A MODIFIED TECHNIQUE FOR EFFECTIVE AND QUANTITATIVE EVALUATION OF BRAIN TUMOUR

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Abstract : In recent days , Cancer becomes a burning issue in the human life. Particularly, brain tumor is one of the major reason of death in human beings. It is obvious that there are odds of survival if the tumour is recognized and assesed accurately at the beginning time. Tumor is characterized as abnormal development of tissues. Brain tumor is an unusual mass of tissues where cells develop and increase wildly. Medical image processing is one of the most challenging and emerging field now-a-days. Efficient Processing of MRI image is a crucial part of this field. This paper is to propose a strategy to detect and estimation of brain tumor from the patient's MRI images.

Index Terms **– Brain tumor, medical image processing, mask, MRImage**

I. INTRODUCTION

The brain is the point of convergence of the sensory nervous system. It is the most complex organ in the human body. It is a non- replaceable and fragile and flexible mass of tissue. Along these lines, any harm or damage in the brain will cause issues for individual wellbeing including portability or discernment. The brain tumor is a gathering of irregular cells that becomes inside the brain or around the brain. A brain tumor does not just affect the quick cells in its area however it additionally can make harm encompassing cells by causing irritation. A threatening tumor, notwithstanding different carcinogenic development, has a few orders, for example, astrocytoma, meningioma, glioma, medulla blastula and metastatic. These tumors are diverse in appearance, shape, size and area. Likewise, these tumors show up as either hypo intense , isointense, or hyper intense as appeared. The tumor might be essential when it is at birthplace, while it will be named optional when the piece of tumor is spread to somewhere else and developed individually. Surgery can be the suggested treatment by and large, for example, the accompanying

- Surgery is fundamental when finish expulsion of is vital however much as could be expected.
- Surgery for a brain tumor might be prescribed to give a tumor tissue test to a precise determination. Surgery is often required to expel at any rate some part of the tumor to relieve pressure inside the skull , or to diminish the amount of tumor to be treated with radiation or chemotherapy.
- Surgery for a brain tumor is recommended to relieve seizures that are difficult to control with other means.
- Surgery for a brain tumor is prescribed to empower coordinate access for chemotherapy, radiation implants or heriditary treatment of a tumor.

II.LITERATURE REVIEW

There are many existing strategies for identification of brain tumor like histogram edge threshold method-this approach assumes that image is divided into background and foreground, K-mean-it is a method of vector quantization originated from signal processing, region growing-it is a region based image segmentation method, and fuzzy c-means method. In these methods it is difficult to anticipate the value of K and with global cluster. But it didn't function admirably; unique partitions result in various clusters of different size and predetermination[2].

K-means method - K-implies technique - K-Means bunching creates a particular number of disjoint, flat(non-various leveled) groups. It is appropriate to creating globular bunches. The k-Means technique is numerical, unsupervised, nondeterministic and iterative. K-Means Algorithm are i)always K bunches, ii)always no less than one thing in each group, iii)The groups are non-various leveled and they don't cover, iv)Every individual from a bunch is nearer to its group than some other group since closeness does not generally include the focal point of bunches.

Region growing method – The early region growing method was the seeded region growing technique. This method task was to arrange a set of seeds as input along with the image. The seed check every one of the protest be portioned. The region are grown by comparing all unallocated neighborhood pixels to the regions .the difference between a pixel density value and the region mean δ,is used as a measure of similarity .the pixel with the smallest difference measured this way is allocated to the respective regions.

Fuzzy c means method - It is a technique for clustering. In this approach, one pixel may fit in with a few bunches which speaks to gathering. In this calculation, the limited combination of pixels is divided into a little gathering of "c" fuzzy groups concurring with a given paradigm. The target capacity of the calculation is characterized in light of the fact that the entirety of

separations between bunch focuses and designs. A few sorts of comparability measures are accustomed with recognize classes relying upon the information and the applying in which it is normally to be utilized. A few illustrations which might be utilized as closeness measures are power separation and network. It considers only image intensity values.

In contrast to these complications proposed methods serves as an proficient strategy for identification and estimation of brain tumor.

III. PROPOSED METHOD

This section illustrates our proposed technique to detect and estimate the tumor through MRI as, it is a best technology used for diagnosing brain tumor even in advanced stages. This method incorporates with various noise removal and morphological techniques, segmentation that is basic concepts of image processing. This method has two stages. The initial one is pre-processing of given MRI image. The next one is segmentation and morphological operations done with the help of MATLAB software.

