



IOT Based Lung Cancer Detector Using Image Processing

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ABSTRACT-

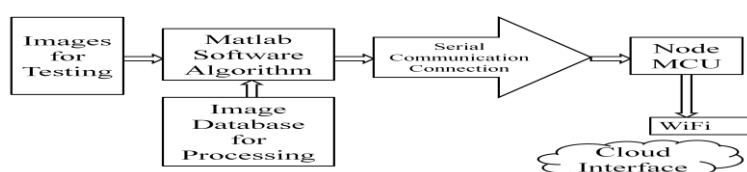
Lung cancer seems to be the common cause of death among people throughout the world. Early detection of lung cancer can increase the chance of survival among people. The overall 5-year survival rate for lung cancer patients increases from 14 to 49% if the disease is detected in time. Although Computed Tomography (CT) can be more efficient than X-ray. However, problem seemed to merge due to time constraint in detecting the present of lung cancer regarding on the several diagnosing method used. Hence, a lung cancer detection system using image processing is used to classify the present of lung cancer in an CT-images. In this study, MATLAB have been used through every procedures made. In image processing procedures, process such as image pre-processing, segmentation and feature extraction have been discussed in detail. We are aiming to get the more accurate results by using various enhancement and segmentation techniques.

Keywords: - Iot ,Based Lung Cancer Detection

Introduction:-

In this project, an automated approach for classification of the lung diseases using CT(Computed Tomography) images is presented. The lung CT image is engaged as the input. The original image is transformed to gray scale image. After that, removal of the noises and contrast enhancement is done for obtaining the enhanced images. The median filter is applied to remove the salt and the pepper noises and the preprocessed images are given as input for feature extraction where the useful features like area, perimeter, eccentricity and moment invariant values etc of the images are extracted and the extracted features are selected by the genetic algorithm method, The parameter values obtained from these features are compared with the normal values suggested by a physician. From the comparison result, cancer stage is detected. Here, IOT comes into picture. The cloud interface and node MCU is used to inform about detected stage to the user. A graphical user interface is developed to scan all the images and display the features and cancer stage. This system can help in early detection of lung cancer more accurately.

Block Diagram :-



Block Diagram No.1

Working :- Image for Testing:

If there is reason to think that you may have lung cancer then doctor can take number of test to look for cancerous cells and all other conditions. This test may include CT scan images, X-ray images of lungs. This will reveals the information about abnormal tissues and nodal. Whereas CT scan can be used to reveals the small damages/injury in your lungs. Then this data will be given to the matlab software algorithm, another input for the matlab software

algorithm is given from the image database for processing.

Image database for processing:

It consist of a number of sample images of lung cancer for classification of lung cancer by image processing technique using CT(computed tomography) scan images to get desired output.

Matlab Software Algorithm:

Image is basically a two dimensional array of pixel, the most common operation of the image is manipulation of this two-dimensional data. For this matlab offers rich library functions.

In order to prepare the image for the classification, the sample image is passed through a filter to remove the salt & paper noise on the image. Then feature extraction process is done. In which the value of RGB & average range will be calculated for each pixel in each sample image. Then this data will be give to the Matlab Software Algorithm. In which it compares the testing image data & sampled image data according to this, decide the stage of lung cancer which is from 1 to 4 stage.

Serial communication Connection :

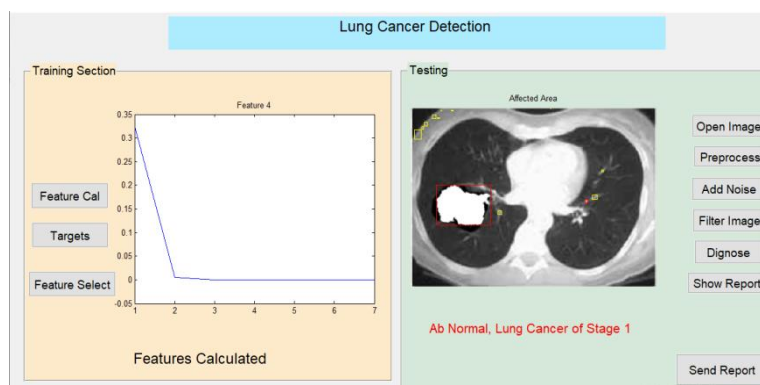
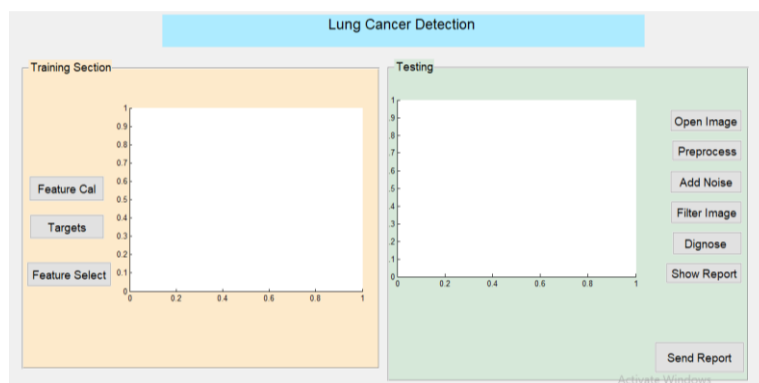
The Result of comparison is given to the Node MCU through the serial communication connection.

