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基于显著性直方图的粒子滤波跟踪

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Particle filter tracking based on saliency histogram

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摘要 提出基于显著性直方图模型的粒子滤波跟踪方法,以提高复杂背景下目标跟踪的稳定性。通过对比目标与背景区中像素色调的分布,确定出不同色调等级的显著性权值,从而建立能够突出目标显著性颜色信息的直方图模型。利用显著性直方图模型可抑制背景中与目标具有相似色调的区域对目标识别的干扰,突出了目标特有色调在目标识别中的作用,从而提高目标识别的准确性。实现了基于显著性直方图粒子跟踪算法,并进行了仿真实验。结果表明:该方法适用于复杂背景下的目标跟踪,计算量增加不大。与传统粒子滤波方法相比,本文方法目标定位准确,跟踪过程中粒子尺寸小,从而有效减小了单帧跟踪运算时间,单帧平均跟踪时间小于5 ms,满足跟踪系统实时性的要求。

关键词 : 目标识别, 目标跟踪, 显著性直方图, 粒子滤波

Abstract : A particle filter tracking method based on the saliency histogram was proposed to improve the stability of target tracking in a complex background. The saliency weights of hues in the histogram were determined by comparing the distribution of the hues in the target and the background. Then, a saliency histogram was established. The saliency histogram could restrain the disturbance from the background to the target by strengthening the recognition role of the hues existing only in the target. Thus, the accuracy of the target location could be improved. On the saliency histogram, the particle tracking algorithm was implemented and a simulation experiment was performed.The experimental results show that the method proposed in the paper can be applied to performance of the target tracking in the complex background with the low computation cost. Furthermore, the sizes of the particles are small because the model is accurate. As compared with the traditional particle tracking method, the proposed method has low tracking computation time for the single frame, and its average tracking computation time is less than 5 ms, which well satisfies the real-time requirement.

Key words : targer recognition target tracking saliency histogram particle filter

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