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A PROCEDURE FOR THE REGISTRATION AND SEGMENTATION OF HETEROGENEOUS LIDAR DATA

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Abstract. Laser scanning, whether airborne or terrestrial is being used nowadays for wide spectrum of applications. In addition, many advances have been introduced to the laser scanning technology in the last decade; thus resulting into increased performance in terms of the point density, scanner range, and expected point accuracy. On the other hand, users are encountering scenarios where the integration of various laser datasets becomes essential in order to avoid data gaps (e.g., missing building roofs in the terrestrial scans, or missing structure facades in the airborne case). This problem is usually solved seamlessly through a classical transformation when the average point accuracy is relatively homogeneous over a given dataset. However, this is not usually the case; in this work, we propose a workflow for the optimal registration of multisource point clouds using weighted conformal transformation. First, the individual scans are filtered and the local point attributes are populated through a data characterization step. Then, an ICPP-based weighted registration algorithm is performed over the entire datasets until convergence. Finally, our heterogeneous segmentation procedure is performed in a simultaneous fashion to ensure exploiting the full potential of a dataset. The performance of this algorithm in terms of correctness, automation level, and other factors is evaluated using real datasets with significant variations in point densities and accuracy.

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