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Analysis and Edge Detection of Lung Cancer – Survey

C. Jeya Bharathi
M.phil (Scholar)
Madurai Kamaraj University College,
Madurai
Email : k.jeyabharathi86@gmail.com

Dr. P. Kabilan
Asst. Professor, Dept of Computer Science
Madurai Kamaraj University College
Madurai
Email: spkabi@gmail.com

***Abstract*—** Treating cancer in the early stages can provide more treatment options, less invasive surgery, and increases the survival rate. This paper deals with the detection of cancerous cells from Lungs CT scan images. To analyze the cancerous cells, physicians tackle many challenging tasks. Locating lung cancer at an early stage is a challenging task since there are few or no symptoms in this stage of the disease and majority of the cases are diagnosed in the later stages of the disease. The majority of lung cancers originate as a small growth or nodule in the lung. Screening CT scans are extremely sensitive in detecting nodules as small as 2 or 3mm within the lungs. CT screening is efficient in locating majority of lung cancers. Lung CT Scan helps in detecting lung cancers at an early stage when compared with other scans like MRI, X-Ray, etc. This present work proposes a method to detect the cancerous cells effectively from the CT scan images by reducing the detection error made by the physicians' naked eye for medical study based on canny edge detection.

Keywords- *CT scan, Edge Detection, Spatial Filters, Pre processing*

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I. INTRODUCTION

Lung cancer, that originates in the tissues of the lungs. Lung cancer is the leading cause of cancer death in the United States in both men and women. Like other cancers, lung cancer occurs after repeated insults to the genetic material of the cell. By far the most common source of these insults is tobacco smoke, which is responsible for about 85% of U.S. lung cancer deaths (see smoking). The incidence of lung cancer in other countries follows their smoking patterns. Some other carcinogens known to cause lung cancer are found in the workplace. These include bischloromethyl ether and chloromethyl ether in chemical workers, arsenic in copper smelting, and asbestos in shipbuilders and other asbestos workers.

Lung Cancer is the uncontrolled growth of abnormal cells; start off in one or both lungs, usually in the line the air passages. The abnormal cells do not develop into healthy lung tissue; they provide rapidly and form tumours. According to American cancer society the cases of lung cancer increases very rapidly and almost 14% newly diagnosed cancers are a lung cancer and also the main cause of cancer death worldwide. The previous study of diagnosis showed that the most of the lung cancer patients belongs to the age of 60 years.

II. REVIEW OF LITERATURE

Ada and Rajneet Kaur et al proposed a lung Cancer is a disease of uncontrolled cell growth in tissues of the lung. Detection of Lung Cancer in its early stage is the key of its cure. In general, a measure for early stage lung cancer diagnosis mainly includes those utilizing X-ray chest films, CT, MRI etc. In many parts of the world widespread screening by CT or MRI is not yet practical, so that chest radiology remains in initial and most common procedure. Firstly, we will use some techniques are essential to the task of medical image mining, Lung Field Segmentation, Data Processing, Feature Extraction, Classification using neural network and SVMs. The methods used in this paper work states to classify digital X-ray chest films into two categories: normal and abnormal. Different learning experiments were performed on two different data sets, created by means of feature selection and SVMs trained with different parameters; the results are compared and reported. Keywords--Data Mining, Lung Cancer, Classification, Neural Networks, and Support vector machine.

H. Mahersia, M. Zaroug and L. Gabralla et all discussed about the lung nodules are potential manifestations of lung cancer, and their early detection facilitates early treatment and improves patient's chances for survival. For this reason, CAD systems for lung cancer have been proposed in several studies. All these works involved mainly three steps to detect the pulmonary nodule: preprocessing, segmentation of the lung and classification of the nodule candidates. This paper overviews the current state-of-the-art regarding all the approaches and techniques that have been investigated in the literature. It also provides a comparison of the performance of the existing approaches.

Mokhled S. AL-TARAWNEH et all proposed recently, image processing techniques are widely used in several medical areas for image improvement in earlier detection and treatment stages, where the time factor is very important to discover the abnormality issues in target images, especially in various cancer tumours such as lung cancer, breast cancer, etc. Image quality and accuracy is the core factors of this research, image quality assessment as well as improvement are depending on the enhancement stage where low pre-processing techniques is used based on Gabor filter within Gaussian rules. Following the segmentation principles, an enhanced region of the object of interest that is used as a basic foundation of feature extraction is obtained. Relying on general features, a normality comparison is made. In this research, the main detected features for accurate images comparison are pixels percentage and mask-labelling.

Vijay A.Gajdhane, Deshpande L.M. et all, 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 a 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

