Volume XL-5

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-5, 371-377, 2014
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-5/371/2014/
doi:10.5194/isprsarchives-XL-5-371-2014

Modelling the appearance of heritage metallic surfaces

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Keywords: Cultural Heritage, Imaging, 3D model, Photogrammetry, Photometric stereo, Rendering, Specularity

Abstract. Polished metallic surfaces exhibit a high degree of specularity, which makes them difficult to reproduce accurately. We have applied two different techniques for modelling a heritage object known as the Islamic handbag. Photogrammetric multi-view stereo enabled a dense point cloud to be extracted from a set of photographs with calibration targets, and a geometrically accurate 3D model produced. A new method based on photometric stereo from a set of images taken in an illumination dome enabled surface normals to be generated for each face of the object and its appearance to be rendered, to a high degree of visual realism, when illuminated by one or more light sources from any angles. The specularity of the reflection from the metal surface was modelled by a modified Lorentzian function.