Node MCU :

Node MCU is the wireless connector. It is also known as WIFI Module. ESP-8266 is the new WIFI platform for IOT . it is very powerful .It is available from ESP-1 to ESP-12.The input and output pin varies according to their type, this module can be used to access the client.

Cloud Interface:

Cloud Interface is used to provide the interfacing between the software and hardware which will report of disease to the client.



Hardware requirement:-

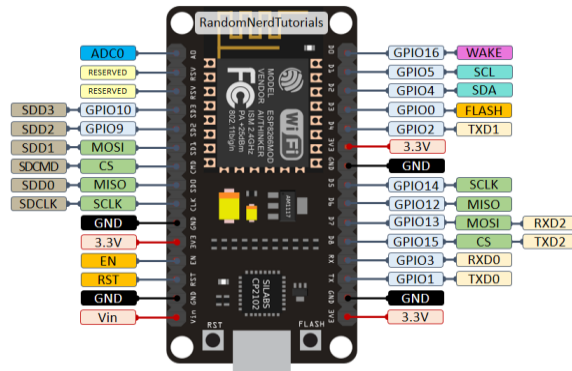


Fig no 2 hardware

- **ESP8266 Peripherals**

The ESP8266 peripherals include:

- 17 GPIOs
- SPI
- I2C (implemented on software)
- I2S interfaces with DMA
- UART
- 10-bit ADC

Advantages:

1. EARLY DETECTION OF LUNG CANCER IS POSSIBLE
2. ASSIST DOCTORS IN TRACEFULL CONDITION

Future Scope And Application:

Lung cancer is one of the most dangerous diseases in the world. Correct Diagnosis and early detection of lung cancer can increase the survival rate. The present techniques include study of X-ray, CT scan, MRI, PET images. The expert physicians diagnose the disease and identify the stage of cancer by experience. The treatment includes surgery, chemotherapy, radiation therapy and targeted therapy. These treatments are lengthy, costly and painful. Hence, an attempt is made to atomize this procedure to detect the lung cancer using image processing techniques. CT scan images are acquired from various hospitals. These images include less noise as compared to X-ray and MRI images. An image improvement technique is developing for earlier disease detection and treatment stages; the time factor is taken in account to discover the abnormality issues in target images. An image improvement technique is developing for earlier disease detection and treatment stages; the time factor is taken in account to discover the abnormality issues in target images. The CT captured images are processed. The region of interest i.e., tumor is identified accurately from the original image. Genetic algorithm and movement invariant gives best results for detecting stage. The results show good potential for lung cancer detection at early stage. For future work, we can implement this technique on some more images. Increasing the number of images used for the process can improve the accuracy. Also MRI, X-ray, PET images can be considered for this technique. Comparison can be done for all these images. So one can justify which types of images gives better result for lung cancer detection. One more technique that we can implement is, we can use raspberry-pi or Arduino. In this technique we can directly dump the code into board and directly interface the board to the scanning machine and it will also automatically transfer message to the user as these are IOT device

Conclusion:-

The proposed Lung Cancer Detector detects the cancer from CT scan images. Objective of this study is to detect lung cancer using image processing techniques. It detects the images as cancerous or non-cancerous along with its stage. The features are extracted using moment invariant functions. In order to improve the classification performance of the large scale of data, Genetic Algorithm (GA) is proposed. The significant results are obtained for the

classification with 80% accuracy. The system detects the different stages of lung cancer which will assist the doctors to detect lung cancer accurately and fast from large amount of data.

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