

Detection of Lung cancer using digital Image processing

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Abstract: - Lung cancer main disease cause of death of among throughout the world. Lung cancer is causing very high mortality rate. There are various cancerous tumors such as lung cancer, breast Cancer, etc., Early stage detection of lung cancer is important for successful treatment. Diagnosis is based on Computed Tomography (CT) images. In this Histogram Equalization used for pre-processing of the images and feature extraction process and classifier to check the condition of a patient in its early stage whether it is normal or abnormal.

Keywords— Computed Tomography, cancer, Histogram Equalization, Watershed Segmentation.

I. INTRODUCTION

Lung cancer mortality rate is the highest among all other types of cancer. It is one of the most serious cancers in the world, with the survival rate very less after the diagnosis. Survival from lung cancer is directly related to its growth at its detection time. The earlier the detection is, the higher the chances of successful treatment are. An estimated 85% of lung Cancer cases in males and 75% in females are caused by cigarette smoking [1]. There are many techniques to diagnose lung cancer, like Chest Radiography (x-ray), Computed Tomography (CT), Magnetic Resonance Imaging (MRI scan) .but, most of these techniques are costly and time consuming. And most of these techniques are detecting the lung cancer in Its advanced stages. Hence, there is a great need of a new technology to diagnose the lung cancer in its early stages. Image processing techniques provide a good class tool for cultivating the manual analysis [2].

II. METHODOLOGY

A. image acquisition/capture: First collect CT scan images of lung cancer which are stored in mat lab .CT scan images has low noise so we select them. Computed Tomography having better clarity, low distortion and noise. CT scan images stored in database in JPEG/PNG format.

2.1 IMAGE ENHANCEMENT

There are two types of enhancement technique, Special domain and Frequency domain. Due to enhancement we improve the quality of images, for human viewer or to

provide better input to image processing technique. We use a histogram equalization technique for enhancement.

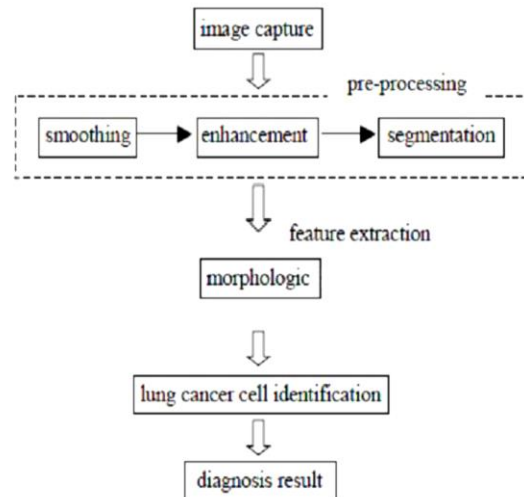


Fig.1.Proposed block diagram

2.2 IMAGE SEGMENTATION

Segmentation is nothing but the partition of image. Segmentation is typically use to detect object and boundaries of an image. We use watershed segmentation tequnique. Watershed segmentation extract seeds indication the presence of object or background at ct scan image. The marker locations are then set to be regional minima typically gradient of the original input image and the watershed algorithm is applied.

2.3 FEATURE EXTRACTION

It is important stage in image processing technique. it detect desired portion or shape of an image. for the classification purpose we need the features as like area, perimeter, roundness, eccentricity.

1.Area: It is the scalar value that gives actual number of overall nodule pixel in the extracted ROI. Transformation function creates an array of ROI that contains pixels with 255 values.

$$\text{Area} = A = (A_{i,j}, X_{ROI}[\text{Area}] = I, Y_{ROI}[\text{Area}] = j)$$

Where, i, j are the pixels within the shape. ROI is region of interest. X ROI [] is vector contain ROI x position, Y ROI [] is vector contain ROI y position[3].

