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MULTIPLE ANALYSIS OF BRAIN TUMOR DETECTION BASED ON FCM

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Abstract - A Tumor is an abnormal mass of a tissue which can be solid or fluid filled in any part of the body. The tumors are of different types and have different treatment. In this paper it is used to detect the brain tumor from MR images based on fuzzy rules. The Brain images can be seen by the MRI scan or CT scan. It is important to find out the tumor from MRI images but it is time consuming although, the MRI scan is more comfortable than any other scans for diagnosis. It do not affect the human body, as it is centered on the magnetic field and radio waves. There are various types of algorithm for brain tumor detection. But they may have some drawback in detection and extraction. According to the previous approaches brain tumor detection is done by preprocessing which is first step and then segmentation is done by fuzzy c-means algorithms the brain tumor is detected and it is identified. Comparing with the other algorithms the performance of fuzzy c-means plays a major role.

Key Words: Tumor, MRI Scan, Preprocessing, Segmentation, Fuzzy c-means.

1.INTRODUCTION

Doctors use many tests to find, or diagnose a brain tumor and learn the type of a brain tumor. They also do the tests to learn if it has spread to another part of body from where it started, doctors may also do tests to learn which treatment could work best For most of the types of tumor, taking the sample of the possible tumor is the only sure way for the doctor to know whether the area of the body has a tumor or not. Most brain tumors are not diagnosed until after symptoms appear. Often a brain tumor is initially diagnosed by an internist or a neurologist. An internist is a doctor who specializes in treating adults. A neurologist is a doctor who specializes in problems with the brain and central nervous system. In general, diagnosing a brain tumor usually begins with magnetic resonance imaging (MRI). Once MRI shows that there is a tumor in the brain, the most common way to determine the type of brain tumor.

TUMOR

The tumor are generally of two types i.e. primary or secondary. The primary brain tumor do not spread to another body parts and can be malignant or benign and secondary tumors if the part of the tumor spreads to another place and grows on its own, then it is known as secondary. The secondary brain tumors are always malignant. The malignant tumor is more dangerous and life threatening than benign tumor whereas malignant means the cells which are cancerous and benign means which are non-cancerous. The main aim of this system is to make a system for detecting and identifying the tumor from MRI For detection and segmentation of brain tumor is that if we obtained the three dimensional image of brain tumor then we can also find out its tumor size and also can evaluate its tumor type.

1.2 MAGNETIC RESONANCE IMAGING

The MRI uses a large magnet and radio waves to look at organs and structures inside your body. Health care professionals use MRI scans to diagnose a variety of conditions. MRI are very useful for examining the brain and spinal cord . the MRI having better qualities then other medical imaging techniques. In this a special dye is used to enhance the likelihood of detecting the brain tumor.

2 PROPOSED SYSTEM

The proposed system it consists of four types named as Pre-processing, segmentation, segmentation using fuzzy c-means, Feature extraction, According to the need the pre-processing step converts the image. It performs filtering of noise and other artifacts in the image and sharpening the edges in the image. RGB to gray conversion. The feature extraction is extracting the cluster which is based upon entropy using fuzzy rules which shows the predicted tumor at the FCM (Fuzzy C-means). output. The extracted cluster is given to the process. It applies a binary mask over the entire image. In the approximate reasoning step the tumor area is calculated using the method making the dark pixel darker and white brighter. In the approximate reasoning step the tumor area is calculated using the binarization method. That is the image having only two values either black or white (0 or 1). Here 256x256 JPEG image is a maximum image size. The binary image can be represented as a summation of total number of white and black pixels. The Pre-processing is done by filtering. Segmentation which is done by Fuzzy C-means algorithm. The feature extraction is done by fuzzy rules and finally, approximating the method to recognize the tumor size in MRI image using FCM detection method.

2.1 Flow Diagram For Proposed Method

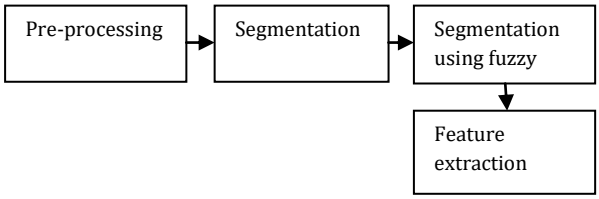

Fig.1 Flow diagram of Proposed Method with all processing steps.

