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# PRIMITIVE-BASED 3D BUILDING RECONSTRUCTION METHOD TESTED BY REFERENCE AIRBORNE DATA

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Abstract. Airborne LiDAR data and optical imagery are two datasets used for 3D building reconstruction. By study of the complementarities of these two datasets, we proposed a primitive-based 3D building reconstruction method, which can use LiDAR data and optical imagery at the same time. The proposed method comprises following steps: (1) recognize primitives from LiDAR point cloud and roughly measure primitives ' parameters as initial values, and (2) select primitives' features on the imagery, and (3) optimize primitives' parameters by the constraints of LiDAR point cloud and imagery, and (4) represent 3D building model by these optimized primitives. Compared with other model-based or CSG-based methods, the proposed method has some advantages. It is simpler, because it only uses the most straightforward features, i.e. planes of LiDAR point cloud and points of optical imagery. And it can tightly integrate LiDAR point cloud and optical imagery, that is to say, all primitives' parameters are optimized with all constraints in one step. Recently, an ISPRS Test Project on Urban Classification and 3D Building Reconstruction was launched, two datasets both with airborne LiDAR data and images are provided. The proposed method was applied to Area 3 of Dataset 1 Vaihingen, in which there are some buildings with plane roofs or gable roofs. The organizer of this test project evaluated the submitted reconstructed 3D model using reference data. The result shows the feasibility of the proposed 3D building reconstruction method.

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