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Detection of Lung Cancer by using Image Processing Method

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***Abstract*: Lung cancer is very common cause of death throughout the world. If we detect cancer in early stage, then the chances of survival can increase. Although CT scan (Computed Tomography) is more efficient than X-ray. However, problem seemed to merge due to time constraint in detecting the presence of cancer cells by using several diagnosing method used. Hence, lung cancer detection system using image processing method.**

***Keywords*: Cancer Detection, Image Processing, Segmentation, Optimization, Feature Extraction.**

1. Introduction

Cancer is most dangerous disease that causes death. According to Worldwide Cancer data reports lung cancer occupies first position and then follows by breast cancer. New cases diagnosed in 2018 as 2,093,876 (12.3%) there was an estimation of 9.5 million cases were of Men and 8.5 million of women. As per five years of survival rate of lung cancer is 56% cases detected. However, only 16% of lung cancer cases were diagnosed at an early stage. Lung cancer is unrestrained growth of cells in both or in one lung. Cancer cells are spread out from lungs or any other caused part through blood stream or lymph fluid around that part. Upheaval can occur when cancer cells spread to other parts of body. Early detection of cancer plays an important role to deterrent cells from multiplying. Always mature cell divides into new cells and their DNA is exactly the same in every way. Lung cancer can be analyzed by screening procedure like CT, MRI and PET scan methods. It can be examined by using a cluster of cancer cells from lungs, examined under microscope. Biopsy, the procedure in which needle passes through skin to take a tissue of cancer cells.

When a patient is under sedation, then biopsy can be done with help of bronchoscopy then doctors insert a tube via mouth or nose into lungs then take a tissue. At the end of that tube a camera, light and a surgical instrument is placed for taking out the tissue.

There are some cures that include radiotherapy, chemotherapy, surgery and open medications done with personal satisfaction. In this study we proposed and evaluated image processing method to analyze the cancer cell of lung cancer by using image processing.

2. Methodology

A. Pre-Processing

Images we are used taken from CT scan. The aim of pre-processing is that improving the image data that have low abstraction i.e. resolution that suppresses unwanted distortion and upgrade the images for their further processing. Image extraction can be done accurately when images are in binary format i.e. black and white image. The default images in RGB form i.e. Red Green Blue. It means that such type of images can be represented as a combination of matrices having dimension of 1×n. Here, n stands for number of pixels. This data is complex for further process so we convert I into grayscale. The images in grayscale having a matrix with each pixels and represented as a discrete level of 0 to 255. The minimum level shows darkest color and maximum dimension will always matches the dimensions of image represented in terms of pixels. The medical images generally are in grayscale by default, still we check again that no other components were present and if any present we have to convert them into grayscale to remove other components present in images.

B. Segmentation

Image processing is that process in which digital image is portioned into sets of pixels which is known as super-pixels. The segmentation is used to simplify the image representation which is easier to analyze. Image segmentation regions should be uniform and homogenous. Image segmentation regions are different with respect to characteristics on which they are uniform. Typically, it is used to locate boundaries, lines, curves and objects.

C. Optimization

It is the process in images of high quality has to be delivered in correct format, dimensions, size and resolution. There are many ways in which image optimization can be done like resizing of image, caching or by compressing the size of image.

D. Feature Extraction

The next step is to involve the certain features of image which are left in binary image. The region props function is used for this Matlab for this procedure. It is able to calculate 21 types of feature of the objects which are present in the image.

For this process we are used to extract only Major Axis Length, Perimeter, Area, Eccentricity, Minor Axis Length and Solidity. In feature extraction we take a portion of an image which is pertinent for solving the ciphering task. The features may be of specific structures like points, edges and objects. The nodules of images are 3D objects so we use 3D features for these images. For geometric views we use binary mask and for texture views we use gray level. The features may be of specific structure like points, objects and edges. For geometric views we use binary mask and for texture views we use gray level.

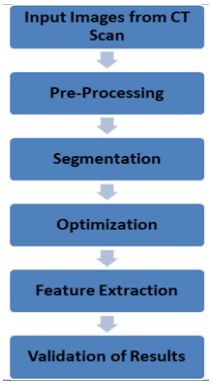
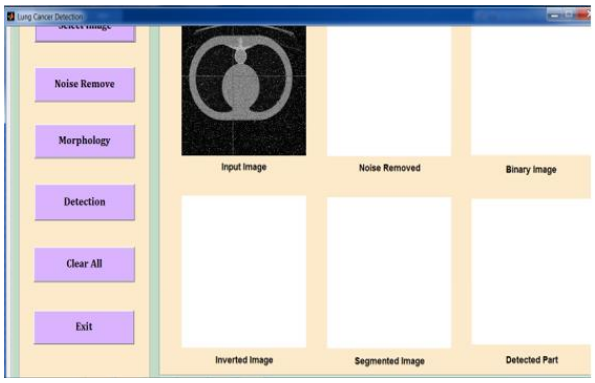