IV. MODIFIED WATER SHED ALGORITHM

The modified watershed algorithm best suits for grey scale images. It is a sophisticated method because of its flexibility in grouping the pixels of an image based on their intensity values. It is most common in medical image processing. Generally, Watershed segmentation is based on sets of neighboring pixels.. In this project, procedure regarding performance analysis of these three variants is drawn and further the Open CV tool is used to calculate the final results.

The catchment basin of this minimum is the area, where water falling on the landscape would flow down to the minimum. The watershed of the image is the set of lines that separate the catchment basins on the image. The "height" in topographic surface may be any measurable property of image pixel: lightness, gradient of lightness, saturation or other. That makes watershed algorithm useful for colour image processing. This proposed method outperforms existing methods in absolute segmentation.

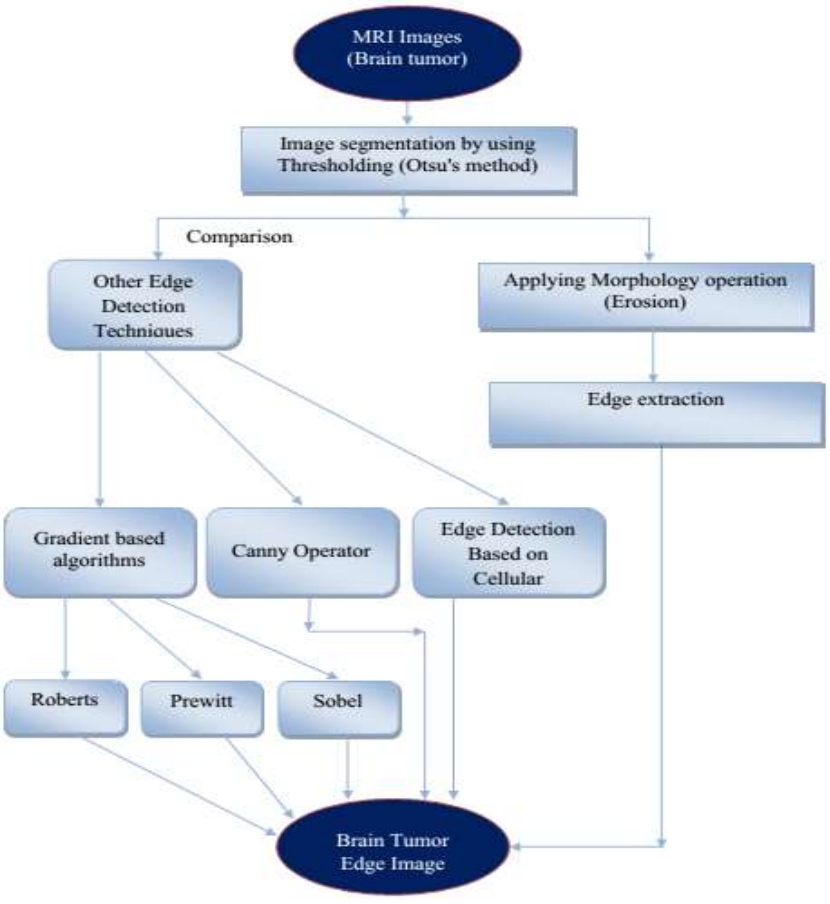

Fig. 1.Flow chart of the proposed work

Step – 1: Load the MRI from the MRI image database, the original image from which the tumour has to be detected

Step – 2: Now perform Pre-processing. The original image contains some RGB value; it has to be converted into a gray scale, gray transform is done and unwanted noise is removed.

Step – 3: Image sharpening is done using high pass filter, to make image sharper. High pass filters emphasize fine details in the image.

Step – 4: Perform post processing on the image.

Step – 5: Both Thresholding segmentation and watershed segmentation is applied to it.

Step – 6: The various morphological operations such as erode and imfill are done. Clean the edges of segmented image using morphological technique.

Step – 7: Compute binary background markers.

Step – 8: Now tumour is detected if yes, perform hierarchal Centroid shape descriptor to determine tumor size and area, if no end the process.

Step – 9: Now display the result which is a segmented tumor image.

Pre-Processing and Post-processing

In this stage image is improved in the way that better points of interest are enhanced and noise is expelled from the image. Most ordinarily utilized enhancement and noise reduction techniques are executed that can give best conceivable results. Enhancement will bring about more prominent edges and noise will be reduced and so the blurring of image is decreased. Notwithstanding improvement, image segmentation will also be applied. This enhanced and upgraded image will help in recognizing edges and enhancing the nature of the overall image.

Threshold Segmentation

Thresholding is another process which converts a gray-scale image into a binary image. Threshold segmentation is one of the simplest segmentation systems. The input gray scale image is changed into a binary image [6, 11]. The optimal threshold value selected using fundamental principle of thresholding technique. The purpose of this operation is to divide pixels at various levels.

