

Comparative Study of Detection of Lung Cancer on CT Images using Different Methods

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ABSTRACT: In early 80s the image processing technique was used in various medical fields for improving this receive and serve stages, in which the time is a key constraint and it is very important to identify the problem in the patient as early as possible. Our study is based on contrast in different cancer part such as the lung cancer. Lung cancer has attracted the recognition of biological and sciatic communities in the past years as of its high prevalence in addition to its fast treatment. Data of year 2008 indicate that lung cancer, everywhere in the world, is found to be significant. Early detection of lung cancer is very crucial for early treatment. There are few techniques available for detection of cancerous cells. Here two techniques are used, thresholding and watershed to distinguish the tumour cells.

KEYWORDS: Lung Cancer , Thresholding, Watershed, Segmentation, Feature extraction.

I. INTRODUCTION

The distinctive rate of lung tumor is the best between every single other kind of growth . Lung cancer is one among many of the wide different cancers in the world, with the lowest solution rate when the diagnosis, with a exponential increase in the data of die every month. Despite there are many solutions available to detect the lung cancer , early detection is very important to avoid the fast growth of cancerous cells and reduction in complicated treatment procedures. Lung malignancy depends upon the cell qualities. Concerning the stages, by and large there are four phases of lung malignancy; I through IV. Organizing depends on tumor size and tumor and lymph hub area. By and by, CT are said to be more viable than plain chest x-beam in recognizing and diagnosing the lung tumor. The early detection of lung cancer gives the wider range of solutions . Cigarette smoking is found to be the main cause of lung cancer in 75% males

Computer Vision systems are efficient schemes that have been rise for the capture and calculation of different lesions in the area of the result of lung cancer. The main solution of these method is to carry the pathologist in the various analysis steps and to allow him a second opinion to the final decisions.

Thus, scholar are allow more and more advice with the consideration of Computer vision techniques for lung cancer. Many article proposed different robotized knob acknowledgment techniques utilizing picture handling, and including, different strategy for division, highlight extraction and classification.

Edges followed by thresholding and morphological dilation, erosion operation. Then, to label each object separately, connected component labelling is carried out. Finally, to filter out non text regions, carried out using exemplar based inpainting algorithm.

Paper is organized in six sections. Three steps of methodology are described in section II. Section III tell about image enhancement methods. The results of comparative study based on accuracy is listed in section IV. Section V gives the study of image segmentation by watershed transformation. Then it is followed by conclusion in section VI

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II. RELATED WORK METHODOLOGY

In this paper, to obtain more specific solution we perform our work in following three stages:

1. Picture Enhancement organize: to make the picture clear and improve it from noising, awful or impendance. The accompanying three procedure are consider this utilization: Gabor channel (has the best outcomes), Auto improvement calculation, and FFT Fast Fourier Transform (demonstrates the most exceedingly terrible outcomes for picture division).
2. Picture Segmentation arrange: to separate and fragment the upgraded pictures, the utilized calculations on the ROI of the picture (only two lungs, the systems used are: Thresholding procedure and Marker-Controlled Watershed Segmentation approach . Marker-controlled Watershed approach shows good results over thresholding.
3. Highlights Extraction arrange: to acquire the general highlights of the improved divided picture utilizing Binarization and Masking Approach.

III. IMAGE ENHANCEMENT

The picture pre-handling stage begins with picture upgrade. Picture upgrade is used to enhance the interpretability or impression of data incorporated into the picture for human watchers, or to give better contribution to other computerized picture preparing systems.

Picture improvement strategies can be isolated into two general classes: Spatial area techniques and recurrence space techniques. As such, there is no broad hypothesis for figuring out what "great" picture upgrade is with regards to human recognition. On the off chance that it looks great, it is great. Nevertheless, when picture update frameworks are used as pre-planning gadgets for other picture dealing with techniques, the quantitative apportionments can figure out which systems are more appropriate . Three methods as Gabor filter, Auto-enhancement and Fast Fourier transform techniques are used in picture upgrade stage.

Gabor Filter

The Gabor channel or filter was at first sustain by scientist Dennis Gabor, we used it for 2D images (CT pictures) . The Gabor work has been perceived as an exceptionally valuable device in PC vision and picture preparing, particularly for surface analysis, due to its ideal restriction properties in both spatial and recurrence space. Figure 1 shows the images , (a) is the original image and (b) is the Gabor image which is improved image.

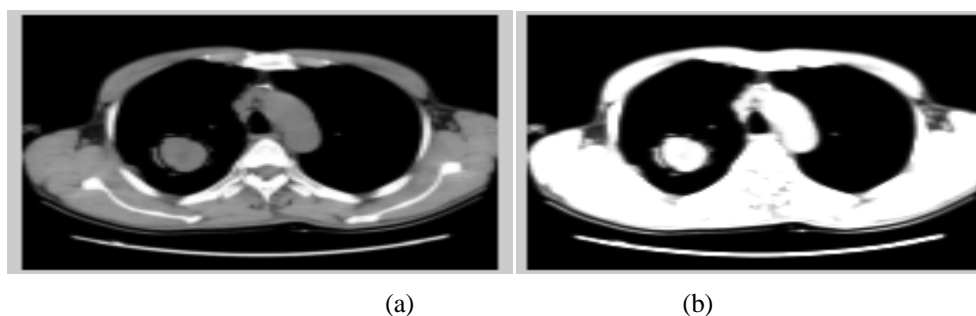


Fig 1. The Result of applying Gabor filter enhancement Technique

Fig(a) original image, Fig (b) Gabor image

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Auto Enhancement technique

Auto upgrade, naturally changes and improves the picture (splendor, shading and differentiation) to ideal levels, and this is unmistakably seen by following (figure 2) as you see (a) is the first picture and (b) is the picture in the wake of applying auto upgrade MATLAB code. This technique emphatically relies upon factual tasks, for example, mean, difference figuring.

