论文与报告

一种利用形状片段的物体检测方法

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摘要
针对物体检测中传统方法计算量大, 对复杂背景敏感, 且大部分物体检测方法只能得到物体所在区域而不能精确定位物体边缘等问题, 本文提出一种基于形状片段特征的物体检测方法. 该方法首先根据训练集得到具有多尺度特性的物体形状片段模型; 对测试图像按照和模型中边缘片段提取一致方法, 根据形状片段间的相似度, 选取出候选形状片段; 然后根据候选形状片段估计出模型中的片段与测试图像中片段之间的旋转角; 最后结合具有全局约束的概率Hough变换, 将物体检测问题转换为Hough空间概率问题; 根据Hough空间求解出的物体中心位置, 对候选形状片段验证, 得到实际物体轮廓片段. 理论分析和实验结果表明, 本文提出的算法具有较好的效果.

关键词 物体检测 Hough变换 不变量 形状分析 形状描述子
分类号

Object Detection Based on Shape Fragments

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Abstract
Most of the algorithms for object detection are sensitive to background clutter and occlusion, and cannot localize the edge of the object. In this paper, the authors present an approach based on the local shape fragments. Firstly, the model of the object is learnt from the training set. The model is composed of shape fragments and the model of the object is in multi-scales. In this way, the method is invariant to scale changes. Then, shape fragments are extracted from the test image, which is in the same way at the model shape fragments extracting method. According to the similarity of the shape fragments, candidate shape fragments are got from the test image. After that, according to the rotation relationship between the fragments on the model and the test image, rotation angle between the fragments are estimated. Finally, the object detection problem is casted to the peak detection problem in Hough space by combining the probability Hough transform. After peak positions are achieved in the Hough space, each candidate shape fragment is traced back to verify whether it belongs to the object. Test results show that the proposed method is valid.

Key words Object detection Hough transform invariant shape analyze shape descriptor

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