Novel method for liver cancer detection using super pixel and ANN algorithm

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Abstract— Nowadays most of the people are affected by liver cancer that can be the leading cause of cancer death. To analyze the liver cancer detection using super pixel segmentation and artificial neural network (ANN) Algorithm and it reduces the time complexity. An automatic 3D segmentation method for high energy sound waves in ultrasound liver images, which is based on a fusion of accurate time-consuming method and statistical texture prior. Three orthogonal linear filter banks are used to extract texture features from each image in the region around the point of the database. The atlas database includes registered liver images from previous patients and their segmented liver surfaces. To train the problem of patient–specific frequency content in the image features from the atlas database are using ANN algorithm and then to segment the super pixel segmentation the liver image from a new patient. The dataset of liver cancer detection are benign and malign.

Index Terms—ANN Algorithms, liver tumor segmentation, ultrasound image.

1. Introduction

In the world wide liver cancer is the most frequent disease. The disease is curable if detected early enough. Primary prevention seems impossible to the causes of this disease are still remaining unknown. The development of Liver cancer has been associated with several well-recognized personal hygiene risk factors such as early menarche and late menopause, family history, dietary, environmental factor, and genetic factors. The cells are similar functions grow side by side to form a common tissue, such as brain tissue, or muscle tissue or bone tissue. As these normal cells proliferate, they beg into the crowd and bump into each other, and a phenomenon that researchers call cell recognition occurs a damas age is sent back to the individual cells in the tissue to stop pro-life rating. An abnormal mass of tissue in the tumor diseases. Tumors can be benign or malignant diseases. To identify the accurate part of shape and grow in a tumor. To fining out the specific diseases depends on the type and accurate part of the tumor diseases. Small clusters of micro calcifications appearing as a collection of white spots on mammograms show an early warning of Liver cancer. Micro calcifications are tiny bits of calcium that may show up in clusters or in patterns (like circles) and are associated with extra cell activity in Liver tissue. Usually, the extra cell grow this not cancerous, but sometimes tight clusters of micro calcifications can indicate early Liver cancer. Scattered micro calcifications are usually a sign of benign Liver tissue.
2. Literature Survey

Automatic liver segmentation based on shape constraints and deformable graph cut in ct images. In this paper liver segmentation is challenging a task in the medical image processing area due to the complexity of the liver’s, low contrast with adjacent organs, and presence of pathos. This investigation was used to develop and validate an automated method to segment livers in CT images. The proposed method was evaluated on 50 CT scan images, in these segmentation have two databases are Sliver07 and 3Dircadb. The experimental results showed that the proposed method was effective and accurate for the detection of the liver surface in ct image.[1] Automatic liver segmentation on computed tomography using random walkers for treatment planning. In this paper proposed more accurate segmentation, a random walker based framework is proposed that can be segmented contrast-enhanced livers CT images with great accuracy and speed. The other segmentation methods with an overlap error of 4.47 % and dice similarity coefficient of 0.94 while it showed exceptional accuracy on segmenting the pathological livers with is overlap error of 5.95 % and dice similarity coefficient of 0.91.[2] Efficient multi-scale 3d CNN with fully connected CRF for accurate brain lesion segmentation. This paper proposed a three-dimensional Convolutional Neural Network for challenging the brain lesion segmentation. 3D fully connected Conditional Random Field which is effectively removes the false positives. Lesion segmentation in multi-channel MRI patient data with many problems in brain traumatic brain injuries, brain tumors, and ischemic stroke. This method is computationally efficient, which allows its adoption in a variety of research and clinical settings.[3] perceptual generative adversarial networks for small object detection. This proposed system of Detecting small objects is notoriously challenging due to their low resolution and noisy representation. Perceptual Generative Adversarial Network (Perceptual GAN) model that improves small object detection through narrowing the representation difference of small objects from the large ones. the performance gain of such ad hoc architectures is usually limited to pay off the computational cost.[4] Gan-based data augmentation for improved liver lesion classification. In this proposed method to generated medical images can be used for synthetic data augmentation, and improve the performance of CNN for medical image classification. Our novel method is demonstrated on a limited dataset of computed tomography (CT) images of 182 liver lesions (Cysts, Metastases and, Hemangiomas). Using synthetic data augmentation achieved an improvement of ~ 7% in accuracy for the liver lesion classification task.[5]

3. Problem Definition

Limitation in choosing the size of image. Costly implementation. False detection. Cannot operate on images with less amount of contrast. The convolutional neural network most commonly used technique is not a straightforward task due to the great variety of lesions, low contrast between the lesion and the surrounding LIVER, irregular and fuzzy lesion borders liver types and presence of molecules.

