

# LUNG CANCER DETECTION USING IMAGE PROCESSING BY CT IMAGES

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**Abstract** - - Detection of the lung cancer detection is the most interesting research area of researcher's in early stages. It is going to be easier by using Matlab .The proposed system is designed to detect lung cancer in premature stage two stages. And the proposed mainly consists of many steps such as the image acquisition, preprocessing, binarization, thresh holding, and segmentation, feature extraction , neural network detection. At first Input lung CT images to the system and then passed through the image preprocessing stage by using some image processing techniques. In first stage, Binarization technique is used to convert binary image and then compare with the threshold value to detect lung cancer. In second stage, The segmentation is performed on it to segment the lung image with a strong feature extraction method has been introduced extract the some other important feature of a segmented the images. Extracted features are used to train neural network and finally the system is tested any cancerous and the image noncancerous images. The performance of proposed system shows satisfactory results and proposed method gives 96.67% accuracy.

## 1.1.INTRODUCTION

The development in image processing techniques can be used in monitoring various parameters in medical field. Due to so many fast foods are running and all are addicted to those and there are suffering with the lung Cancers. Detection of lung cancers at initial stages is better. In context, with the evolution of Mat lab software Detection pretty Easy to detect whether a person is affected with a lung cancer or not.

### 1. Matlab software

Matlab is a proprietary Programming language, Which was developed by MATHWORKS. It is using at a drastic

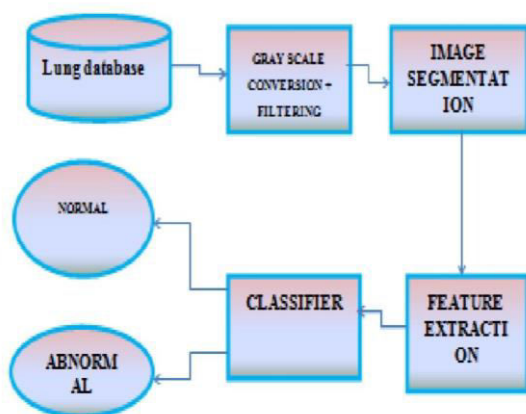
usage of its user friendly. Which is used for plotting of functions and matrix multiplication and it is using in image processing Technology for early detections of any disease. It also implement the user defined algorithms and interfaces C C++ JAVA and so on. There is a problem in solving larger Mathematical problems takes much time to solve them by using others while, by using matlab we can complete the problem in seconds. Nowadays so many engineers and scientists are mainly using this matlab Technique. It is easier to do some electrical projects too. It is easy to design 3-D Images like Drones etc .It used for various applications like Data Analysis exploration and visualization, Modeling , Simulation and Prototyping and some Scientific and Engineering Graphics Matlab is showing its own growth in the various parameters and implementing of the latest versions for the ease of the Users. Matlab is simply conclude as a Mathematical Tool built to visualize things in a simple way to the users.

## 1.2. MOTIVATION

The motivation of project is in recent developments in medical fields. It have provided foundation platforms for considering the development of effective usage of the technology. They offer the prospect of flexibility in use and to detect the disease in early stages. The Matlab software has provided to be ideal as the core of such type of detecting techniques. There are many other practical uses for the matlab software like brain tumor detection and bone tumor detections at early stages. This project mainly motivates tease of the matlab software of the early detection of cancers and later it is easy to control the future effects. Matlab is user friendly for the development of medical technology and to know the problem at the initial stages.

## 2. PROBLEM STATEMENT

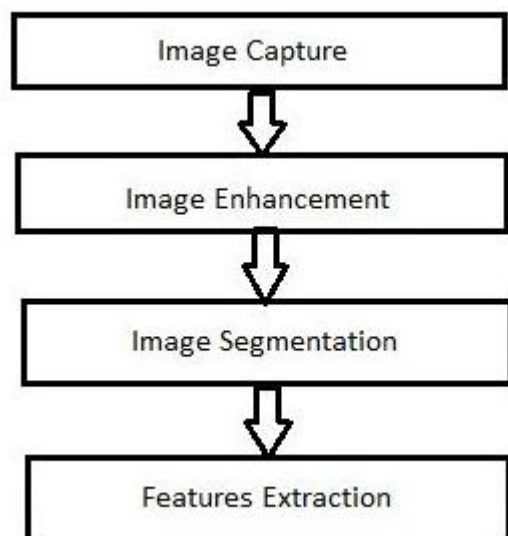
Design and implementation of lung cancer detection using matlab uses matlab software and images it can conclude the whether the person is effected with lung cancer or not.



BLOCK DIAGRAM

## OBJECTIVE

- To study the medical image processing under the concepts of MATLAB
- Enhancement of image using Gabor filter
- Image segmentation using Marker-Controlled Watershed Segmentation Approach
- Obtain the general features of the enhanced segmented image using Binarization.



PROCESSING STAGES

## 2.1 CAPTURED IMAGE

In this project we are using the image of size 20 small cell types of lung cancer images and 20 non-small cell types of lung cancer images. A total of 40 images(samples) each of 200\*200pixels in size. These are collected from private hospitals and browsing the public data bases from internet. All images are stored as 200\*200\*256 JPEG raw data.