2.2 Pre-processing

The pre-processing plays a very important role it is used for processing the gray scale image by using different techniques like brightness, filtering and many others. In this process the white objects are defined from gray and light items from dark objects. The RGB (red green and blue) to grey conversion also takes place here. It includes a median filter for noise deduction. In this process it changes the brightness of the image and the tumor detection in the MRI image got easier to identify.

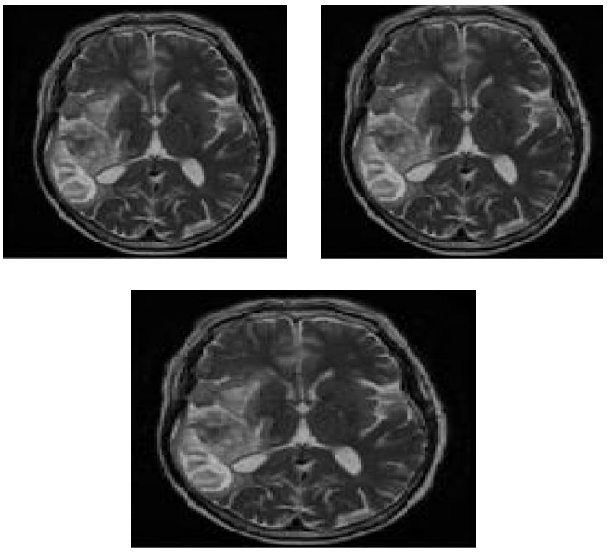

Fig 2 pre-processing

3. Segmentation

In this process the clustering is the set of objects in the same group which are similar then to the other groups. These are basically unsupervised method of learning, the algorithm Fcm are used to define the number of clusters. The clustering are based on the features into k number of groups where k is a positive integer. The clustering is done by entropy by using the fuzzy rules.

3.1 Fuzzy c-means

Fuzzy c-means (FCM) it is a method of clustering which allows one piece of data to belong two or more clusters. In this the number of clusters are found by the entropy it is based on the fuzzy rules in this the median value should be the same as near to the pixels, one cluster value and secondly the cluster value should be subtracted the result should come zero and then the rules in this the median value should be the same as near to the pixels .one cluster value and are found then the objective function will be zero and then maximum value get morphed and the result when we get one we will get a color of a tumor which is detected in this we get tumor region and tumor size.

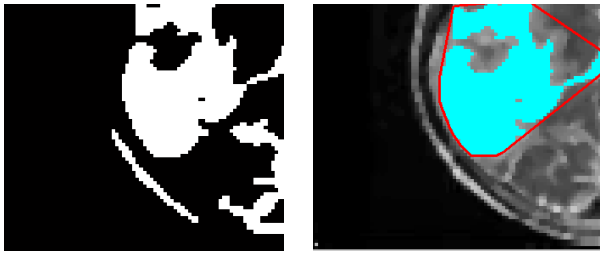

Fig. 3 FCM resulted image

4.RESULT

Process Accuracy		
Initial Variance		
Previous Work	Proposed Work	Filteration
0.2	0.2	.012
Precision Value		
Previous Work	Proposed Work	Filteration
0.81	0.96	0.15
Recall Value		
Previous Work	Proposed Work	Filteration
0.86	0.90	0.04

4. CONCLUSION

There are different types of tumors available. They may be mass in the brain or malignant over the brain. The brain image dataset is divided into two sets. Training dataset and testing dataset. Thus, the pre-processing is done by filtering. Segmentation is done by fuzzy c means algorithm and then Feature extractions is done and finally the method scans the RGB or grayscale, converts the image into binary image by binarization technique and detects the edge of tumor pixels in the binary image. Also, it calculates the size of the tumor

by calculating the number of white pixels (digit 0) in binary image. The region of the tumor is based on the area of tumor.

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