

# **An Innovative Approach of Evaluating the Accuracy of Point Cloud Generated by Photogrammetry-based 3D Reconstruction**

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## **ABSTRACT**

The theoretical accuracy of photogrammetry-based reconstruction has been studied intensively in literature, but the problem remains in evaluating the accuracy of the generated point cloud in real practice. Typically, checking the coordinates of Ground Control Points (GCPs) using total station is considered a promising approach. However, the GCPs are artificial objects with clear and identifiable features and have consistent normal vectors or less roughness than natural objects, which cannot be considered as typical samples to evaluate the point cloud accuracy. Therefore, the present paper proposes an innovative method based on cloud-to-cloud comparison to evaluate the accuracy of point clouds generated from the SfM-MVS algorithm. The proposed method utilizes close-range photogrammetry with high accuracy as the referencing point cloud. A case study is carried out on a piece of the bare soil surface, which is about 1000m<sup>2</sup> with about a 1.5m elevation variance. Compared to the GCPs-based method, the proposed method is more reliable in evaluating the accuracy of the 3D point cloud model.