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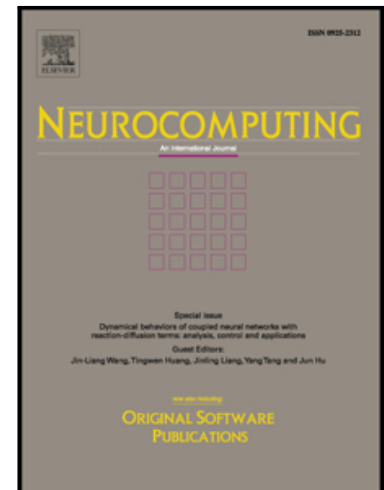
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Saliency based Object Tracking in Complex Scenes

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Abstract: A robust visual tracking system is expected to track the object accurately and rapidly in complex scenes with clutters, distracters and partial occlusion etc. These challenges remain the focuses of current research. Studies on human vision reveal that the human visual system is able to tackle these challenges efficiently by applying mechanisms including visual saliency and attention. Inspired by this research finding, this paper presents a saliency-based tracking method for robust tracking. The major steps include saliency computation, feature tracking and model updating. The saliency of visual features is defined on their regions of interest. By examining visual saliency in regions of a visual object and its environment, we are able to estimate object saliency and environment saliency of extracted visual features for robust visual tracking. Experiments indicate that the proposed method can achieve promising performance in an environment with distracters and partial occlusion compared with the state of the art tracking methods.

Keywords: Robust tracking, Visual saliency, Partial occlusion, Local Sensitive Hash.

1. Introduction

Object tracking is widely applied in practical applications, which is expected to track the object accurately and rapidly. Under the condition of practical applications, complex scenes with clutters, distractions and partial occlusion *etc.* challenge tracking systems. A robust tracking method needs to tackle these factors. These challenges remain the focuses of current research and require further investigation. Human vision system can deal with complex scenes accurately and rapidly. Psychological and perceptual research has demonstrated that the saliency mechanism, which guides human attentions to the critical spatial locations and visual features of the scene preferentially, is the significant principle in human visual search [1, 2]. Biological vision research also indicates that human attention plays a decisive role for visual tracking by the human visual system [3-5] that relies on the distinctiveness of features of the target [6].

Saliency mechanisms have already been introduced into the visual tracking community. Collins *et al* treat object tracking as a maximum separability problem between the target and the background. In this method, the more discriminative features are selected for the target in a color space [7]. Mahadevan *et al* utilize center surround mechanism to evaluate feature saliency and select salient features based on classification accuracy [8]. Wu *et al* extract salient keypoints of the target by

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