Medical Image Processing Using Image Segmentation Techniques

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Abstract

Background: Medical image segmentation has an essential role in computer-aided diagnosis systems in different applications. The vast investment and development of medical imaging modalities such as microscopy, dermoscopy, X-ray, ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), and position emission tomography attract researchers to implement new medical image-processing algorithms [1].

Objectives: Medical Image segmentation is an important image processing step. Comparing images to evaluate the quality of segmentation is an essential part of measuring progress in this research area. It divides an image into areas based on a specified description, such as segmenting body organs/tissues in the medical applications for border detection, tumor detection/segmentation, and mass detection [2]. The objective is to analyze the x-ray image and segment and highlight the infected area for better observation.

Methodology: The image segmentation techniques that use information regarding texture, shape, contours, etc., perform well when the images are simple, less noisy, and the problem can be described in some closed a mathematical form that can be solved analytically [3]. In this project different types of Threshold operations, Canny edge detection, Region Growing, Genetic algorithms, and K-means have been used [4].

Results and discussion: The result of image segmentation depends on many factors, i.e., pixel color, texture, intensity, the similarity of images, image content, and problem domain. It is not possible to consider a single method for all types of images. All methods can perform well for a particular type of image [5].

Conclusions and future work: This paper summarizes various segmentation techniques, the advantages, and the disadvantages. Segmentation can be applied to the X-ray image. Comparing to other methods thresholding is the simplest and computationally fast. In the future will be implementing the Gas (Genetic Algorithms) algorithm into image analysis and segmentation and few other methods and also will try to get more optimized and more accurate results using optimized segmentation techniques.

References

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