IMAGE SEGMENTATION BASED ON EDGE DETECTION USING BOUNDARY CODE

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Abstract. *Image segmentation is an important basic process in image analysis. It is used in several processes, which receive the input of more advanced processes, the result of which will affect the accuracy of overall results significantly. Edge detection is the basic process of image segmentation. The Sobel filter, Derivative of Gaussian and Laplace of Gaussian are well-known methods of edge detection. However, these methods cannot detect edge details and it remains difficult to segment thin areas because the edge pixels obliterate details. For example, in a text image, the details of the characters are obliterated by using these methods. We propose an image segmentation method by using boundary code to solve this problem. Thin areas are segmented continuously by using our proposed segmentation method. In an experiment, we compare the proposed method with existing methods. We use binarization with a discriminant analysis method and a Sobel filter to compare our proposed method. According to the experimental result, the proposed method segments more accurately than existing methods in images that have a narrow elongated object, shading and blurring.*
Keywords: Image segmentation, Edge detection

1. **Introduction.** Image segmentation is an important basic process in image analysis. Segmented images are used for several processes such as computer vision [1,2], the analysis of remote sensing data [3-5], the analysis of medical data [6-8], the analysis of astronomical data [9,10] and many other applications. However, the result of these processes is affected by the accuracy of the results of segmentation significantly.

Several image segmentation methods have been studied over quite a long period of time [9,11-15], and they can basically be classified into three categories [11].

(1) Edge-based segmentation.
(2) Region-based segmentation.
(3) Characteristic feature thresholding or clustering.

Edge-detection techniques consist of making a decision as to whether pixels are an edge or not. These techniques include high-emphasis spatial frequency filtering, gradient operators adaptive local operators [16-20], functional approximations [21] and line and curve fitting [22]. These basic methods are still used in new segmentation methods [10,23,24].

Region merging, region splitting and a combination of region merging and splitting approaches [11,15] are well known as region-detection techniques. The basic techniques of region detection are based on the techniques of edge detection.

In characteristic feature thresholding or clustering, threshold selection schemes are based on a gray-level histogram and local properties, and clustering techniques were known as a multidimensional extension of the concept of thresholding [11,25,26]. Generally, it