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ALIGNMENT OF POINT CLOUD DSMs FROM TLS AND UAV PLATFORMS

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Abstract. The co-registration of 3D point clouds has received considerable attention from various communities, particularly those in photogrammetry, computer graphics and computer vision. Although significant progress has been made, various challenges such as coarse alignment using multi-sensory data with different point densities and minimal overlap still exist. There is a need to address such data integration issues, particularly with the advent of new data collection platforms such as the unmanned aerial vehicles (UAVs). In this study, we propose an approach to align 3D point clouds derived photogrammetrically from UAV approximately vertical images with point clouds measured by terrestrial laser scanners (TLS). The method begins by automatically extracting 3D surface keypoints on both point cloud datasets. Afterwards, regions of interest around each keypoint are established to facilitate the establishment of scale-invariant descriptors for each of them. We use the popular SURF descriptor for matching the keypoints. In our experiments, we report the accuracies of the automatically derived transformation parameters in comparison to manually-derived reference parameter data.

[Conference paper](#) (PDF, 828 KB)

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