

Automated Detection and Diagnosis from Lungs CT Scan Images

Rutika Hirpara

Biomedical Department, Government engineering college, sector-28, Gandhinagar, Gujarat

Abstract: Early detection of lung cancer is very important for successful treatment. Diagnosis is mostly based on CT images. early symptoms of the diseases, appearing in patients’ lungs We are aiming at computerizing these selections. lung cancer images and its database in basic three stages to achieve more quality and accuracy in our experimental results: pre-processing stage (enhancement, smoothing, segmentation), feature Extraction (morphological) stage and Lung cancer cell identification.

Key words: CT, Lung cancer, enhancement, segmentation, morphological

INTRODUCTION

Lung tumor detection system uses convolution filters with Gaussian pulse to smooth the cell images. The contrast and color of the images are enhanced. Then the nucleuses in the images are segmented by thresholding. All of those are simple digital image processing techniques. In the image Pre-processing stage we started with image enhancement by using Gabor filter. Image segmentation is an essential process for most image analysis subsequent tasks. Region growing algorithm and otsu’s thresholding method existing techniques for image description and recognition depend highly on the segmentation results. Thresholding is one of the most powerful tools for image segmentation. The segmented image obtained from Thresholding has the advantages of smaller storage space, fast processing speed and ease in manipulation, compared with gray level image which usually contains 256 levels.

LUNG CANCER DETECTION SYSTEM:

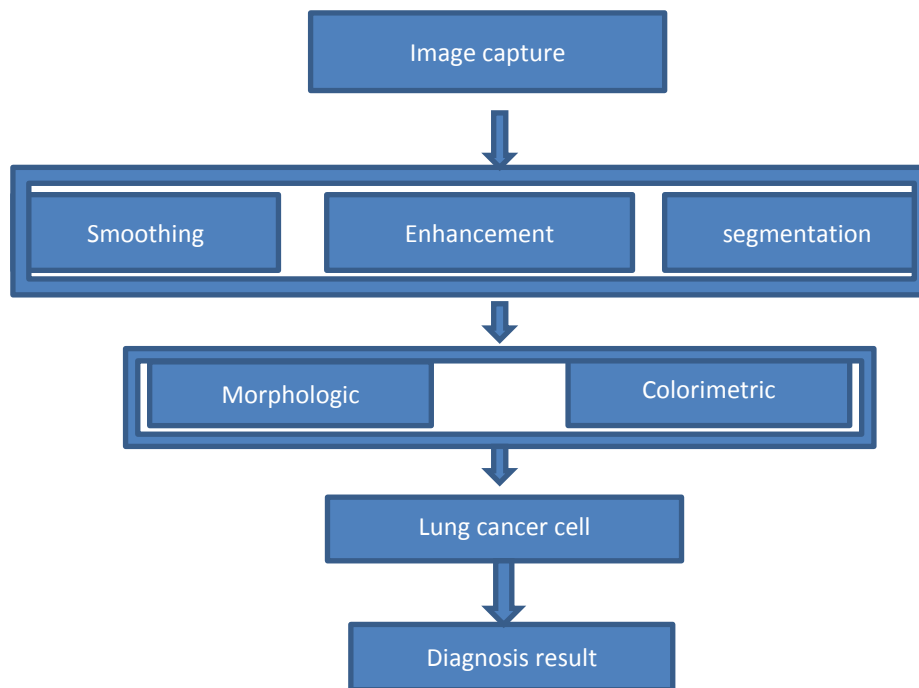


Fig.1: Lung cancer detection system

On this basis, a lung cancer cell identification module is employed to analyze those features to judge whether cancer cells exist in the specimens or not. Moreover, if there are cancer cells, the cancer cell type is identified. The entire diagnosis process of Lung Cancer Detection System is shown in Fig 1. In the image fig 2 Pre-processing stage we started with image enhancement. In image

enhancement stage used Gabor filter in fig 3. And used Thresholding Techniques for image segmentation in fig 4. Therefore, thresholding techniques have drawn a lot of attention during the past 20 years.