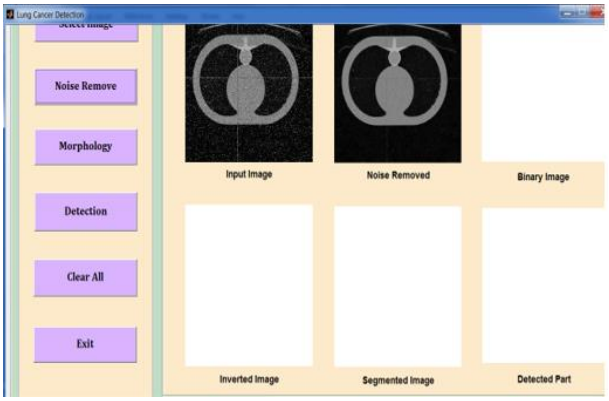
Fig. 1. Flowchart

3. Classification of Procedure

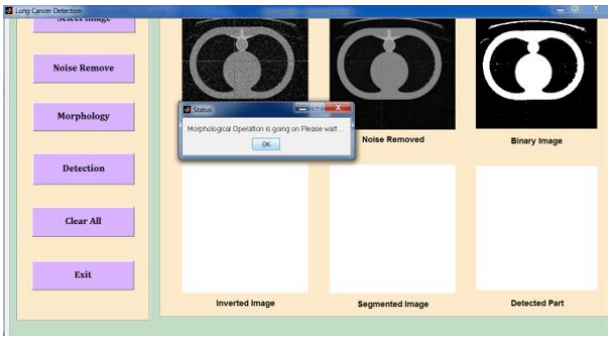
Step 1: When input image is detect



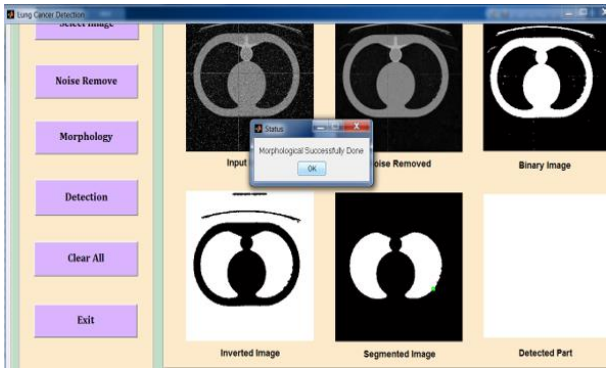
Step 2: When Noise is removed from input images



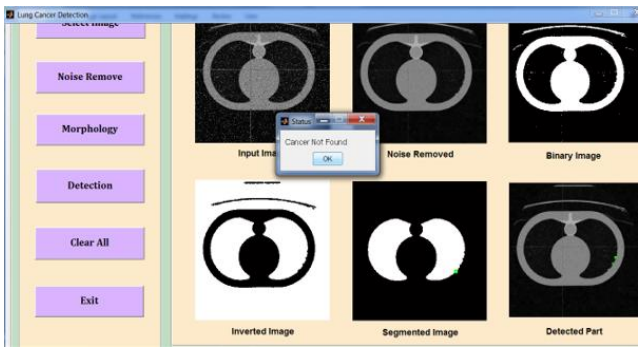
Step 3: When morphological is on process



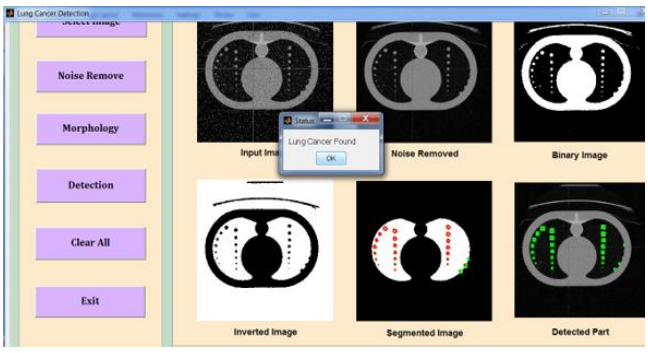
Step 4: When morphological process is successfully done



Step 5: Detection of cancer (cancer not found)



Step 6: Detection of cancer (cancer cell found)



4. Result

It helps in early detection of cancer which is helpful in curing disease. The requirements of techniques detect the occurrence of cancer nodule in early stage. The prophecy of early diagnosis of lung cancer can be done with this model. To observe the detection's accuracy and determination each area of digital image is filled with zeros and protruding on original image. As we can clearly see the run length coding was able to detect image nodule without any losses. This method is efficacious to detect the diseased areas and enable their feature extraction to highlight the mortmain of one's medical report.

5. Conclusion and Future scope

Image improvement techniques is used for develop the disease like cancer in early stage, the time factor is also taken in account so that we discover the abnormalities issues in target images. The accuracy and quality of images are the main factors of this research. The evaluation of image quality as well as intensification stage is adopted on low pre-processing techniques. The technique which we proposed in this research is efficient segmentation principles to a region of feature extraction. The technique which we are using gives a promising result for early detection as compared to other techniques. Reckon on general features normal comparison is made. The main detection of image nodules is pixels percentage and mask-labeling with high accuracy and vigorous operations.

For future work, we can also know about the size of tumor cells in lungs so that we can find the staging of cancer ad also know about the eccentricity, intensity, average intensity and also about the perimeter of tumor. We can also apply this technique to other type of cancer like breast cancer, skin cancer, brain tumor etc.

References

[1] Bariqi Abdillah, Alhadi Bustamam and Devvi Sarwinda, "Image processing based detection of lung cancer on CT scan images," Journal of physics, vol. 893, 2017.