## 2.2 IMAGE ENHANCEMENT

It is the process of image smoothen or sharpening the image .It improves the image quality and reduces the noise which is present in the image. It is of 2 types, These methods are used on image quality.

1.spatial domain method

2.frequency domain method

**SPATIAL DOMAIN:** It is a method which is directly operates on pixel of a digital image.

**FREQUENCY DOMAIN:** It is a method which operates on a fourior transform of a image. It is a low level processing technique. In this we are going to use three techniques.

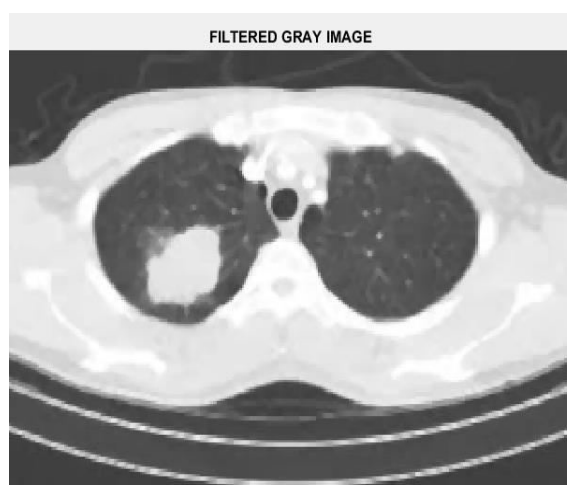
1.gabour filter

2.fast fourior transform

3.auto enhancement

**GABOR FILTER:** It is developed by Dennis Gabor for CT images. It is a linear filter used for texture analysis which means it analyses whether there are any specific frequency content in the image in specific directions in a localized region around the point or region of analysis in a spatial domain. A 2D Gabor filter is a Gaussian kernel function modulated by a sinusoidal plane wave. It is a linear filter whose impulse response is defined by a harmonic function multiplied by Gaussian function. Because of its fast fourior function multiplication is converted in to convolution in its frequency domain.

Frequency and orientation representations of Gabor filters are similar to those of the human visual system and they have been found to be particularly appropriate fir texture representation and discrimination. The filter has a real and imaginary components representing orthogonal directions which forms a complex number or used individually.



## FAST FOURIOR TRANSFORM:

It is a representation of a image as a sum of complex exponential of varying magnitude , frequencies and phases. It operates on fourior transform given image. The frequency domain is space in which each image value at a image position F represents amount that the intensity value in image vary over a specific distance related to F.

## AUTO ENHANCEMENT:

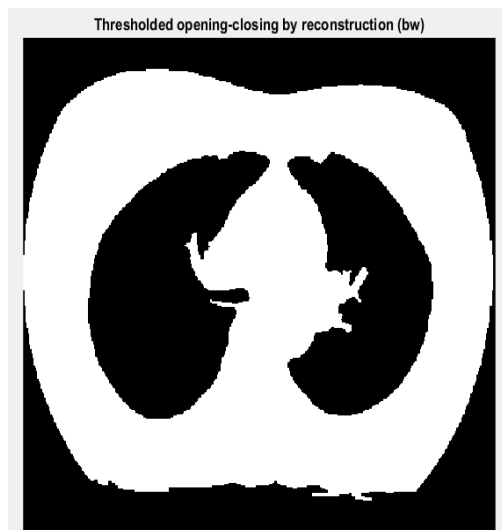
It is based on the subjective observation and statistical operation. In operation such as mean and a variance calculated. Enhancement percentage of this research was equal to 38.025%.

## 2.3.IMAGE SEGMENTATION:

segmentation means making in to small pieces,image segment means image segmented in to various set of pixels also known as super pixels. It is used to locate objects, edges and boundaries in images. The output image segmentation is a set of segments collectively cover entire image. Sum of the pixels in a particular region are similar with some characteristic property such as color, intensity or texture .There are THRESHOLDING and WATERSHED MASKING techniques.

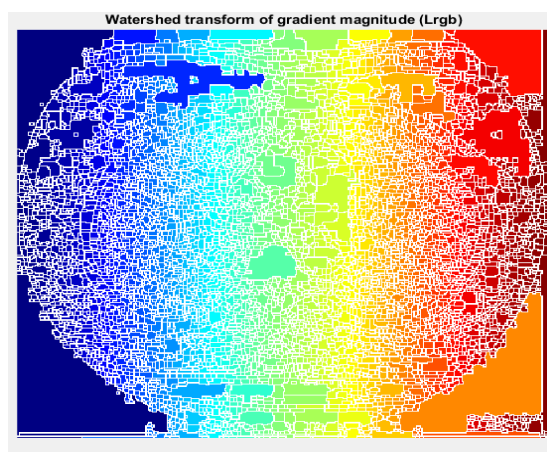
### THRESH HOLDING APPROACH:

Thresh holding is one of the most powerful tools for image segmentation segmented image obtained from thresh holding has the advantages of smaller storage space, fast processing speed and ease in manipulation, compared a gray level image which usually contains 256 levels. In this we have a gray scale image given a thresh holding procedure.



