Lung Cancer Identification Using Matlab

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Abstract- In this paper, we implement and analyze the image processing method for detection of lung cancer. Image processing techniques are widely used in several medical problems for picture enhancement in the detection phase to support the early medical treatment. In this research we proposed a detection method of lung cancer based on image segmentation. Image segmentation is one of intermediate level in image processing. Marker control watershed and region growing approach are used to segment of CT scan image. Detection phases are followed by image enhancement using Gabor filter, image segmentation, and features extraction. From the experimental results, we found the effectiveness of our approach. The results show that the best approach for main features detection is watershed with masking method which has high accuracy and robust.

Keywords- Classification; Computed Tomography; Lung cancer; Nodules; Segmentation

I. INTRODUCTION

Lung cancer is one of the major cancer death worldwide. It is the most dangourous cancer as compared to any other like Breast Cancer, Skin Cancer and many more. It is really tough to detect lung cancer in its beginning because its symptoms appear at the advanced stage where the chance of survival is very law. Every year many people die suffering from lung cancer than other cancer. There is significant reasons which shows that early detection of this cancer will increase the chance of survival. According to world health organization 7.6 million deaths are only because of lung cancer that is obtained from the latest measurements. Besides, the demise rate from malignant growth are relied upon to rise continueslyupto 17 million worldwide till 2030[1]. There are numerous procedures to finding lung malignant growth, for example, Chest Radiograph (x-beam), Computed Tomography (CT), Magnetic Resonance Imaging (MRI sweep) and Sputum Cytology[2]. Be that as it may, the vast majority of these systems are costly and tedious. As it were, a large portion of these procedures are identifying the lung malignant growth in its propelled stages, where the patient's shot of survival is low. In this way, there is an incredible requirement for another innovation to recognize the lung disease in its beginning times. Picture preparing systems give a decent quality device to improving the manual investigation. Various medicinal scientists used the examination of sputum cells for early identification of lung cancer[3], latest research transfer on quantitative data, for example, the size, shape and the proportion of the influenced cells[4].

Therefore we endeavor to utilize programmed demonstrative framework for distinguishing lung malignant growth in its beginning periods dependent on the investigation pictures of lung disease of the dim dimension. So as to define it we are applying a standard which depends on the edge method through which we apply division pre-handling procedure which partition picture into a few stages and numerous means are being connected on it by which we get completely analysis picture by the assistance of which identification of lung malignancy in beginning period become simple. In picture division we utilized as the initial step is picture upgrade by the assistance of histogram Equalization we get recurrence dimension of a picture. There are numerous calculations which are utilized in picture division in therapeutic field, for example, histogram examination, territorial development, edge recognition and Adaptive Thresholding [5]. A survey of such picture division procedures can be found in [6]. For lung disease analysis numerous creators have utilized shading data as the key separating factor for cell division [7]. The examination of sputum pictures have been utilized in [8] for recognizing lung malignant growth; it comprises of pictures for distinguishing dim dimension. They utilized investigation procedures and highlight extraction for the improvement of the pictures, for example, edge discovery, heuristic learning, area marking and expelling In my commitment, I moved toward the division of lung disease issue by utilizing thresholding strategies: For division I have utilized thresholding Ostu strategy and 2D histogram examination. The pictures are gotten from medical clinics [9]. In any case, the pictures arediscribed by an uproarious and jumbled foundation designs that make the division and programmed recognition of the malignant cells very dificult. Notwithstanding that there are many dim dimension out of sight of the pictures. I expect to structure a framework that augments the genuine positive and limits the bogus negative to their best dimension. These make me to consider a pre-handling system which can cover all these dark dimensions and keep the cores and cytoplasm. There are a few strategies through which we recognize malignant growth which are being utilized over decade of years.

a. Objective

The objectives associated with presented work are given here under

- The main objective of this work is to improve the segmentation process by comparing Two dimensional Histogram Method and Two Dimensional Ostu Method.

● The objective of the work is to perform feature extraction and get their values.
● The objective of the work is to predict from the data formed manually, person suffering from cancer or not.
● The objective of the work is to implement the work in Matlab.
● The objective of work is to analyse the work under different parameters.

II. LITERATURE REVIEW

In 1960, Lusted L.B. Proposed for the first time that analyzing and recognizing the abnormal and normal photofluorography images of the chest could be conducted automatically. Hence, the analysis of medical images by computer was introduced.

