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Automatic Brain Tumour Detection Using Symmetry Information

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Abstract-
Image segmentation is used to separate an image into several "meaningful" parts. Image segmentation is identification of homogeneous regions in the image. Many algorithms have been elaborated for gray scale images. However, the problem of segmentation for color images, which convey much more information about objects in scenes, has received much less attention of scientific community. While several surveys of monochrome image segmentation techniques were published, similar surveys for color images did not emerge.
Image segmentation is a process of pixel classification. An image is segmented into subsets by assigning individual pixels to classes. It is an important step towards pattern detection and recognition. Segmentation is one of the first steps in image analysis. It refers to the process of partitioning a digital image into multiple regions (sets of pixels). Each of the pixels in a region is similar with respect to some characteristic or computed property, such as color, intensity, or texture. The level of segmentation is decided by the particular characteristics of the problem being considered. Image segmentation could be further used for object matching between two images. An object of interest is specified in the first image by using the segmentation result of that image; then the specified object is matched in the second image by using the segmentation result of that image

I. Introduction

In Image processing, edge information is the main clue in image segmentation. But, unfortunately, it can't get a better result in analysis the content of images without combining other information. So, many researchers combine edge information with some other methods to improve the effect of segmentation [1] [2] [3].
Nowadays, the X-ray or magnetic resonance images have became two irreplaceable tools for tumours detecting in human brain and other parts of human body [4][5]. Although MRI is more expensive than the X-ray inspection, the development of its applications becomes faster because of the MR inspection does less harm to human than X-ray's.
Segmentation of medical images has the significant advantage that interesting characteristics are well known up to analysis the states of symptoms. The segmentation of brain tissue in the magnetic resonance imaging is also very important for detecting the existence and outlines of tumours. But, the overlapping intensity distributions of healthy tissue, tumor, and surrounding edema makes the tumor segmentation become a kind of work full of challenge.
We make use of symmetry character of brain MRI to obtain better effect of segmentation. Our goal is to detect the position and boundary of tumours automatically based on the symmetry information of MRI.

II. Literature Survey

In most of time, the edge and contrast of X-ray or MR image are weakened, which leads to produce degraded image. So, in the processing for this kind of medic image the first stage is to improve the quality of images. Many researchers have developed some effective algorithms about it [4] [5] [6].
After the quality of image been improved, the next step is to select the interesting objects or special areas from the images, which is often called segmentation. Many techniques have been applied on it. In this paper, we mainly discuss the brain tumor segmentation from MRI. For now, there are also some very useful algorithms, such as mixture Gaussian model for the global intensity distribution [7], statistical classification , texture analysis, neural networks and elastically fitting boundaries, etc. An automatic segmentation of MR images of normal brains by statistical classification, using an atlas prior for initialization and also for geometric constraints. Even through, Brain tumours is difficult to be modeled by shapes due to overlapping intensities with normal tissue and/or significant size. Although a fully automatic method for segmenting MR images presenting tumor and edema structures is proposed in, but they are all time consuming in some degree. As we know, symmetry is an important clue in image perception. If a group of objects exhibit symmetry, it is more likely that they are related in some degree.

So, many researchers have been done on the detection of symmetries in images and shapes.
I developed an algorithm based on bilateral symmetry information of brain MRI. Our purpose is to detect the tumor of brain automatically. Compared with other automatic segmentation methods, more effective the system model was constructed and less time was consumed.

III. Problem Statement

Image segmentation is a key step from the image processing to image analysis, it occupy an important place. On the other hand, as the image segmentation, the target expression based on segmentation, the feature extraction and parameter measurement that converts the original image to more abstract and more compact form, it is possible to make high-level image analysis and understanding.

If the input brain image is colorized, it is converted into gray image. First read the red, blue and green value of each pixel and then after formulation, three different values are converted into gray value. The automated edge detection technique is proposed to detect the edges of the regions of interest on the digital images automatically. The method is employed to segment an image into two symmetric regions based on finding pixels that are of similar in nature. The more symmetrical the two regions have, the more the edges are weakened. At the same time, the edges not symmetrical are enhanced. In the end, according to the enhancing effect, the unsymmetrical regions can be detected, which is caused by brain tumor.

IV. The Proposed Mechanism

In brain tumor detection are many techniques but it can't give the accurate result and processes are very time consuming. I have proposed the new technology for the detection of brain tumor automatically by using bilateral symmetry information. It takes less time than other techniques of the brain tumor detection. Here I have used the algorithm for this purpose.

Bilateral Symmetry Axis algorithm
- Here used the Least Square method for fit the Mid pixel.
-As per symmetry axis, check which side of the brain tumor present or not.
-Edge detection Purpose use Canny and Aslo compare with other technique.

Automatic brain tumor detection
- Show how much area affected by tumor in form pixel or percentage.

V. Methodology Used

I have studied many techniques for brain tumor detection. I have used edge detection technique for brain tumor detection. Edge-based method is by far the most common method of detecting boundaries and discontinuities in an image.I have used canny edge detection for detectiong the edge also compare others technique. The parts on which immediate changes in grey tones occur in the images are called edges. Edge detection techniques transform images to edge images benefiting from the changes of grey tones in the images.

VII. Conclusion

At first, it checks the image can be divided into symmetric axis or not. If it is divided into Symmetric part then no tumor in brain and it can be divided in curve shape then chances of tumor in human brain. However, if there is a macroscopic tumor, the symmetry characteristic will be weakened. According to the influence on the symmetry by the tumor, develop a segment algorithm to detect the tumor region automatically.

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