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## 研究论文

### 秩1约束下基于圆球的相机标定算法

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摘要:

利用圆球投影的秩1约束特性, 提出了一种基于圆球标定物的相机内参数标定算法. 从绝对二次曲线投影、圆球投影的关系上对秩1约束进行了几何解释, 由此推导出圆球投影与绝对二次曲线投影之间的3个约束公式. 在几何意义明确的基础上, 分析了球体投影与相机内参数的关系, 并采用非线性优化算法求解相机内参数. 实验结果表明, 该算法的鲁棒性好, 相对于传统算法, 可以提高相机内参数的求解精度.

关键词: 相机标定 圆球 秩1约束 几何解释

### Rank-1 constraint for camera calibration based on spheres

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Abstract:

With the rank-1 constraint, a method for camera intrinsic parameters calculation based on spheres is proposed. The geometric interpretation of the rank-1 constraint is explored from the relation of the image of the absolute conic and the sphere image. Three algebraic equations are derived from the rank-1 constraint. The relation of the sphere images and the camera intrinsic parameters is clearly interpreted in vision geometry. Finally, a nonlinear optimized method is used with the three constraint equations for improving the accuracy. Experimental results show that our method is robust. Compared with the traditional method, it can improve the accuracy of the results of the intrinsic parameters.

Keywords: camera calibration sphere rank-1 constraint geometry interpretation

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- Article by Wu,C.K

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