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Automated high resolution 3D reconstruction of cultural heritage using multi-scale sensor systems and semi-global matching

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Abstract. 3D surface models with high resolution and high accuracy are of great value in many applications, especially if these models are true to scale. As a promising alternative to active scanners (light section, structured light, laser scanners, etc.) new photogrammetric approaches are coming up. They use modern structure from motion (SfM) techniques, using the camera as main sensor. Unfortunately, the accuracy and resolution achievable with the available tools is very limited. When reconstructing large objects with high resolution an unacceptably high laborious effort is another problem. This paper shows an approach to overcome these limitations. It combines the strengths of modern surface reconstruction techniques from the remote sensing sector with novel SfM technologies, resulting in accurate 3D models of indoor and outdoor scenes. Starting with the image acquisition all particular steps to a final 3D model are explained. Finally the results of the evaluation of the approach at different indoor scenes are presented.

[Conference Paper](#) (PDF, 678 KB)

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