

A Project Report on
**Lung cancer detection system using lungs
CT image processing**

Submitted in partial fulfillment of the requirements for the award
of the degree of

Bachelor of Engineering

in

Computer Engineering

by

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Approval Sheet

This Project Report entitled **“Lung cancer detection system using lung CT Image processing ”** submitted by **“Samruddhi Kulkarni”(16102014),“Samiksha Bhilare”(16102025),“Aakash Singh”(16102041)”** is approved for the partial fulfillment of the requirement for the award of the degree of Bachelor of Engineering in **Computer Engineering** from **University of Mumbai**.

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CERTIFICATE

This is to certify that the project entitled **“Lung cancer detection system using lung CT image processing”** submitted by **“Samruddhi Kulkarni” (16102014), “Samiksha Bhilare” (16102025), “Aakash Singh” (16102041)** for the partial fulfillment of the requirement for award of a degree Bachelor of Engineering in **Computer Engineering**, to the **University of Mumbai**, is a bonafide work carried out during academic year 2017-2018..

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Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Signature)

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Abstract

Cancer is the root cause for a large number of deaths worldwide, out of which lung cancer is the cause of the highest mortality rates. Computer tomography scan is employed by radiologists to detect cancer in the body and track its growth. Visual interpretation of database can lead to cancer detection at later stages, thus leading to late treatment of cancer which only boosts up the cancer death rates. Therefore, image processing tools can be used for early detection of cancer. In this paper, a lung cancer detection algorithm is proposed using mathematical morphological operations for segmentation of the lung region of interest, from which Haralick features are extracted and used for classification of cancer by artificial neural networks.

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1. Introduction

Lung cancer is a type of cancer that begins in the lungs. Your lungs are two spongy organs in your chest that take in oxygen when you inhale and release carbon dioxide when you exhale. Lung cancer disease is the second largest death threat to the world after heart attack, as this cancer is responsible for the largest number of deaths, compared to the number of deaths caused by any other cancer type. Typically, the body programs cells to die at a certain stage in their life cycle to avoid overgrowth. Cancer overrides this instruction, causing cells to grow and multiply when they should not. The overgrowth of cells leads to the development of tumors and the harmful effects of cancer.

Lung cancer is the uncontrolled growth of the cells, thus leading to the formation of lung nodules. It is reported that lung cancer is responsible for around 19% deaths globally mostly due to alcohol and tobacco consumption. The rate of survival is assured by only 15% survival chances, for a survival period of 5 years. [2]. The main cause of such high death rate is the detection in later stages, thus leading to delayed treatment. If lung cancer is detected at an earlier stage, chances of survival can increase up to 50-70%. Non small cell lung cancer and small cell lung cancer are the two major groups into which the lung cancer can be classified based on the cell characteristics.

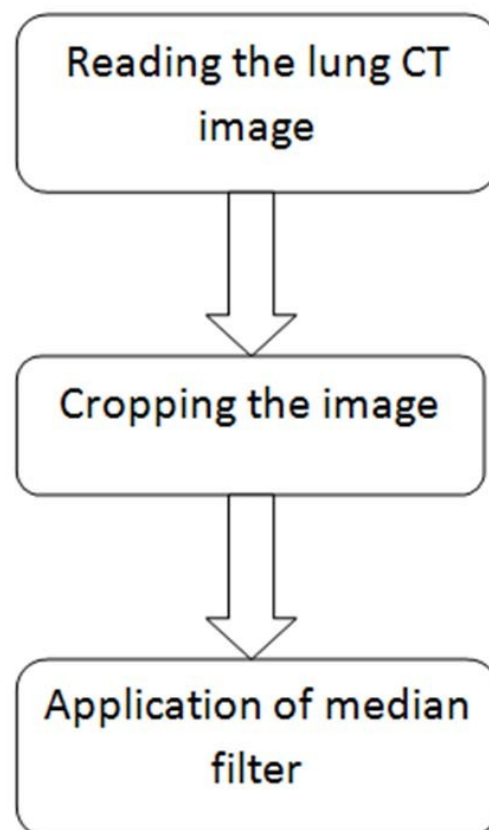
2.Literature Review

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3. IMAGE PROCESSING

Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Usually Image Processing system includes treating images as two dimensional signals while applying already set signal processing methods to them. Cropping of the image in first step is done to eliminate the unwanted portions from the image. Next, median filters are applied to the images, which are basically used to get rid of the salt and pepper noise present in the images.



3.1 Filtering

Filtering is a technique for modifying or enhancing an image. For example, you can filter an image to emphasize certain features or remove other features. Image processing operations implemented with filtering include smoothing, sharpening, and edge enhancement.

Filtering is a *neighborhood operation*, in which the value of any given pixel in the output image is determined by applying some algorithm to the values of the pixels in the neighborhood of the corresponding input pixel. A pixel's neighborhood is some set of pixels, defined by their locations relative to that pixel.

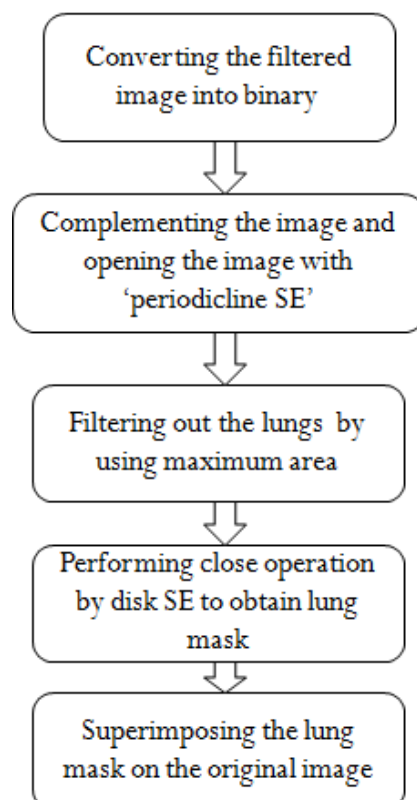
3.2 Median Filter

The Median Filter is a non-linear digital filtering technique, often used to remove noise from an image or signal. Such noise reduction is a typical preprocessing step to improve the results of later processing (for example, edge detection on an image). Median filtering is very widely used in digital image processing because, under certain conditions, it preserves edges while removing noise (but see discussion below), also having applications in signal processing.



4.Segmentation

Segmentation is the process of partitioning a digital image into multiple segments. The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. More precisely, image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics.



6. Conclusions and Future Scope

The methodology adopted in this project aims to develop an automated system for lung cancer detection. Application of median Filter to eliminate impulse noise in the images proved to be a success. The morphological operations also contributed towards satisfactory results in the process of segmentation.

Artificial neural networks proved to be a good classifier with acceptable accuracy. The methodology adopted in this project resulted in an accuracy of 92% for the hospital database. This system aims at increasing the accuracy and speed of the lung cancer detection system. It also helps in detecting the cancer at earlier stages.

Acknowledgement

We have great pleasure in presenting the report on “**Lung cancer detection system using lungs CT image processing**”. We take this opportunity to express our sincere thanks towards our guide **Brinal Colaco** Department of Computer, APSIT thane for providing the technical guidelines and suggestions regarding line of work.

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