



Photometric methods for 3D reconstruction

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Abstract

This tutorial will look at 3D reconstruction methods that make use of the powerful shading cue. These techniques require some control of the lighting environment and hence can be thought of as more 'active' than correspondence based reconstruction. Their advantage is that they can provide detailed reconstructions of objects that are challenging for fully passive methods. We will begin by a brief overview of the field including shape-from-shading and classic photometric stereo. We will then cover in some detail the specifics of calibrating illumination, integrating normal fields and dealing with self shadows. The techniques presented in the tutorial will be illustrated with two useful applications. The first is multi-view photometric stereo which can be used to obtain detailed 3D models of untextured objects. The second method is colour photometric stereo which provides reconstructions of deforming objects such as freely moving cloth or human faces.

Syllabus: Photometric stereo, shape-from-shading, 3D modelling, deformable objects