

A DATA-IDEALITY STUDY FOR PHOTOMETRIC STEREO UNDER UNKNOWN LIGHTING

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Photometric stereo technique allows to reconstruct the three-dimensional shape of an object starting from digital images of it. The method requires that the surface should be Lambertian and the lights should be at infinite distance from the object. In real scenarios this assumptions can not be satisfied, indeed is impossibile to accurately measure the relative position between the light sources and the target. This situation is common in archaeological applications, which is the topic of our studies. Although the Hayakawa method determine an estimation of the light source position starting from the data, in some cases it breaks down because some images deviate from ideality. In order to understand which images from a given dataset should be selected to produce a better reconstruction, we introduce and discuss two measures of data ideality. Then we investigate the performance of these indicators using a synthetic dataset and some experimental datasets.