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OBJECTS EXTRACTION ALGORITHM OF COLOR IMAGE USING ADAPTIVE FORECASTING FILTERS CREATED AUTOMATICALLY

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Abstract. *This article presents an interactive color object extraction scheme based on pixels extracting where users outline the desired objects on the input original RGB color image as the original seeds. The proposed algorithm analyzes the distribution of seeds in the neighboring region of a seed to automatically generate an adaptive forecasting filter and the corresponding threshold vector. The filter utilizes its corresponding threshold vector to identify the pixels which resemble the desired object. These identified pixels are added to seeds set and can then be used as seeds to extract other pixels. The extraction steps are repeated according to the modified significance linked connected component analysis (SLCCA) scheme until all the seeds in the set are used. Finally, the coordinates of seeds of the final seeds set are transformed to the original input RGB color image to extract the desired objects. In the experiment, several measures of errors, such as ME, RFAE, EMM, EER, MHD, are conducted to measure the performance of the proposed algorithm. The experimental results show that (a) the proposed algorithm can simultaneously and efficiently extract multiple desired objects from an RGB color image even though the background complexity and the number of seeds is small (one seed only); (b) the proposed algorithm is simpler and saves more time than the MSRM scheme [19] with the same precision; (c) the proposed algorithm is very accurate and efficient compared with the DTS scheme [18].*

Keywords: RGB (Red, Green and Blue), HSI (Hue, Saturation and Intensity), Adaptive

1. **Introduction.** Object extraction (or image segmentation) separates assigned objects from the background. Today, object extraction plays a central role in the areas including: medical image analysis [1,2], video object extraction [3], tracking systems [4] and pattern recognition [4,5].

The segmentation of an image is a process of dividing an image into non-overlapping regions which are groups of connected homogeneous pixels. There are lots of ways of defining the homogeneity of a region in the segmentation process. Typical parameters include color, depth of layers, gray levels, texture, etc. Pal and Pal [6] provided a review on various segmentation techniques; they concluded that segmentation has no standard approach, and that the most appropriate segmentation technique depends on the characteristic of an image and its applications. The most commonly used approaches in still image can be divided into the following: histogram thresholding [2,7], feature/color space clustering [8], edge detection approaches [9], neural network based approaches [10], region-based approaches [11], Markov random field [12] and mixture-of-Gaussians modeling [13], physics-based approaches [14], and combinations of above [3,15], where Histogram-based methods, boundary-based methods, region-based methods, hybrid-based methods and graph-based techniques are the five primary types of segmentation techniques.