4. Proposed Method

In this project, an approach to border detection in dermoscopy images based on the multi-level decomposition and classification method is presented. LIVER cancer detection using digital image processing. The scope of Artificial neural network is used. Two phases are training and testing. Early detection of Cancer will reduces the complication. Reduction of insignificant amount of workload and time for ophthalmologists.
4.1 SEGMENTATION ALGORITHM

Process of subdivides a digital image into multiple segments. Used to find the location of the lesion border. Existing algorithms are only applicable to dermoscopy images. Digital photographs cannot be used in existing algorithms because of illumination variation. Segmentation based on pixel color intensity.

**BLOCK DIAGRAM**

![Block Diagram](image)

Figure 1: Block Diagram for Proposed System

4.2 INPUT IMAGE

A Special camera called ‘Ultrasound camera’ is used for taking images. An image is made up of a finite number of elements called pixels, each of which has a particular location and values. Input images are represented in the form of a matrix in Matlab.

4.3 CLASSIFICATION

In the Classification is using an ‘Artificial neural network’. ANN is a mathematical or computational method and consists of an interconnected group of artificial neurons. A two-layer network is developed and training is done to achieve minimum error.

**FLOW CHART FOR TRAINING**

![Flow Chart](image)

Figure 2: Flow Diagram for training
FLOW CHART FOR TESTING

Figure 3: Flow Diagram for testing

4.4 IMAGE ENHANCEMENT

Enhancement is the process of manipulating an image so that the result is more suitable than the original image for a specific application. Intensity Transformations are used in image enhancement. Image enhancement is the improvement of digital image quality (wanted e.g. for visual inspection or for machine analysis), without knowledge about the source of degradation. Enhancement is the process of manipulating an image so that the result is more suitable than the original for a specific application.
Image enhancement can be done in two domains

a) Spatial Domain

b) Frequency Domain

Spatial domain refers to the image processing methods in this category are based on direct manipulation of pixels in the image. The pixel values are manipulated to achieve the desired enhancement.

In frequency-domain methods, the image is first transferred into the frequency domain. It means that, the Fourier Transform of the image is computed first. All the enhancement operations are performed on the Fourier transform of the image and then the Inverse Fourier transform is performed to get the resultant image.

4.5 IMAGE SEGMENTATION

Image segmentation is necessary for most image analysis of subsequent tasks. Segmentation partitions an image into distinct regions containing each pixel with the similar attributes. To be meaningful and useful for image analysis and interpretation, the regions should strongly relate to depicted objects or features of interest. Meaningful segmentation is the first step from low-level image processing transforming a grayscale or color image into one or more other images to high-level image descriptions in terms of features, objects, and scenes. The success of image analysis depends on reliability of segmentation, but an accurate partitioning of an image is generally a very challenging problem.

4.6 FEATURE EXTRACTION

Feature extraction involve the amount of a piece of equipment required to a large set of data accurately. The function of the feature extraction and selection methods is to obtain the most relevant information from the original data and represent that information in a lower position of an element. The feature is defined as a function of one or more measurements, each of which specifies some quantifiable property of an object, and is computed such that it quantifies some significant characteristics of the object.

5.Output and Result

Figure 4: Output for Liver Cancer Detection
6. Conclusion

The conclusion of our study is to investigate a good method for automated analysis of LIVER images for the purpose of detecting and recognizing Cancer diseases. The proposed method can recognize with Cancer accurately, in comparison to other methods and is potentially a powerful tool for the recognition of Cancer diseases. To identify the accurate part of diseases in liver cancer. To detect the use of artificial neural network and super pixel segmentation.

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