Lung Cancer Detection using Regional and Marker based Watershed Segmentation

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Abstract—Lung cancer proves to be a harmful threat to people who are more commonly used in people who smoke. Of 100 different types of cancer observed in the human body, this is the third largest cancer found with less survival rate. Early detection of lung cancer can increase the survival among humans. In the traditional method they use to identify lung cancer using Active Contour Segmentation Model. First, both lungs are segmented by the active contour model for their initialization, a masking technique is used. This mask is partly preserved by our morphological processes after refinement. The watershed transformation is widely used in many areas of image processing, eliminating the need for any kind of contour connection. The overall performance of the Active Contour Segmentation method is 86%, but we can achieve up to 98% performance of the result can be obtained in our novel Regional and marker based watershed segmentation.

Key words: Segmentation, Watershed, Masking Technique

I. INTRODUCTION
Lung cancer is the type of cancer that begins in the lungs. Lung cancer is considered the main cause of cancer death worldwide, and it is difficult to detect early stages because symptoms appear only in the advanced stages causing the mortality to be among the highest among all other types of cancer. More people die because of lung cancer than any other types of cancer such as breast, intestinal and prostate cancer. There is significant evidence that early detection of lung cancer will reduce mortality.

Cancer is one of the most serious health problems in the world. The mortality rate of lung cancer is the highest among all other forms of cancer. Several researches are estimated as 85% of lung cancer cases in men and 75% in women are caused by cigarette smoking. In 2010, 42,026 people in the UK were diagnosed with lung cancer and there were 35,184 deaths from lung cancer. The overall survival rate for every segment of cancer 63%. Although surgery, radiation therapy and chemotherapy have been used as the treatment of lung cancer; the five-year survival rate for all stadiums combined only 14%.

Based on the statistics of the American Cancer Society, it is estimated that there are 2, 20,000 new cases, 1, 60,000 deaths a year, and the 5-year survival rate for all stages is only 15%. The various factors that affect the 5-year survival rate are stage cancer, type of cancer, other factors such as symptoms, general health etc.

II. EXISTING SYSTEM
In the existing system, it uses Active Contour based segmentation. First, both lungs are segmented by the active contour model. A masking technique is used for the initialization. Then regions of interest in the (ROIs) that are detected by using some stochastic 2D features as shown. In this step some segmental bronchi or bronchioles (small airways in the lung) could be detected in the ROI. This is the reason for that why a 2Dimensional anatomical feature is used to detect the cancer.

This algorithm has been tested on various types of images, including medical and non-medical. Finally, recognized cancers are used as initial masks of active contour modeling to accurately extract the contours of nodes.

A. Disadvantages
– Time consuming and Accuracy is not perfect one and it will not adapt with different images.
– When image size is too large, this method works slowly.

III. PROPOSED SYSTEM
The proposed method is to remove the noise from the input image. The features are preprocessed and segment the image with the help of input lung image. The input lung image is segmented as binary image. After that we can analyze the performance analysis based on our condition finally we can identify the person will be affected by lung cancer or not. Therefore, the type of data collected from different sources (different patients and subject pictures)

A. Advantages
– The watershed lines always correspond to the most significant edges, due to noise, that could produce local minima, and, thus, erroneous results, in energy minimization methods.
– This cancer will be located on the pixels with higher contrast.

B. Hardware Requirements
– Processor: Intel core2 Duo
– Speed : 2.93 GHz
– RAM: 4GB RAM

Fig. 1: Anatomy of Lungs
C. Software Requirements
- Operating System: Windows 7
- Front End: MATLAB-2016a

IV. MODULES
1) Input image
2) Preprocessing and Segmentation
3) Visualization
4) Performance Measures

A. Input Image
In our project we will get the input image from our browse file, the input image will be depending upon our project according to segmentation.

B. Preprocessing & Segmentation
While we pre-process the input image, we get the input image without noise from the image file, it will be a noisy picture so we want to filter the image with the preprocessing technique. In order to obtain better segmented images, noise must be removed. For this purpose, we have used a filter for noise removal as an image preprocessing step. We can find the dilated, binary, watery image for the identification of the cancer spots and the outline of the lung. We can identify these that the person is affected by cancer or not.

C. Visualization
In visualization process is mainly classify how the person will affected by lung cancer based on their smoking. These diseases will be identified with the help of abnormal X-rays.

D. Performance Measures
The X-ray images were obtain under the same conditions with their probability values of bronchitis and lung cancer. According to the existing, our proposed method will achieve 90% of accuracy, 60% of specificity and 75% of sensitivity. We can also achieve the accurate result for conditional probabilities of abnormal x-ray results.

V. CONCLUSION
Medical image segmentation definitely has great potential in the medical field. Watershed segmentation method can be used on a variety of images and in a wide range of applications. This shows a segmentation algorithm for lung x-ray images. Further obtained segments can be used as a diagnostic aid for content-based medical imaging. We have obtained segmentation tools on several pulmonary images of the lung, which is from NIH / NCI Lung Image Database Consortium (LIDC) data set that provides the opportunity to perform the proposed research. The test results show that the proposed method can improve the speed, robustness and accuracy of the diagnosis since the physician can assess a particular case at the right time. Therefore, this technique is very useful for research for medical fraternity and students. Based on this study, it is clear that the water-cutting segmentation technique is good for evaluating the lung cancer cell region.

REFERENCES