International Journal of Innovative
Computing, Information and Control
Volume **5**, Number **3**, March **2009**

ICIC International ©2009 ISSN 1349-4198
pp. 725–734

EXTRACTION OF ATTRACTIVENESS MAP OF IMAGES BASED ON PRINCIPAL COMPONENT ANALYSIS FOR IMAGES TAKEN BY PLURAL CAMERAS

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Received February 2008; revised June 2008

Abstract. *This paper describes a method that extracts attractiveness map of input images. It estimates the degree of attractiveness of each part of the images using plural images taken by plural cameras. The attractiveness is expected to indicate the high possibility of existing of interest objects. We assume that the novel objects are contained in only a few images among the plural images. The degree of attractiveness of each part of the particular input images containing objects is obtained by subtracting the reconstructed background images from the input images. The adequate background images for the particular input images are inferred from other input images which does not contain novel objects. Since illumination condition is inferred from the input images which does not contain objects, appropriate background images can be reconstructed without suffering the effect of contained objects. The effectiveness of the method is confirmed by computer simulations.*

Keywords: Attractiveness, Principal component analysis, Object detection, Region of interest

1. **Introduction.** Human does not analyze the whole area of an input visual image uniformly. He or she analyzes a visual scene moving his or her attention from one place to another. It is desirable that computer vision systems should have a function to pay attention to the region where the objects probably exist. Then the systems can concentrate their computational resources there. The systems can not only improve the processing efficiency but also remove the effect of noise. Moreover if the systems have a function of attention they may be utilized to detect the region of interest. The region of interest may be useful not only for image analysis but also for various multimedia technology [1,2].

Where is visual attention attracted? The degree to which visual attention is easily attracted has been quantified as the degree of saliency. Itti and Koch [3] proposed a model to obtain the saliency map of an input image. The saliency map topographically codes for local conspicuity over the entire complex scene. This model has been applied in several cases for years as in [4-6]. Meanwhile, Wang, Cavanagh, and Green [7] found a psychological phenomenon that the reaction time in the search for an unfamiliar target among familiar distractors is usually shorter than that in the search for a familiar target among unfamiliar distractors. This asymmetrical effect in visual search might implies that the degree to which attention can be easily directed to a certain area of the image is influenced by visual experience. The model in the paper [3], however, does not cover this effect. To account the effect of visual experience, there proposed a new saliency map model that calculates the saliency based not only on the input image but also on the results of learning [8,9]. This model determines the feature primitives by using Principal