Avinash.S, Dr. K Manjunath, Dr.J.Senthilkumarexplained lung cancer detection method using Gabor filter and watershed segmentation techniques. To overcome the drawbacks of FFT method proposed method is explained. This new technique with Gabor filter and watershed segmentation can be used for quick detection of lung cancer [2]

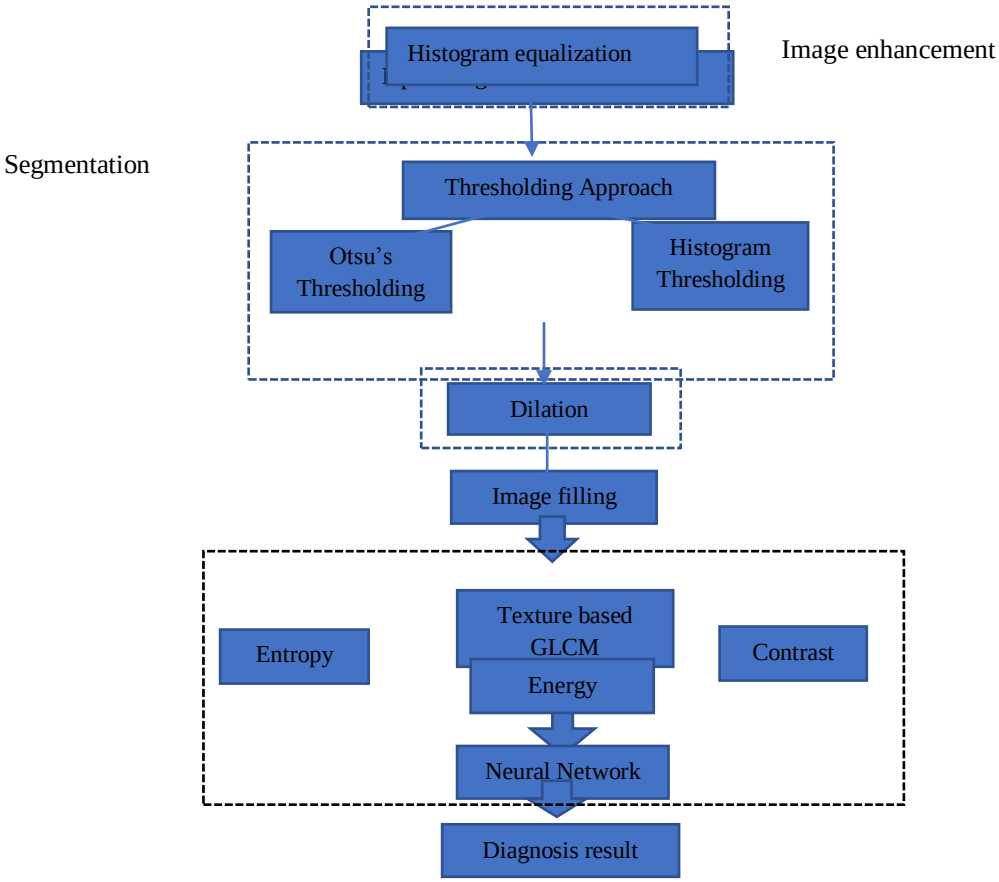
RachidSammouda proposed a model to segment extracted lung regions from chest computer Tomography images. In this paper three diagnostic rules are verified as well-defined filters of candidate cancerous regions from the status of candidate [4]

SummrinaKanwalwajid, Kaizhu Huang, Amir Hussain, WadiiBouliia explained feature extraction technique using Local energy-shape Histogram(LESH). For research experiments the JSRT digital image database of radio chest radiograph is selected. The enhancement of radiograph images was using a contrast limited adaptive Histogram equalization [CLAHE] approach. Simulation resultsevaluatedusing classification accuracy performance measure [7]

Bhagyarekha U. Dhaware, Anjali C. Pise explained lung cancer detection method using Bayesian classifier and FCM Segmentation. In this paper feature selection is based on the statistical features by applying sequential forward algorithm

III. PROPOSED METHODOLOGY

In the proposed work for designing the Intelligent CADs system are: (1) Image Acquistion (2)Image enhancement (Histogram equalization) (3) Segmentation(Thresholding approach) (4) Dilation (5)Image filling (6)Feature Extraction from CT images(5) Classification using ANN.



The dataset from lung images are collected from a database of Lung Image Consortium (LIDC). We have taken around 150 CT images which contain both male and female. The lung CT images having low noise when compared to X-ray scan image and MRI image. So, we have taken the CT imagesfor detecting of the lungs. The main advantages of computed tomography image have better clarity, low noise and distortion. Lung CT images are given as input. Dimensions of images are 512×512pixels in size with the layer thickness of $0.75 - 1.25mm$.Here 110 nodules of size less than 3mmused. There are different stages of lung cancer nodules such as pleural nodules and vascular nodules have been taken in this project work

a. Input Image

In this step we select a image and apply it for classification through which we get all pre-processing images.

b. Image Enhancement

The second we have applied is image enhancement in this step filters are being applied filters are on the images to remove some problems of images such as noise, blurring and etc. For image enhancement different types of filters are being applied on images, here we are applying filters like Historical equalization

c. Histogram Equalization

Histogram equalization is the one of the well-known methods for enhancing the contrast of given images in accordance with the sample distribution of an image.

