An Improved Segmentation Method for Lung Cancer Detection

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ABSTRAK

ABSTRACT

Segmentation is one of the image processing technique which is use to segments an object from the background of an image. Problems may occur when segmenting an object from background normally due to cases such inhomogeneity intensity and others. This research proposed new segmentation method to be use in lung cancer diagnosis or detection purpose. Methods of image segmentation from every article are analyzed basically for advantage, features and drawbacks of each proposed method. Research suggest a combination of model, which have been proposed in other thesis or article with their results. Best model from reviewed articles which suggest best results is chosen, model A and model B to be combined and produce much better results in terms of accuracy and efficiency.
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<th>Abbreviation</th>
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<tr>
<td>CT</td>
<td>Computerized Tomography</td>
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<td>FCM</td>
<td>Fuzzy C-Mean</td>
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<td>MAE</td>
<td>Mean Absolute Error</td>
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<td>RMSE</td>
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<td>SBPWM</td>
<td>Simple Boost Pulse Width Modulation</td>
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<td>SLIVER07</td>
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<td>SPF</td>
<td>Signed Pressure Force</td>
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<td>TCIA</td>
<td>The Cancer Imaging Archive</td>
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CHAPTER 1

INTRODUCTION

1.1 Background

Cancer are group of disease that undergoes an abnormal cell grows inside human that are potential to spread through body parts that if there is no any prevention or management taken it may be lethal. As for lung cancer, their presence was like circle lump within lung space which are called as lung nodule. It has been reported that there are about 1.6 million death cases out of 1.8 million lung cancer diagnoses worldwide in 2012 (Siang et al., 2016). In order to diagnose this kind of disease, technologies are required to scan through lung intersection. Years of invention and research by collaboration of scientist and engineers, there are many technologies been produced that are specifically used for cancer detection.

Computerized Axial Tomography (CT) Scan are used to scan body parts like a loaf of bread by slicing it purposely to find any abnormalities insides. However, doctors need to analyse manually all the images as the scanned images are like photos that aren’t yet filtered because CT scanner are system that only captures without going through any image processing. This process is necessary to increase accuracy and to aid the lung cancer specialist in analysing the lung for any lung nodule.

Segmentation are one of the method that are used in image processing. In shorts segmentation work by partitioning digital image into segments with same colour, intensity or texture. Thus, it is easier to analyse the image because it has already detected if there’s any specific subject. Relating with CT scan, result image can undergo segmentation process to detect any lung nodule within the lung area and highlight it so that it can be differentiate.
There are terms that will be used in this research purpose, ‘Active-Contour’ also called snakes is a framework in computer vision for delineating focus object outline which is widely used for edge detection, shape recognition and more. It describes the boundaries between focus object and possible background or other objects. Other term, Signed Pressure Force (SPF) function is formulated function that is generally used to either shrink or expand the contour. Finally, Gaussian function can be simply put to smoothen any image by using this function filter.

Below is an illustration of an example for an Active Contour, the left image shows the initial shape of the contour that shrink until it fit the target object like in the right image.

Figure 1.1: Contour shrinks fitting the object.

There’s limit to the current used method which is it can only be applied on certain cases. Problems occurred when cases aren’t appropriate with method use. Other problem the scanner alone can’t do the image processing for detecting any lung nodule.

1.2 Problem Statement

The CT scanner does not build with image processing system to determine if there is any presence of lung nodule and even though the latest segmentation method can produce a good result it is still imperfects.

Limitations of current applied methods, there are none segmentation method that can be globally applied to all various cases. Simply said, recently compose functions or
methods used are limited to specified cases parameter. If used on other cases that isn’t appropriate with the method, results may be inaccurate or most likely segmenting wrong parts.

Thus, the solution for this is by enhance the results of the output which is more accurate and lessen bad output by implementing Gaussian and the SPF function in Active-Contour for the segmentation method.

1.3 Objectives

The objectives are:

i. To investigate a segmentation method to enhance the result of output for lung nodule detection.

ii. To implement an improve segmentation method for automated lung cancer diagnosis using the propose method.

iii. To validate the accuracy of improved segmentation method in acquiring information on lung nodule.

1.4 Scope

The scopes of this research are:

i. Using proposed segmentation method to process the CT-Scan image.

ii. CT-Scan image processed result accurately segmenting lung nodule from others.

iii. Determine whether composed method works better than current and functioning well.

1.5 Report Organization

This report shall consist of five chapters. Chapter 1 discuss on introduction on research that explain in general about the research terms, statement of problem, objectives and scopes. While chapter 2 focus on reviews from past studies, identified problems and possible solution by others researcher. Chapter 3 will explain in details on methodologies
REFERENCE


