

基于种子点传播的快速立体匹配

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Fast stereo matching based on seed pixel propagation

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摘要

图/表

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摘要 针对计算机视觉中的对应点误匹配问题,提出了一种基于种子点传播的快速局部立体匹配算法来进一步提高匹配算法的运行效率。该算法首先利用Canny算子提取图像边缘,结合边缘信息构造动态匹配窗口,以克服固定窗口对匹配带来的不利影响;然后利用AD-Census联合匹配代价在动态窗口上进行代价聚集,用WTA搜索策略得出初始视差图,对视差值进行筛选以确定种子点;随后利用像素间颜色差异将种子点的视差值传递给周围非种子点;最后采用区域投票和局部校正方式对视差值求精,进而获取精确的稠密视差图。实验结果表明,该算法可对Middlebury测试图生成高质量的视差图。与目前较新的局部立体匹配算法相比,其运行速度提高了1.8倍,满足了实际应用对速度和精度的要求,具有较高的实用价值。

关键词 : 计算机视觉, 立体匹配, 边缘检测, 种子点, 视差传播, 视差图

Abstract : For the mismatching problem in computer vision, a fast local stereo matching algorithm based on seed pixel propagation was proposed to further improve the efficiency of matching algorithm. Firstly, the edge of an image was extracted using Canny operator in order to overcome the adverse influence of a fixed window on stereo matching by combining with the edge information to construct a dynamic matching window. Then, the AD-Census combined matching costs was used to realize the cost aggregation on the dynamic window, the initial disparity map was obtained by WTA search strategy and the disparity was filtrated to get seed pixels. Furthermore, the color difference between pixels was used to propagate the disparity of seed pixels to around unseeded pixels. Finally, the region voting and local rectification were adopted to refine the disparity and to get the accuracy dense disparity map. Experimental results show that the algorithm provides high-quality disparity map on Middlebury data set, the computing time is accelerated by 1.8 times as compared with that of newer local matching algorithms at present. It meets the demands of actual applications for accuracy and speeds.

Key words : computer vision stereo matching edge detection seed pixel disparity propagation disparity map

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