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Automatic Detection of Adenocarcinoma using Active Contours

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Abstract

CT scan is the one of the image representation for abdomen, where the tumour to be located and specified effectively with clarity, by the medical expert. This role can be hold by using one of the image processing techniques called segmentation. Image segmentation is the technique which isolates the image into different regions to simplify the image and identify the Tumour easily. Image segmentation has been extensively studied by various approaches. This work, focus on the one of the image segmentation technique with a new regularization term that yields an unsupervised segmentation model which identifies different Tumour locations in a given CT image. Active contours form a boundary around a particular part of the image based on an energy function. The energy function may include intensity values of pixels or gradient values. Chen-Vase method of active contour algorithm is adopted for image segmentation. The segmentation is done after properly masking of CT scan image. The cancer prone area is generalized prior to the masking of the image. Effected abdomen cancer can be identified for better analysis of medical experts using image processing MATLAB tools. This paper describes a new method to detect and extract the features in CT scan images, which shows good performance in detection of difficult features. And the developed technique makes use of major image processing methods and fundamentals to detect the cancer with minimum possible human interaction.

Keywords

Active contours, Adeno carcinoma, Bit Map Image, Chan-vase Active Contour, Computed Tomography

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1. Introduction

Medical image segmentation plays an important role in clinical diagnosis. CT medical image segmentation scheme should possess some preferred properties such as minimum user interaction, fast computation, and accurate and robust segmentation results. Discussed by T.chan and L.vese etal.[1]

Image segmentation is an image analysis process that aims at partitioning an image into several regions according to homogeneity criterion. Image segmentation is a very complex task, which benefits from computer assistance, and yet no general algorithm exists. It has been a research field in computer science for more than 40 years now, and the early hope to find general algorithms that would achieve perfect segmentations independently from the type of input data has been replaced by the active development of a wide range of very specialized techniques. Most of the existing segmentation algorithms are highly specific to certain type of data, and some research is pursued to develop generic frameworks integrating these techniques.

Segmentation can be a fully automatic process, but it achieves its best results with semi-automatic algorithms, i.e. algorithms that are guided by a human operator. This concept of semi-automatic process naturally involves an environment in which the human operator will interact with the algorithms and the data in order to produce optimal segmentations. The simplest example of the need of a human intervention during the task of segmentation results from the specificity of the existing algorithms depending on the type of input data, the operator will have to carefully pick the best adapted algorithm, which most of the time cannot be done in an automatic way. The subjective point of view of the human is required.

Image Segmentation has become an essential tool in the medical field with the generalization of diagnosis using Computerized Tomography (referred to as CT), [2] image segmentation is often required to allow doctors and surgeons to analyze the patients data, e.g. prior to surgery to determine the exact location of an organ or a tumor.

An adenocarcinoma tumor is an abnormal growth of tissue in the brain. Unlike other tumors abdominal tumors spread by local extension and rarely metastasize (spread) outside the brainKinzler KW etal [3]. A benign abdominal tumor is composed of non-cancerous cells and does not metastasize beyond the part of the abdomen where it originates. These tumors are considered malignant if they contain cancer cells, or if they are composed of harmless cells located in an area where it suppresses one or more vital functions [4].

In this paper we try to develop a segmentation algorithm for abnormal CT scan images using Active contours technique.

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2. Algorithm of Adenocarcinoma Detection

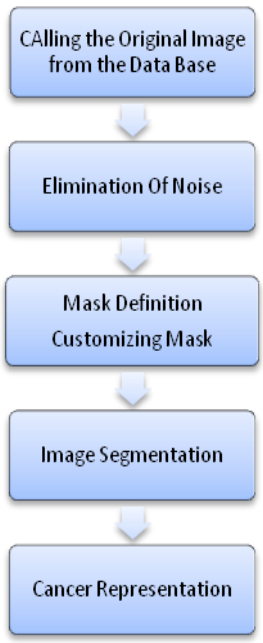

Fig. 1: Algorithm of Adenocarcinoma Detection.

In order to calculate the clinical parameters of interest, new region classification and segmentation techniques based on Active contours are developed. The CT Scan of abdomen are a bit noisy, with poor resolution and weak edge delineation, which required the development of effective segmentation to overcome these challenges. The complete algorithm is shown in fig.1.

Calling the Original image from the data Base : The first step in the algorithm states that a collective set of CT scan images are maintained at the data base For the effective analysis of tumor. This data base images are retrieved from the data base .Neelapala Anil Kumar etal[5].

Elimination of Noise: Noise removal is performed by using the Median filters and sharpening filters to sharpen the edges of the CT scan images. Depending on the type ,we can specify the Additional parameter to image noise by normalizing the intensities ranging from 0 to1.[6]

Mask definition : (Customizing mask): Using the reference point in the original image, a mask is to be created around the image. This is primarily done because the region of interest is the anterior chamber to avoid spurious layers interfering .Once the masking is set, the image is to be processed again in order to obtain the approximate Tumor.

Segmentation: Image segmentation is one of the most important steps leading to the analysis of processed image data the main goal is to divide an image in to parts that have a strong correlation with objects or areas of the real world contained in the image[7]. We may aim for the complete segmentation, which results in a set of disjoint regions corresponding uniquely with objects in the input image, or for partial segmentation, in which regions do not corresponds directly with image objects. The image analysis models became popular since their publishing in work since the publishing work on “Snakes: Active contour models” T. Chan, B. Sandberg, etal [8] since then they have become active and successful research branch of image segmentation.

Cancer Representation: After the Successful processing steps of Filtering And Segmentation techniques we can have the tumor image have been isolated from the original imageD.Judehemanth,

D.Selvathietal [9].The representation of cancer are viewed as an Automated System[10].

3. Results

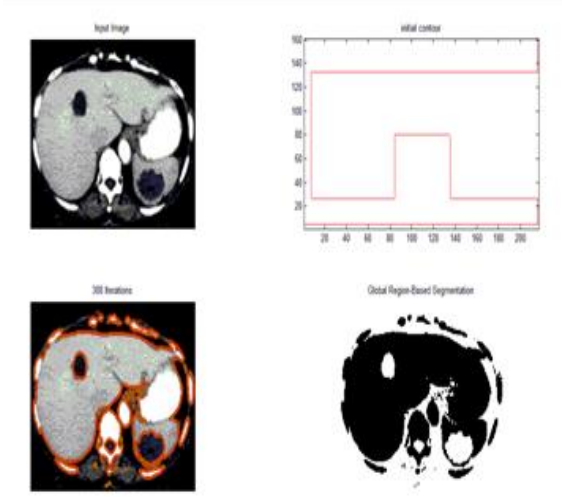

Fig.2: Automated results of detected Adenocarcinoma.

The above results shows the detected Adenocarcinoma procedure involving the process of calling the input image with pre-determined mask and number of iterations required for the detection of Effected abdomen cancer identification**.**

4. Conclusions

Chen-Vase method of active contour algorithm is adopted in this paper for image segmentation. The segmentation is done after properly masking the CT scan image. The cancer prone area is generalized prior to the masking of the image. Effected abdomen cancer can be identified for better analysis of medical experts using image processing MATLAB tools.

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