Proposed method:

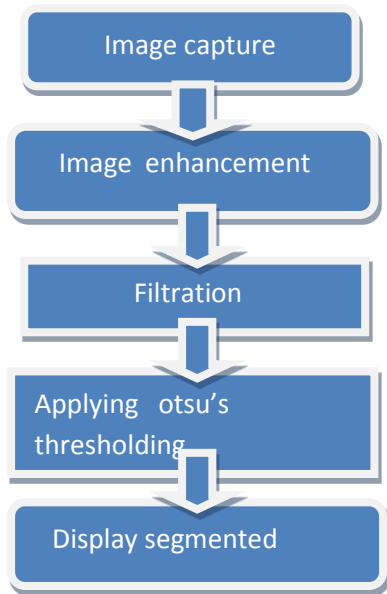


Image enhancement:

Image enhancement as away to improve the quality of image, so that the resultant image is better than the original one, the process of improving the quality of a digitally stored image by manipulating the image with MATLAB™ software. Spatial domain techniques, which operate directly on pixels. Frequency domain techniques, which operate on the Fourier transform of an image.

Gabor filter enhancement technique

A Gabor filter is a linear filter whose impulse response is defined by a harmonic function multiplied by a Gaussian function. Because of the multiplication-convolution property the Fourier transform of a Gabor filter's impulse response is the convolution of the Fourier transform of the harmonic function and the Fourier transform of the Gaussian function.



Fig:2 Original image



Fig:3 Image enhancement by using gabor filter

Image segmentation:

The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze.

Region growing algorithm method

Region growing is a simple region-based image segmentation method. It is also classified as a pixel-based image segmentation method since it involves the selection of initial seed points. The process is iterated on, in the same manner as general data clustering algorithms. The fundamental drawback of histogram-based region detection is that histograms provide no spatial information.

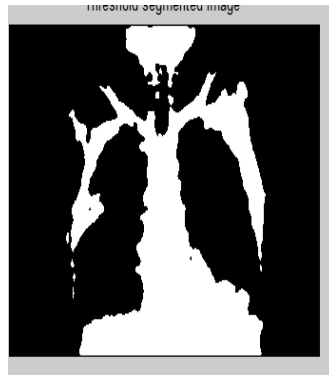


Fig.4 Segmentation: threshold by region growing algorithm

Feature extraction:

The Image features Extraction stage in algorithms and techniques to detect and isolate various desired portions or shapes of an image. The extracted morphologic features include the perimeter, area, roundness, and rectangleness of the nucleus and using erosion and dilation structuring element. Lung cancer cell identification in using sobel edge detection algorithm, to set gradient value. If there are cancer cells, the cancer cell type is identified and find the location on original image.

Result:

(Output)



Conclusion:

Using region growing algorithm to get 68% accuracy from detection of lung tumor. By using segmentation method and other method detect tumor in lung ct image according it diagnose lung tumor. real time application and devides which will work in hospitals and other research and medical centers.

References:

- [1] A. Amutha, Dr. R. S. D. Wahidabanu, "Lung Tumor Detection and Diagnosis in CT scan Images", 2013 (IEEE), pp-1108-1112.
- [2] Satrajit Basu, Lawrence O. Hall, Dmitry B. Goldgof, Yuhua Gu, Virendra Kumar, Jung Choi, "Developing a Classifier Model for Lung Tumors in CT-scan Image", 2011 (IEEE), pp-1306-1312.
- [3] Jilong Zhang, Wenqiang Zhang, Chen Chen, Yihui Guan, Changmei Wang, "Computed Diagnosis System for Lung Tumor Detection based on PET/CT Images", 2010 (IEEE), pp-166-170.
- [4] Cherry Ballangan, Xiuying Wang, Dagan Feng, Stefan Eberl and Michael Fulham, "Lung Segmentation and Tumor Detection from CT Thorax Volumes of FDG PET-CT Scans by Template Registration and Incorporation of Functional Information", 2008 (IEEE), pp-5349-5353.
- [5] Iyad Jafar, Hao Ying, Anthony F. Shields, Otto Muzik, "Computerised detection of lung tumors in PET/CT images", 2006 (IEEE), pp-2320-2323.