INTRODUCTION

Cancer is now the biggest reason of death in the world. Lung cancer is one of the most common cancers in present days. Due to the lifestyle of people there is a steady increase in cancer patient. Pain, breathlessness, cough, weight loss and fatigue are the general symptoms of cancer. Survival from the disease is not easy if it is not identified at the early stage. Only 15% of lung cancer is recognized at the early stage [1]. The main reason because of which it is difficult to find lung cancer in early stages is that there is only a dime-sized lesion growth called nodule, inside the lung, and by the time it is identified it is already too late for the patient. Also, these small lesions cannot be identified by X-rays and are only noticed by a CT scan. Even after the detection, it takes a considerable amount of effort and experience of radiologists to identify and mark the nodules as benign or as a probable case of malignancy. Normally the lung cancer can be divided into two groups. First one is non-small cell lung cancer and second one is small cell lung cancer.

The CT image of lung is used to diagnose the lung cancer. Normally by a doctor, the CT image of lung is analyses first and then they detect the presence of cancer in lung. False detection is very big problem which are faced in this approach. False detection is caused due to following reason like the presence of air in bronchi, presence of ribs and blood vessels etc [2].

So there is a need to develop approach of automated identification of cancer. Image processing tools are the best tool for developing such automated approach for lung cancer identification. CT image of lung is processed and finds whether the presence of cancer nodule is there or not. There are many image processing tools [3][4] for this purpose. This paper focuses to build an efficient and accurate automated approach for lung cancer detection. This paper proposed a Lung cancer detection system that uses a fuzzy inference system to identify the cancer cells. This approach has four stages to detect the presence of cancer nodule in lung. The first one is Pre-processing stage, then the Segmentation is done, then the features of cancer cells are extracted in next stage i.e. in feature extraction stage and fuzzy inference rules to identify lung cells. Pre-processing step is used to enhance the image. Enhanced CT image is then passes through segmentation phase. From the segmented image some features are extracted to guess the existence of abnormality of lung. On these extracted features fuzzy rules are applied to identify the possibility of cancer cells.

Many of the different methods have been proposed and used to detect and classify lung cancer in CT images using different algorithms. For example, Camarlinghi et al. [5] have used three different computer aided detection techniques for identifying pulmonary nodules. Abdulla and Shaharum [6] used feed forward neural networks to classify lung nodules.
in X-Ray images even if with only a small number of features such as area, perimeter and shape. Kuruvilla et al. [7] have taken six distinct parameters including skewness and fifth & sixth central moments extracted from segmented single slices containing two lungs along with the features mentioned in [6]. This paper reports a high detection rate of 88.5% with an average of 6.6 false positives (FPs) per CT scan on 15 CT scans. Hayashibe et al [9] projected an automatic method based on the subtraction between two serial mass chest radiographs, which is used in the detection of new lung nodules. Kanazawa et al [10] presented a system which extract and used to analyze the features of the lung and pulmonary blood and then utilizes defined rules to perform identification. Then it was used in the detection of tumor candidates from helical CT images. Naseer Salman [11] suggested that Marker-driven watershed segmentation extracts seeds indicating the presence of objects or background at particular image locations. The marker locations then set to be regional minima within the topological surface. Then the watershed algorithm is applied. Mori et al [13] projected a method to extract bronchus area from 3-D chest X-ray CT images, which is used in a virtualized bronchoscope system.

METHODOLOGY

ANFIS controller is used for the cancer detection, it provides the better method for cancer detection. ANFIS controller stands for Adaptive Neuro Fuzzy Controller. Fuzzy controller works between the values 0 and 1.

Therefore the cancer can be detected more efficiently by ANFIS controller. The below flow chart shows the method used for detection of cancer.

Steps used for identifying cancers are as follows:

1. Firstly read all the CT images one by one.
2. Now apply preprocessing to remove noise and enhance the contrast.
3. Now determine the threshold value from the image.
4. After determining the threshold values convert the preprocessed image into binary image.
5. Apply morphological processing to smooth the given region.
6. Now determine various suspected regions with image.
7. After determining the suspected region create Database for ANFIS.
8. Train the classifier.
9. After training the ANFIS classifier go to testing phase.
10. Now by using if then rule
    - If A < 3mm
    - Then the input region is normal
    - And if not
    - Then it has infected by lung cancer.
11. If A is greater than 3mm then algorithm used is described below:
    a) Create Database for ANFIS.
    b) Train the ANFIS classifier.
    c) Then display the suspected region.
12. Display the testing and classification results for each obtained regions in lung image.

RESULT

Two different types of lungs are used and detected in this process.

Taking first input

![Input 1](image)
CONCLUSION

For improving the cancer detection in lungs, new and improved algorithm is developed to obtain the better detection of cancer in lungs. It can be seen that the ANFIS controller provides the better output than fuzzy interference system. Complexity is decreased. Percentage of the false recognition is less.

References

Prediction Of Lung Cancer Using Anfis Controller System


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