

论文与报告

## 基于照明参数与反射系数的分层SFS算法

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摘要

提出一种由明暗信息复原形状的鲁棒算法. 此算法能有效地估计照明方向、漫反射系数、照明天顶角以及沿图像轮廓由明暗信息复原形状, 并且在考虑自阴影影响情况下, 用新方法从图像的统计特征估计照明的仰角和表面反射系数, 使重建强度梯度接近输入图像梯度实现平滑约束. 该方法为数据驱动, 稳定可靠, 能同时更新表面斜率与高度图, 大大减小发射项与可积分项内的剩余误差. 最后给出SFS (Shape from Shading) 算法的分层实现.

关键词 [照明参数估计](#) [漫反射系数](#) [分层SFS算法](#) [拉普拉斯模型](#) [剩余误差](#)

分类号

## A Hierarchical SFS Algorithm Based on Illuminant Parameters and Surface Albedo

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Abstract

This paper proposes a robust algorithm to recover shape from shading information. This algorithm can estimate effectively illuminant direction, surface albedo, the azimuth of the illuminant and recover shape using shading information along image contours. The elevation of the illuminant and surface albedo are estimated from image statistics, taking into consideration the effect of self-shading. With the estimated reflectance map parameters, we compute the surface shape using a new procedure that implements the smoothness constraint by making the gradients of reconstructed intensity close to the gradients of the input image. The new algorithm is data driven, stable, and updates surface slope and height maps simultaneously, and significantly reduces the residual errors in irradiance and integral terms. Finally a hierarchical implementation of the SFS algorithm is presented.

Key words [Estimation of illuminant parameters](#) [surface albedo](#) [hierarchical SFS algorithm](#) [Lambertian surface model](#) [residual errors](#)

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