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An Experiment with Statistical Region Merging and Seeded Region Growing Image Segmentation Techniques

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Abstract and Figures

This paper puts forth our observations from the experiments conducted on interactive segmentation techniques - Statistical Region Merging and Seeded Region Growing, both based on Region Growing methods, using Matlab software on selected natural images. Both these techniques meant to solve segmentation challenges posed by medical images and were effective as well; however, in this experiment, we have subjected natural images to these techniques to assess the effectiveness. We have chosen the images such that those have complexities and pose segmentation challenges. The objective of this experiment is to understand and assess the effectiveness of these techniques on select natural images, which have complex image composition in terms of intensity, color mix, indistinct object boundary, low contrast, etc. We have used Jaccard Index, Dice Coefficient and Hausdorff Distance as measures to assess the accuracy, besides visual assessment. We have compared the segmented images with ground truth using these accuracy measures. While both the techniques failed to give acceptable results on most of the images, relatively, we have found Statistical Region Merging to be slightly better than Seeded Region Growing method.

Segmentation Set I | Segmentation Set III | Segmentation Set V | Segmentation Set VII | Segmentation Set VIII

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An Experiment with Statistical Region Merging and Seeded Region Growing Image

Segmentation Techniques

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Keywords: Statistical Region Merging · Seeded Region Growing · Interactive segmentation · Effectiveness

1 Introduction

1.1 Background

Image segmentation is about extracting foreground or object of interest from background and image segmentation has been a challenge ever since the need came into existence. The purpose or application behind each segmentation need has been different and hence different algorithms; each suitable for the specific purpose. Since about last

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... Numerous image segmentation algorithms have been developed in the literature, from the earliest methods, such as thresholding [6], region growing [7, 8] , k-means clustering [9], watersheds [10], to more advanced methods, such as power watershed [11][12][13], watershed-cut [14], mutex watershed [15], active contours [16,17], graph cuts [18][19][20][21] [22], Markov random fields [23], and sparsity based methods [24]. The interested reader may refer to ([25] Section 2) for an exhaustive review of the literature regarding segmentation algorithms. ...

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