



航空学报 2012, Vol. 32, Issue (5): 886-892 DOI: CNKI:11-1929/V.20111231.1406.003

电子与自动控制

[最新目录](#) | [下期目录](#) | [过刊浏览](#) | [高级检索](#)

[<<](#) [<](#) [前一页](#) | [后一页](#) [>](#) [>>](#)

### 基于Census变换和改进自适应窗口的立体匹配算法

周龙, 徐贵力, 李开宇, 王彪, 田裕鹏, 陈欣

南京航空航天大学 自动化学院, 江苏 南京 210016

### Stereo Matching Algorithm Based on Census Transform and Modified Adaptive Windows

ZHOU Long, XU Guili, LI Kaiyu, WANG Biao, TIAN Yupeng, CHEN Xin

College of Automation Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China

摘要

参考文献

相关文章

Download: [PDF \(2386KB\)](#) [HTML KB](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

**摘要** 针对现有立体匹配算法难以在幅度失真图像中获取高匹配精度的问题,提出了一种基于Census变换和改进自适应窗口的立体匹配算法。首先根据图像结构和色彩信息获得基于十字骨架的任意形状和大小的Census变换窗口;其次利用Census变换的Hamming距作为匹配代价,使用两次累加降低计算复杂度,采用局部优化得到初始视差;最后提出一种基于均值偏移的视差提精方法,有效地处理了不可信视差区域,获得高精度的视差图。实验表明,通过该算法获得的视差图与当前优秀的局部算法相比精度相当,特别是能很好地处理现有算法难以解决的幅度失真问题,适用于无人视觉导航的应用。

**关键词:** 立体匹配 Census变换 改进自适应窗口 幅度失真 视差提精

**Abstract:** In view of the fact that it is difficult for existing stereo matching algorithms to obtain high matching accuracy from images with radiometric differences, this paper proposes a novel algorithm based on Census transform and modified adaptive windows. First, according to the image structure and color information, an arbitrary shaped adaptive window based on the cross skeleton is constructed. Then, a matching cost based on Hamming distance is determined by Census transform. A two-step accumulation is used to reduce the computation complexity. The matching cost is subsequently optimized by winner-takes-all to gain initial disparity. Finally, A novel disparity refinement method based on mean-shift is proposed which is able to deal with the unreliable initial estimates and obtain a highly accurate disparity map. Experiments demonstrate that, compared with the state-of-art local algorithms, the proposed algorithm produces comparable accuracy: in particular, it can handle radiometric differences which are not solved by the state-of-art algorithms. Therefore the algorithm can be applied to environments of UAV vision navigation.

**Keywords:** stereo matching Census transform modified adaptive window radiometric difference disparity refinement

Received 2011-08-07;

Fund: 国家自然科学基金(60974105); 航空科学基金(20100152003); 江苏高校优势学科建设工程资助项目

Corresponding Authors: 徐贵力, Tel: 025-84892284 E-mail: guilixu2002@163.com Email: guilixu2002@163.com

引用本文:

周龙, 徐贵力, 李开宇, 王彪, 田裕鹏, 陈欣. 基于Census变换和改进自适应窗口的立体匹配算法 [J]. 航空学报, 2012, (5): 886-892.

ZHOU Long, XU Guili, LI Kaiyu, WANG Biao, TIAN Yupeng, CHEN Xin. Stereo Matching Algorithm Based on Census Transform and Modified Adaptive Windows [J]. Acta Aeronautica et Astronautica Sinica, 2012, (5): 886-892.

#### Service

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ Email Alert
- ▶ RSS

#### 作者相关文章

- ▶ 周龙
- ▶ 徐贵力
- ▶ 李开宇
- ▶ 王彪
- ▶ 田裕鹏
- ▶ 陈欣