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MULTI -STEP AND MULTI -PHOTO MATCHING FOR ACCURATE 3D RECONSTRUCTION

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Abstract. The paper presents an automated procedure for surface reconstruction from digital images. This method was developed for closerange photogrammetric applications, with a particular attention to terrestrial free-form objects that can be modelled with point clouds extracted from images. Therefore, the paper is not directly concerned with architectural elements, where objects feature breaklines and discontinuities that are preferably modelled with manual measurements. The implemented algorithm (MGCM+) integrates two image matching techniques developed in Photogrammetry and Computer Vision in order to obtain metric results in an automated way. Different strategies were exploited to successfully combine both strategies, along with several new improvements. Starting from a set of images and their orientation parameters a preliminary seed model is extracted by using a patch-based algorithm (PMVS). Then, a multi-photo refinement via LSM (MGCM) improves the precision of results and provides a statistical evaluation through a variance-covariance matrix.

[Conference Paper](#) (PDF, 1488 KB)

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