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OBJECT-SPACE MULTI-IMAGE MATCHING OF MOBILE-MAPPING-SYSTEM IMAGE SEQUENCES

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Abstract. This paper proposes an object-space multi-image matching procedure of terrestrial MMS (Mobile Mapping System) image sequences to determine the coordinates of an object point automatically and reliably. This image matching procedure can be applied to find conjugate points of MMS image sequences efficiently. Conventional area-based image matching methods are not reliable to deliver accurate matching results for this application due to image scale variations, viewing angle variations, and object occlusions. In order to deal with these three matching problems, an object space multi-image matching is proposed. A modified NCC (Normalized Cross Correlation) coefficient is proposed to measure the similarity of image patches. A modified multi-window matching procedure will also be introduced to solve the problem of object occlusion. A coarse-to-fine procedure with a combination of object-space multi-image matching and multi-window matching is adopted. The proposed procedure has been implemented for the purpose of matching terrestrial MMS image sequences. The ratio of correct matches of this experiment was about 80 %. By providing an approximate conjugate point in an overlapping image manually, most of the incorrect matches could be fixed properly and the ratio of correct matches was improved up to 98 %.

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