INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Impact Factor: 8.165

A Survey on Thresholding based Lung Segmentation

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ABSTRACT: In image processing, segmentation refers to a process that involves partitioning or dividing the digital image into multiple segments. It is one of the important steps, that is used to analyse the processed image. Thresholding is considered as one of the most commonly used segmentation technique in computer aided systems.In this survey we will be explaining the types of thresholding available for segmentation like OTSU threshold, global thresholds, adaptive threshold etc and also the various thresholding approaches used by different authors.

KEYWORDS: Image segmentation, Thresholding, OTSU threshold, Adaptive threshold.

I. INTRODUCTUTION

Image segmentation plays an important role in medical field for image analysis. Lung diseases are caused due to rise in air pollution, change in genes and due to the environmental changes[1]. There are various disease related to the lung.In order to segment and analyze the disease we need chest x-ray image or Computer Tomography(CT) image. Computer aided system can help in early detection of the disease. Computer Aided Diagnosis reduces the complexity andhelps is diagnosing the medical image[2]. The most important step in computer aided systems is image segmentation.The segmentation accuracy on a medical image must be high so that, the disease can be identified more precisely.

The paper presents a literature survey on thresholding technique used by different researchers to segment the lung field from the medical image. Section 2 gives a theory on thresholding techniques used in image processing and section 3 gives the literature survey on threshold based lung segmentation.

II. THRESHOLDING

Thresholding is one of the simplest process which isused in image segmentation.The image has to be preprocessed and the noise has to be eliminated in order to get better segmented image. Thresholding is one the oldest method of segmentation. Threshold is nothing but a brightness constant that is used to segment the objects and the background in an image. The input image should be a gray scale image and output produced by thresholding based segmentation, is a binary image.

Thresholding can be divided into global thresholding and adaptive thresholding. Global thresholding is a process where a single threshold can be applied to the whole image. Whereas adaptive thresholding is a technique where variable thresholds are used. In adaptive thresholding the threshold values vary because of the gray-level variation in objects and its background.

III. LITERATURE

There are many research papers that present the type of segmentation used to segment and predict the lung disease. Authors have used several processing approaches like image pre-processing, histogram equalization based preprocessing of images, threshold based segmentation and many more.

In the paper[3], presented by Parthima Guruprasad, Kushal S Mahalingpur and Kushal S Mahalingpur, they have given a brief description of segmentation using thresholds. They have also explained about the methods used in thresholding like binary threshold, threshold binary inverted,truncate and so on. They have used otsu threshold to analyse a handwritten devangiri words. Their experimental results showed that OTSU thresholding produced good results for documents which were degraded.

Senthilkumaran N and Vaithegi S presented a paper[4], that describes adaptive thresholding for eliminating the background. They have also explained about the types of thresholding available in image processing. This paper also gives a comparison between Niblack and Sauvola thresholding algorithm.

A. A. KHAN and others have presented a paper[5], that describes how to detect TB using image processing. They have used thresholding to segment the lungs from the chest x-ray image. Here the process is to partioning digital image into different segments according to the set of pixels know as image segmentation. They have used a block based method to find local and global threshold using histogram.

Pramit Brata Chanda and Subir Kumar Sarkar presented a paper[1], that uses adaptive threshold to segment the image. This paper talks about adaptive threshold based segmentation and this can be used on chest x-ray image , CT image etc.They have used a chest x-ray and applied various image processing techniques to segment the chest x-ray image to find the lung cancer. The have also calculated the parameters like accuracy, specificity, Recall, Precision and so on, to accurately measure the performance evaluation.

Aleksandr Zotina , Yousif Hamadb , Konstantin Simonovc , Mikhail Kurako[6] and others have used image processing techniques to detects the lung boundaries for chest x-ray images. They have used OTSU thresholding to segment the lung regions. They have also used convex hull and canny edge to detect the boundaries. They have used GLCM for classification of the image.

IV. CONCLUSION

In order to develop an efficient segmentation technique, a literature review is necessary. This paper gives an explanation of what is thresholding and how it works for segmenting the image. This paper gives a literature survey on different thresholding techniques used by researchers.

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