d. Segmentation

Segmentation is a important step in image processing. Through the help of segmentation, images are divided to some regions that contents of each region have the same specifications. Changing the image representation for easier explanation is the mainpurpose of segmentation. Representation of segmentationis in medical images in 2D, slice by slice has many useful applications in medical world such. Image segmentation is basically used to locate objects and boundaries (lines, curves) in images. The aim of segmentation is to simplify the representation of the image into something that is more meaningful and easier to analyse. Image segmentation is basically used for assigning a label to every pixel in an image such as pixels with the same label share specific visual characteristics [9]. The output of image segmentation is a set of segments that collectively cover the whole image (edge detection). All pixels in a given region are similar with respect to some characteristic such as colour, intensity, or texture. Adjacent regions are significantly different with respect to the same characteristic[10].

e. Thresholding approach

The basic idea of applying threshold approach is to automatically select an optimal gray-level threshold values for separating objects of interest in an image from the background based on their gray-level distribution. Over several years, many technologies have been intend for selecting the threshold automatically.

f. Dilation Operation

Dilation operation is used to extract image component which is used to extract image components that are useful in the representation and description of region shape such as boundaries, skeletons

g. Feature Extraction

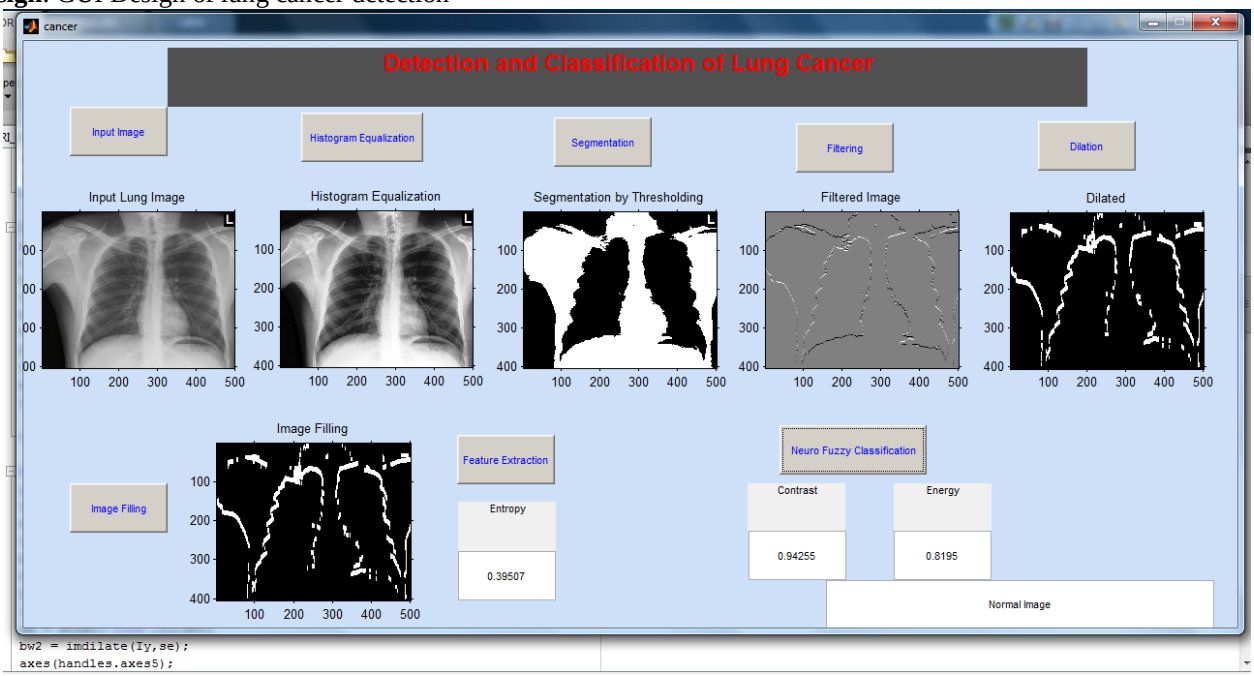
In feature extraction there are several methods through which we can detect or remove portions that are present in a image. To analyse the probability of lung cancer presence, we are applying – Gray level Co-occurrence matrix.

h. Neural network Training Set

Here we are applying neural network training set to get various levels of success for prediction that we have been performed in above steps. Through this we will get a prediction model which will show how much the performed job is correct. We have formed a manual dataset by that is obtained from feature extraction step. The data is based on the value of Entropy, Contrast and Energy. Through which we can predict how many person are suffering from cancer and how many are not suffering from cancer. To perform this job we have made dataset of 3 types input dataset, sample dataset and target dataset

IV. RESULT

GUI Design: GUI Design of lung cancer detection



V. CONCLUSION

The presented work is the detection of lung cancer nodules by applying implementation on image pre processing and segmentation. By implementing these steps the nodules are detected and then some features are extracted. Then the obtain features are used for the classification of the disease stages. Through the obtained nodules feature more information about the condition of lung cancer at the early stages. After that we have applied prediction model by applying that we predict from the obtained dataset from feature extraction to know how many people suffering from cancer or not. This technique helps the radiologists and the doctors by providing more information and taking correct decision for lung cancer patient in short time with accuracy. Therefore, this method is less costly, less time consuming and easy to implement.

VI. REFERENCES

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