Enhancement of Roentgenogram Imaging for Early Diagnosis of Disease

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Abstract— Various non-invasive and invasive investigations are available for assessment of pulmonary abnormalities. The prediction for the patients with life threatening disease is correlated to the period of the disease at the time of diagnosis. Detection of suspicious region in the early stages of disease can be considered the most effective way to improve survival. Digital imaging techniques are considered as a great revaluation in medical field. Advance techniques more facilitate as compare conventional procedure. An accurate assessment of primary investigation is to cure progress the disease in advance stage.

Keywords— Conventional procedure, Digital imaging, Primary investigation, Pulmonary abnormality

I. INTRODUCTION

Nature has given us a special protection to yielding parts of our body such as Brain, Heart, Lung etc., but lung is more prone to infection by indirect or direct means easily. The most frequent causes of doctor's visits is upper respiratory infections with varying symptoms ranging from runny nose, sore throat, cough, to breathing difficulty, and lethargy[2]. The World Health Organization (WHO) reported that tobacco smoking killed 100 million people worldwide in the 20th century. It could kill one billion people around the world in the 21st century [1]. Smoking is one of the major causes of morbidity and mortality in both developed and developing countries. The diseases caused by smoking are Emphysema, Chronic Obstructive Pulmonary Disease (COPD), Chronic Bronchitis and Bronchogenic Carcinoma etc. [5], [6]. Detection of suspicious region in the early stages of disease can be considered the most effective way to improve survival. To cope up with this serious problem, simple non-invasive procedures will be included for early detection of pulmonary abnormalities in routine examination. Advance techniques play a significant role in early detection, as it helps in the extraction of suspicious cases from the medical screenings [4]. Various non-invasive and invasive advance investigations are available for assessment of pulmonary abnormality such as sputum testing, chest x-ray, and advance imaging such as computed tomography (CT) and magnetic resonance imaging (MRI), etc.[7],[8]. Chest X-ray imaging is the primary investigation technique for imaging the lung for the detection of pulmonary abnormality with accommodating of subject in primary sitting. An accurate assessment of primary investigation is to cure progress of the disease in advance stage. But in manual procedure there are chances of error which create complication for the patient as well as to right planning of treatment. The prediction for the patients with life threatening disease is correlated to the period of the disease at the time of diagnosis. Advance techniques more facilitate as compare conventional procedure. Digital imaging techniques are considered as a great revaluation in medical field. Advancement of techniques reduces the long procedure of testing and reduce the processing time resulted the speedy test reports. Speedy report is essential to maintain the accuracy. This study ropes the contribution of Image processing in medical field. Image enhancement programs are the primary tools, with which a user may organize, transform and enhance images. Image enhancements encompass the methods of altering images, whether they are digital, traditional analog, or illustrations [3], [6].

II. METHODOLOGY

The proposed system has following stages; image acquisition, image importing, pre-processing, morphological operation and segmentation. The proposed work has started with acquisition of the digital image. That original image is stored in JPEG format and altered into gray scale. After that, for removal of the noises and contrast enhancement is done for obtaining the enhanced images. The median filter is applied to remove the noise and the preprocessed images are given as input for feature extraction where the useful features of the images are extracted. Segmentation is used to isolate lungs from the background. Segmentation by thresholding the images, classified the suspected abnormal regions. This suspected region is extracting some diagnostic features of each region for further analysis and interpretation. It also incorporates to highlight suspicious cases, which a physician can then focus on when they examine the first imaging of chest. Otsu thresholding is applied on the image for segmentation. Morphological operations are applied for smoothing the image. To fill small holes morphological closing is applied which fuse narrow breaks and closed thin gaps within the image. It is implemented by imclose() function, which accepts two parameters; input image and structuring element. Another morphological operation erosion is used which means to "shrink" or "thin" objects. On the other hand dilation "grow" or "thicken" objects. Again closing is used. The above steps are repeated until the enhanced image is achieved.

On finally obtained image edge detection is used to get Fig 1.11. The edge detection highlights the abnormal region which attracts to the viewer and stress to interest. An accurate assessment of primary investigation is important for plan the treatment and cure progress the disease in advance stage.

III. RESULTS

Fig. 1 Original image

Fig 1.1 Gray level image

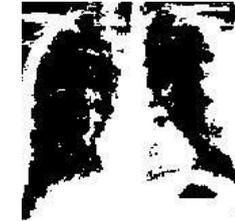Fig 1.2 Filtered Image

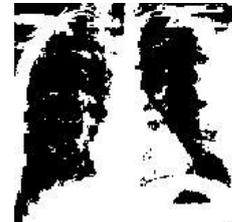Fig 1.3 Threshold Image

Fig 1.4 Closed Image

Fig 1.5 Eroded Image
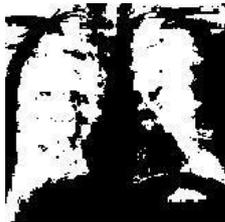

Fig 1.6 Dilated Image

Fig 1.7 Closed Image

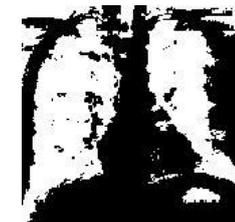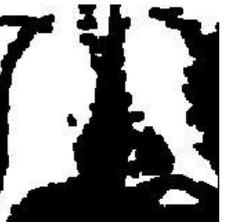Fig 1.8 Threshold Image
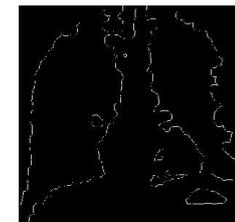

Fig 1.9 Dilated Image

Fig 1.10 Closed Image

Fig 1.11 Edge Detection

IV. CONCLUSIONS

Thresholding Chest x-ray is routinely use as a diagnostic test that has been implemented as a screening test in developed and developing countries. The overburden of work the rate of misdiagnosis may be higher in x-ray imaging by conventional method. The proposed sequence of morphological operations followed by preprocessing steps smoothen the

irregular boundaries of the image. It increases the accuracy of diagnosis from an image set by serving as a second reader for radiologists. The proposed system and the clinician work in a complementary way to improve the diagnosis and batter utilization of golden period.

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