Tumour Classification and Ellipsification for Breast Cancer in Mammogram Images using Image Processing in MATLAB

K.Sindhuja[1],R.Sivakami[1],C.Sona[1] and Dr.C.Sujatha[2]
[1]Department of ECE, SSM Institute of Engineering and Technology, Dindigul, Tamilnadu-624002.
[2]Associate Professor, Department of ECE, SSM Institute of Engineering and Technology, Dindigul, Tamilnadu-624002.

Abstract

Recent advances in using quantitative ultrasound (QUS) methods have provided a promising framework to non-invasively and inexpensively monitor or predict the effectiveness of therapeutic cancer responses. One of the earliest steps in using QUS methods is contouring a region of interest (ROI) inside the tumours in ultrasound B-mode images. This contouring is done by manual segmentation which is a very time-consuming and tedious process where as auto-contouring is also an extremely difficult task for computers due to the poor quality of ultrasound B-mode images. For the prediction of cancer response cell, a rough boundary of the tumours as an ROI is only needed. In this work, a semi-automated tumours localization approach is proposed for ROI estimation in mammogram B-mode images acquired from the patients with locally advanced breast cancer (LABC). The proposed approach consist of some different modules, including 1) feature extraction using keypoint descriptors, 2) adding the feature descriptors with the distance of the keypoints to the user-input pixel as the center of the tumours, 3)a support vector machine (SVM) to classify keypoints as "tumours" or "non-tumours", and 4) ellipse as an outline of the ROI representing the tumours. These process with the B-mode images from LABC patients yielded promising results with an accuracy of about 80 to 90% using random functions. These results demonstrated that the proposed method can be used as the first stage in a computer assisted cancer response prediction system for semi-automated contouring of breast tumours.

Keywords - *Image Enhancement, Image Segmentation, Image Classification.*

I. INTRODUCTION

In this technique the tumor cells are identified by using classification and ellipcification process. The main aim of this process is to predict a means to assess the individual report to treat them early by this approach.There are several functional imaging modalities such as Magnetic Resonance Imaging (MRI), Diffuse Optical Spectroscopy (DOS), and Positron Emission Tomography (PET) that can provide imaging at a microscopic level to detect dead cells. The two main drawbacks of these imaging technologies include: (i) the requirements for a large capital investment and an external agent (ii)The latter is also expensive, and may cause some side effects and allergic reactions. In contrast, Quantitative UltraSound (QUS) methods in mammogram images provide a portable, non-expensive, and noninvasive means for a rapid acquisition of functional images that can be used for an early assessment of cancer cells. Moreover, in QUS methods, the endogenous contrast – generated by the process of cell death which is employed in treatment assessment, which reduces the requirement for injecting external agents. The applications of QUS methods have recently been extended from cancer response monitoring the tissue characterization (or) visualization using 3-D Automated Breast UltraSound (ABUS) scanners. The first major step in the implementation of each of these applications is to contour a Region of Interest (ROI) inside the tumours in frames with identifiable tumours areas. This step is currently performed manually as there is no automated software to segment an ROI in ultrasound B-mode images. The manual segmentation of tumours is a very time-consuming task. With the availability of 3-D scanners such as ABUS technologies, the problem will be even more severe to be contoured in each patient. Therefore, designing an automated segmentation method can save a significant amount of expert's time and efforts. In this work, a semi-automated supervised tumours localization method was proposed for ROI estimation in B-mode images gethered from patients with Locally Advanced Breast Cancer (LABC) and determining their accuracy of the cancer cells.

II. BACKGROUND

Several segmentation techniques has been tried for different mammogram images.Different classification techniques were applied on some expressive features have been employed to extract segments from the images.These classification techniques include some methods like FAST,SURF,BRISK and some simple methods like k-means and Fuzzy c-means(FCM).

k-mean algorithm