2. Perimeter:

It is a scalar value that gives actual number of the nodule pixel. It is the length of extracted ROI boundary. Transformation function create array of edge that contain pixel with 255 values that have at least one pixel which contain 0 values [3]. Perimeter = $P = (P_{i,j}, X_{edge}[P] = i, Y_{edge}[P] = j)$ Where, X edge [] and Y edge[] are vectors the curve, respectively[3].

3. Eccentricity:

This metric value is also called as roundness or circularity or irregularity complex (I) equal to 1 only for circular and it is less than 1 for any other shape. Represent the co-ordinate of the ith and jth pixel forming.

$$\text{Eccentricity} = (\text{Length of Major Axis} / \text{Length of Minor Axis})$$

4. Roundness:

The roundness value is to 1 only for circular and it is less than 1 for any other shape.

III. RESULT AND DISCUSSION

3.1 To Insert Image in Mat lab: - We select the images from database. In the form of JPEG/PNG format.

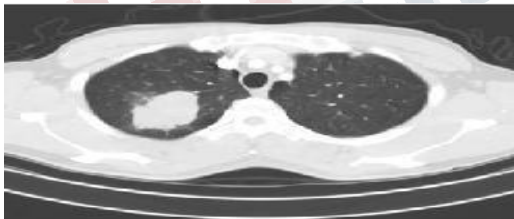


Fig 2.Select the Images

3.2. To convert colour image into gray image: - Convert the colour image into gray scale images.

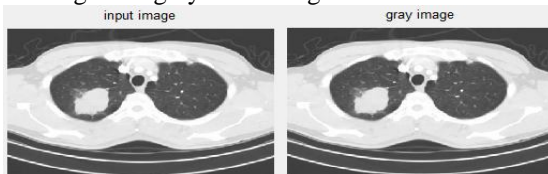


Fig 3.grey scale conversion

3.3. To Enhance Image:-We use histogram equalization technique for enhancement.

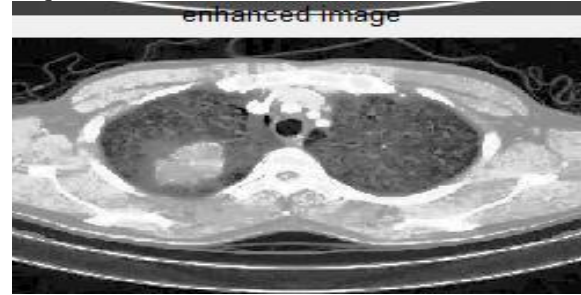


Fig.4: Enhanced image

3.4 Image Segmentation:- Image segmentation is the process of partitioning a digital image into multiple segments. The goal of segmentation is to simplify or change the representation of an image into something that is more meaningful and easier to analyze. Segmentation divides the image into its constituent regions or objects [3].

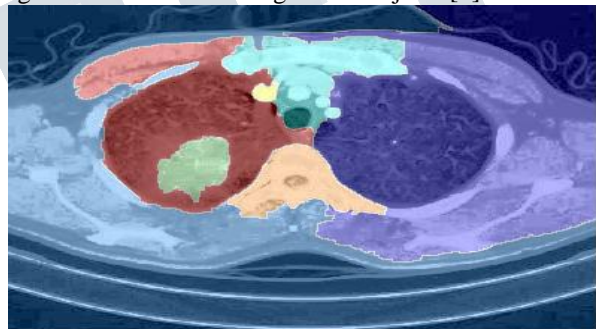


Fig 5.Segmentation image

5. Feature Extraction: - We use algorithm to detect isolate desire potion of shape of given image. The input data will be transformed to reduce representation of features set. This measure in scalar.

These features are as follows,

AREA	940
LENGTH	347.376
WIDTH	286.912
Eccentricity	1.21074

IV. CONCLUSION

The most dangerous and widespread disease in world is lung cancer according to stage discovery of cancer cell, this shows the detection of cancer in early stage is plays important roll to avoid serious stages. To improve more accurate result three stage use: Image enhancement, segmentation, feature extraction stage. The watershed segmentation tequique gives more accuracy (84.55%) than other approach.

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