doi:10.5194/isprsarchives-XXXIX-B3-179-2012, 2012.

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