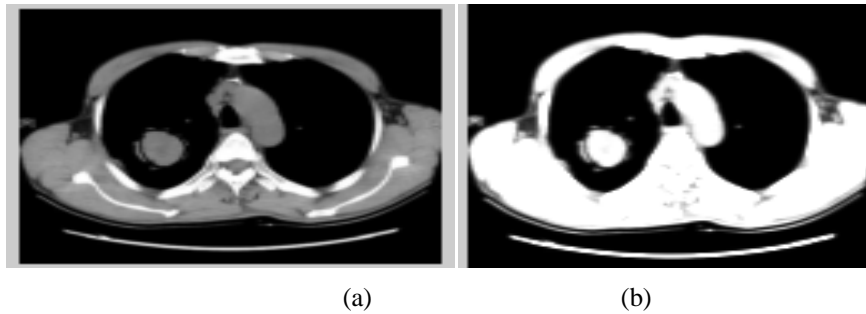
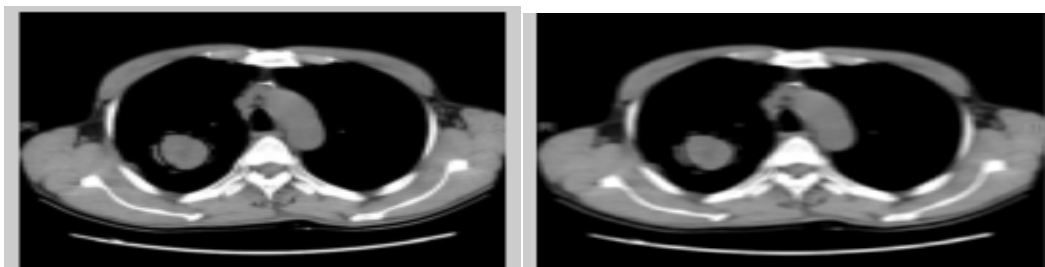


Fig 2. The Result of applying Auto Enhancement Technique
Fig(a) original image, Fig (b) Enhance image

FFT method

Quick Fourier Transform procedure works on Fourier change in the particular image . The recurrence area is a space in which each picture an incentive at picture position F speaks to the sum that the power esteems in picture "I" differ over a particular separation identified with F. Quick Fourier Transform is utilized here in picture separating (improvement). Figure 3 depicts the impact of applying FFT on unique pictures, where FFT strategy has an improvement level of 27.51%.



Fig(a) original image Fig. (b) Enhance image
Fig 3. The Result of applying FFT Enhancement Technique

IV. RESULTS

Table 1 : Results of Comparative study of image enhancement methods

IMAGE ENHANCEMENT METHOD	ACCURACY
GABOR FILTER	80.975%
AUTO ENHANCEMENT	37.95%
FFT FILTER	27.075%

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V. IMAGE SEGMENTATION BY WATERSHED TRANSFORMATION

This example shows how to utilize watershed division to isolate contacting objects in a picture. The watershed change is frequently connected to this issue. The watershed changes for the segment process discover "watershed part lines" in a sustainable image using their verification it as a surface where contrast being large and dull pixels become less. Division utilizing the watershed change works better in the event that one can recognize, or "check," frontal area questions and foundation areas. Marker-controlled watershed division takes after this essential system:

1. Compute a division work. This is a picture whose dim locales are the items one is looking for in section.
2. Compute closer view markers. These are associated blobs of pixels inside every item.
3. Compute foundation markers. These are pixels that are not some portion of any question.
4. Modify the division work with the goal that it just has minima at the forefront and foundation marker areas.
5. Compute the watershed change of the altered division work.

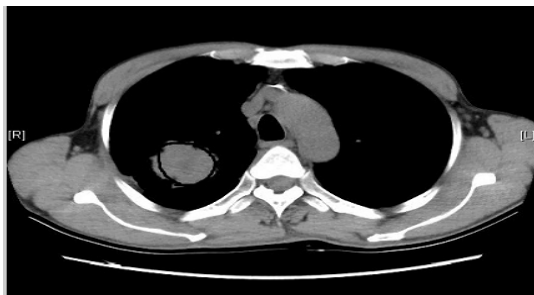


Fig. 4 Original image

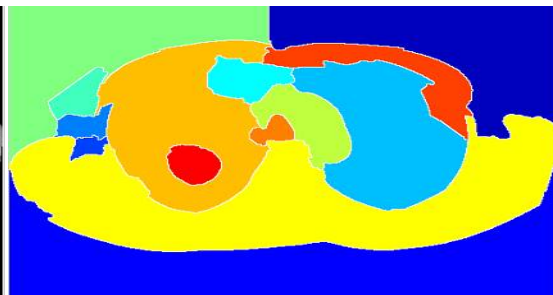


Fig 5 Segmented Image by watershed Transformation

VI. CONCLUSION

Lung cancer is widely spread and serious problem in the world. CT images are very useful in analysis of cancer and plays a vital role to avoid serious stages. It helps in reducing the percentage distribution in the world. To get more precise outcomes we separated our work into three phases: Image Enhancement arrange, Image Segmentation stage and Features Extraction organize. Lung Nodule Detection in CT Scans is a functioning region of research which is constantly developing and there are numerous upgrades that can be incorporated to improve the detection. Out of the three techniques of image enhancement, Gabor filter has shown highest accuracy.

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