It converts the RGB image into a binary image i.e black and white image which has only two shades i.e black and white which represent the level 0 and 1 only. Threshold value for this will be lies between 0 and 1 because it has only two levels., after achieving the threshold value; image will be segmented based on it.

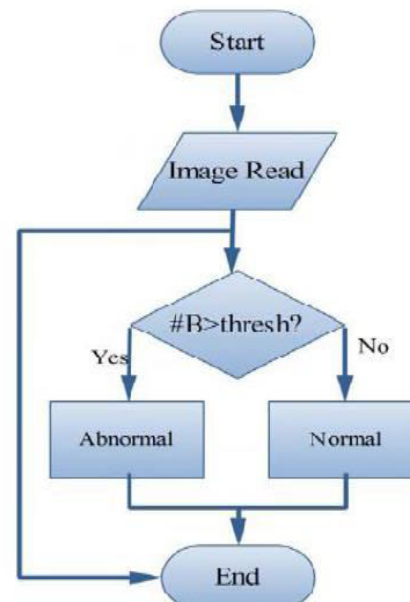
**WATERSHED MASKING TECHNIQUE:** It indicates the presence of objects or background specific image locations. It is of 2 types EXTERNAL ASSOCIATED WITH THE BACKGROUND and INTERNAL ASSOCIATED WITH THE BACKGROUND.



And to find the catchment basins and watershed rigid lines in an image by treating it as a surface where the light pixels are high and dark pixels are low

**3.4FEATURE EXTRACTION:** Before using the feature extraction we use various image processing techniques like binarization, thresh holding, normalization, masking approach etc, are applied on the sampled image. after that feature extraction techniques are applied to get features that will be useful in classifying and recognition of images.

**1.BINARIZATION :** It depends on number of black and white pixels of an image. Black pixels in image is greater than white pixels in an images concluded that x-ray report is normal otherwise it is abnormal. Then we calculate the black and white pixels taking average from that and it can be used as a threshold. If black pixels greater than threshold value and it is a abnormal otherwise it is normal.

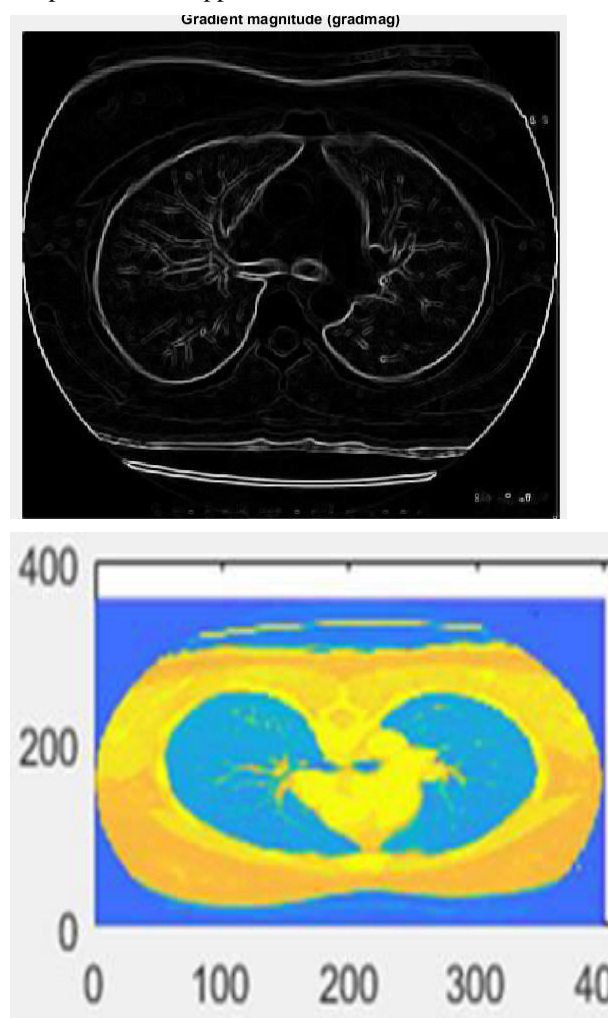


### MASKING APPROACH:

Appearance of solid blue color indicates normal case of a presence .RGB masses indicates the presence of cancer.



Masking approach is the best thing used for removal of the the noise and it indicates the presence of cancer in that CT images. Masking approach depends on the fact that of the masses are as white connected areas inside ROI (lungs), and we can say that the if the number of black pixel greater than the number of white pixel indicate that the report is at the normal otherwise the report is abnormal. If we making a thing Combining Binarization and Masking as a together this going will take a decision that whether the report is normal or it is abnormal according to the mentioned that the assumptions in the previous two approaches.



**4. CONCLUSION:** In this proposed frame work we have done the lung cancer discovery in CT examine picture. We will extend the work by testing with different other neural system and examinations can be made to relate the enhancements in the perceptions, of assuming any. One can execute this technique on some more pictures too. Growing the amount of pictures are used the methodology, can improve the precision. Furthermore X-beam X-pillar, PET pictures can likewise be considered contribution for this strategy.

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