基于运动矢量多级分析的视频全局运动估计

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Global Motion Estimation Based on the Multi-stage Analysis of Motion Vectors

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摘要 基于运动矢量场的视频全局运动估计相较于基于像素的估计方法具有较低的计算复杂度，因而广泛应用于视频分割及视频压缩等领域中。然而噪声和前景目标等外点区域的存在，降低了全局运动估计的准确性。为了提高全局运动估计的准确度，该文提出一种基于运动矢量多级分析的全局运动估计算法，该算法根据局部运动与全局运动的运动特性差异自适应地滤除前景目标区域，由邻域矢量间相似性度量检测出纹理平滑周期区域，最后滤除孤立的噪声区域，由滤波得到的内点区域求解全局运动参数。实验结果表明，该方法能有效地滤除外点区域，提高全局运动估计的准确性。

关键词： 图像处理　全局运动估计　运动矢量场　多级外点滤除　运动参数模型

Abstract： Global motion estimation based on motion vector field has lower complexity than pixel-based method, so it is widely used in video segmentation and compression. However, outlier motion vectors, caused by image noise or foreground objects, reduce the accuracy of motion vector-based global motion estimation. In this paper, a global motion estimation algorithm based on the motion vector multi-stage processing is proposed to improve the estimation accuracy. The proposed method adaptively removes foreground objects by comparing the motion characteristics differences between the local motion and global motion area. For each block considered, the motion similarity between the neighboring blocks is exploited to detect the cycle smooth area. The isolated noise area is also filtered out. Finally, the inlier motion vectors are used to estimate the global motion parameters. Experimental results show that the proposed scheme filters effectively outlier motion vectors and improves the accuracy of global motion estimation.

Keywords： Image processing   Global motion estimation   Motion vector field   Multi-stage outlier filter   Motion parameter model

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