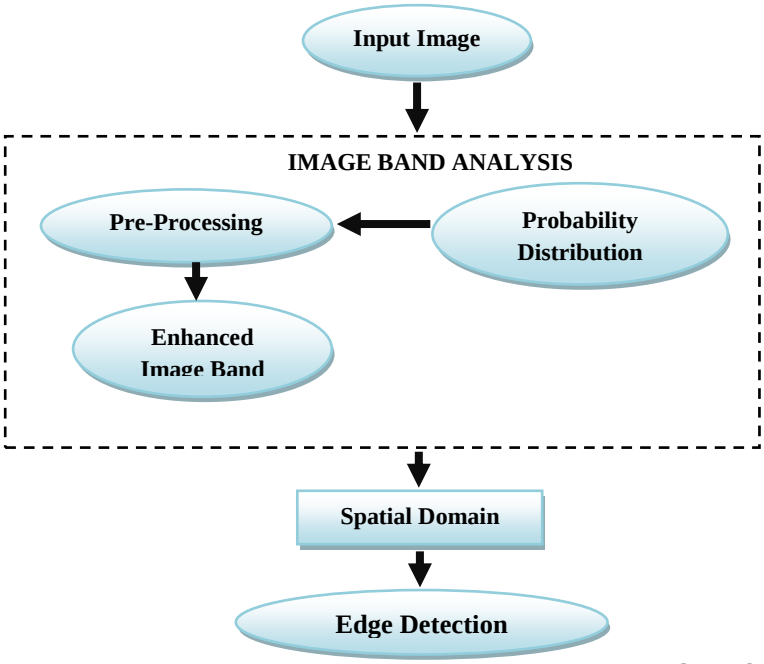
Bhagyashri G. Patil, Sanjeev N. Jain et all In recent years the image processing mechanisms are used widely in several medical areas for improving earlier detection and treatment stages, in which the time factor is very important to discover the disease in the patient as possible as fast, especially in various cancer tumors such as the lung cancer. Lung cancer has been attracting the attention of medical and sciatic communities in the latest years because of its high prevalence allied with the difficult treatment. Statistics from 2008 indicate that lung cancer, throughout world, is the one that attacks the greatest number of people. Early detection of lung cancer is very important for successful treatment. There are few methods available to detect cancerous cells. Here two methods of segmentation such as thresholding and watershed are used to detect the cancer cell and too find out better approach out of them.

Disha Sharma, Gagandeep Jindal et all The automated Computer Aided Diagnosing (CAD) system is proposed in this paper for detection of lung cancer form the analysis of computed tomography images. To produce a successful Computer Aided Diagnosis system, several problems has to be resolved. In recent years the image processing mechanisms are used widely in several medical areas for improving earlier detection andG treatment stages, in which the time factor is very important to discover the disease in the patient as possible as fast, especially in various cancer tumors such as the lung cancer, breast cancer. This system generally first segments the area of interest (lung) and then analyzes the separately obtained area for nodule detection in order to diagnosis the disease. Initially, the basic image processing techniques such as Erosion, Median Filter, Dilation, Outlining, and Lung Border Extraction are applied to the CT scan image in order to detect the lung region. Then the segmentation algorithm is applied in order to detect the cancer nodules from the extracted lung image.

After segmentation, rule based technique is applied to classify the cancer nodules. Finally, a set of diagnosis rules are generated from the extracted features. For experimentation of the proposed technique, the CT images are obtained from a NIH/NCI Lung Image Database Consortium (LIDC) dataset that provides the chance to do the suggested research. DICOM [9] (Digital Imaging and Communications in Medicine) has become a standard for medical imaging. Its purpose is to standardize digital medical imaging and data for easy access and sharing. There are many commercial viewers that support DICOM image format and can read metadata. The main objective of the project is to develop a CAD (Computer Aided Diagnosis) system for finding the early lung cancer nodules using the lung CT images and classify the nodules as Benign or Malignant.

III. ANALYSIS AND EDGE DETECTION PROCESS

The steps involved in analysis and edge detection process are as follows:



A. *Probability Distribution*

Histograms give a rough sense of the density of the data, and often for density estimation: Estimating the probability density function of the underlying variable. The total of a histogram used for probability density is always normalized to 1. The histogram block computes the frequency distribution of the elements in each column of the input, or tracks the frequency distribution in a sequence of inputs over a period of time. The running histogram parameter selects between basic operation and running operation.

B. *Pre – Processing*

The pre-processing step converts the image. It performs filtering of noise and other artifacts in the image and sharpening the edges in the image. RGB to gray conversion and Reshaping also takes place here. It includes median filter for noise removal. The possibilities of arrival

of noise in modern MRI scan are very less. It may arrive due to the thermal effect.

C. *Enhanced Image Quality*

The process of enhancing the images is to improve the visual quality due to non-ideal image acquisition process. The improvement of images is sometimes defined "Objectively" (e.g. increase the signal-to-noise ratio), and sometimes defined "Subjectively" (e.g. make certain features easier to see by modifying the colors or intensities). Intensity adjustment is an image enhancement technique that maps an image intensity values to new range.

D. *Spatial Filters*

Spatial filtering is a form of FIR filtering. The filter is actually a mask of weights arranged in a rectangular pattern. The processes are one of the sliding masks along the image and performing a multiple and accumulate operation on the pixels covered by mask.

E. *Edge Detection*

Edge detection is a fundamental tool in image processing and computer vision, particularly in the areas of feature detection and feature extraction, which aim at identifying points in a digital image at which the image brightness changes sharply or, more formally has discontinuities. The same problem of finding discontinuities in 1D signal is known as detection.

CONCLUTION

Image edges help us to determine objects. In this proposed method, the cancerous part in the lung using CT scan images is identified successfully. Physicians use the naked eye to detect the growth and spread of cancerous nodule in the lungs from the CT scan 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; the time factor is taken in account to discover the abnormality issues in target images. The CT captured images are processed. Gabor filter and watershed segmentation gives best results for pre-processing stage. Canny Operator gives best results for edge detection while comparing to other edge detection.

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