AN ADAPTABLE THRESHOLD DECISION METHOD

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ABSTRACT. Otsu’s thresholding method (OTM) is one of the most commonly used thresholding methods. Unfortunately, the threshold obtained by OTM is biased in favor of the class, whose standard deviation or quantity (number) of data is larger. Besides, one may adopt distinct thresholds in different applications for a same data set. Accordingly, this paper proposes an adaptable threshold decision method (ATDM) to provide the most appropriate thresholds for assorted applications. This paper also proposes a PSO (particle swarm optimization) based parameters detector (PBPD) to decide the fittest parameters which are used by ATDM. Image segmentation extracts the regions of interest from an image for follow-up analyses, and thresholding is one important technique for image segmentation. This paper will employ ATDM to detect the object contours in an image in order to investigate the performance of ATDM. The experiments show that ATDM can give impressive segmentation results.

Keywords: Thresholding, Otsu’s method, Image segmentation, Serial images

1. Introduction. Many thresholding methods [1,7,8,13-16] have been proposed in the past two decades. Otsu’s thresholding method (OTM) [16] has been widely used because of its simplicity. It evaluates each possible threshold using discriminative criterion, and finally takes the one, that maximizes between-class variance or minimizes within-class variance, as the optimal threshold. OTM often provides satisfactory thresholds for separating a set data into classes. However, Hou et al. [8] found that the threshold obtained by OTM tends to get closer to the cluster with a larger variance or a larger quantity of...