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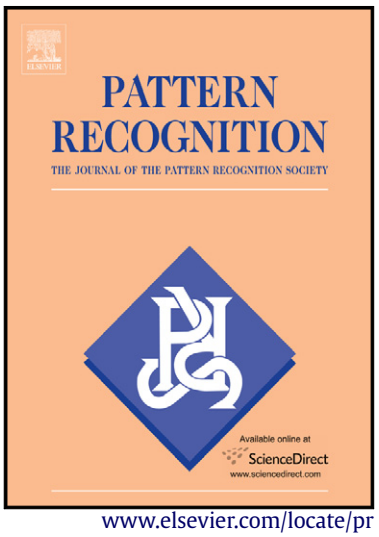

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Abstract

It is a very challenging problem to well simulate visual attention mechanisms for content-based image retrieval. In this paper, we propose a novel computational visual attention model, namely saliency structure model, for content-based image retrieval. First, a novel visual cue, namely color volume, with edge information together is introduced to detect saliency regions instead of using the primary visual features (e.g., color, intensity and orientation). Second, the energy feature of the gray-level co-occurrence matrices is used for globally suppressing maps, instead of the local maxima normalization operator in Itti's model. Third, a novel image representation method, namely saliency structure histogram, is proposed to stimulate orientation-selective mechanism for image representation within CBIR framework. We have evaluated the performances of the proposed algorithm on two datasets. The experimental results clearly demonstrate that the proposed algorithm significantly outperforms the standard BOW baseline and micro-structure descriptor.

Keywords: Image retrieval; gray level co-occurrence matrix; visual attention; saliency structure model; saliency structure histogram.

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1. Introduction

With the development of digital image processing technology, large collections of image data have become readily available. Since the demand of market, search or retrieval has become a popular service, where image retrieval has also become a very extensively investigated topic, but how to extract features from the vast amount of image data is a challenging problem. Fortunately, human's visual system has visual attention

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