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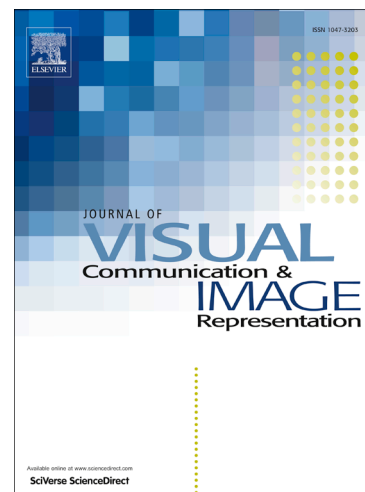
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Contour Segment Grouping for Object Detection

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Abstract

In this paper, we propose a novel framework for object detection and recognition in cluttered images, given a single hand-drawn example as model. Compared with previous work, our contribution is three-fold. 1) Three preprocessing procedures are proposed to reduce the number of irrelevant edge fragments that are often generated during edge detection in cluttered real images. 2) A novel shape descriptor is introduced for conducting partial matching between edge fragments and model contours. 3) An efficient search strategy is adopted to identify the location of target object hypotheses. In the hypotheses verification stage, an appearance-based (support vector machine on pyramid histogram of oriented gradients feature) method is adopted to verify the hypothesis, identify the object, and refine its location. We do extensive experiments on several benchmark datasets including ETHZ shape classes, INRIA horses, Weizmann horses, and the two classes (anchors and cups) from Caltech 101. Experimental results show that the proposed method can significantly improve the accuracy of object detection. Comparisons with other recent shape-based methods further demonstrate the effectiveness and robustness of the proposed method.

Keywords: Shape-based object detection; Contour grouping; Depth-first search

1. Introduction

Object detection is a very important and difficult task in computer vision and image analysis, which seeks to locate and identify specific classes of objects within images. This

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