The morphological operations are applied on the converted binary image. The purpose of the morphological operators is to separate the tumor part of the image. Then only the tumor portion of the image is visible and is shown in white color. This segment holds high intensity compared to the other segments.

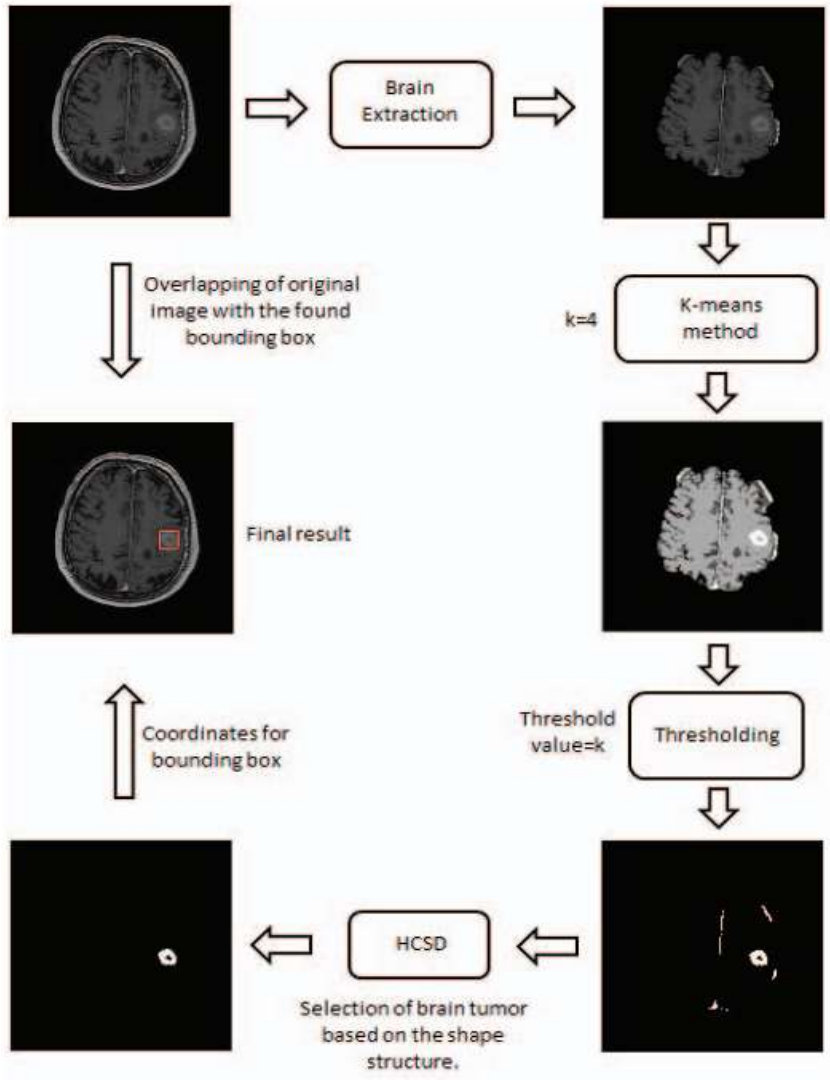

Fig. 2. Process of the algorithm with images

The binary mask with values of 0 indicates the image pixel is part of the background. Any binary image can be used as a mask, provided that the binary image is the same size as the image being filtered. The Mask is used to modify the stored image. This can be done using Boolean logic to get pixels in the gray scale image to the value of the binary image. If it is a non-zero the result of multiplying the gray scale image by the binary image by means of the convention with the aim of the binary image values are 0 for off and 1 for each pixel[16].

Then hierarchal centroid two shape fold descriptor with the centroids arranges extricated from a double picture and it depends on the kd-tree method decay. It is in view of the HCSD is a shape descriptor separated recursively by breaking down the picture in sub-pictures.

The resulted image obtained after all the steps are processed.

V. SOFTWARE DESCRIPTION

MATLAB is a superior dialect for technical evaluation and computing. This software tool establishes the calculation, effective programming coding in a user friendly manner. It has a linear process which is intended for computing. MATLAB is a authenticated coding. The required dimensioning can be evaluated effectively which can be further utilized for hardware implementation also. This helps the user to solve complicated image processing applications. This is the reason to select MATLAB for our proposed method.

VI. RESULTS AND DISCUSSION

The evaluated outcomes of the proposed method are illustrated in this section. The proposed Brain Tumour Recognition system is designed, code, implemented and simulated in the Mat lab Software and the simulation results are presented as follows.

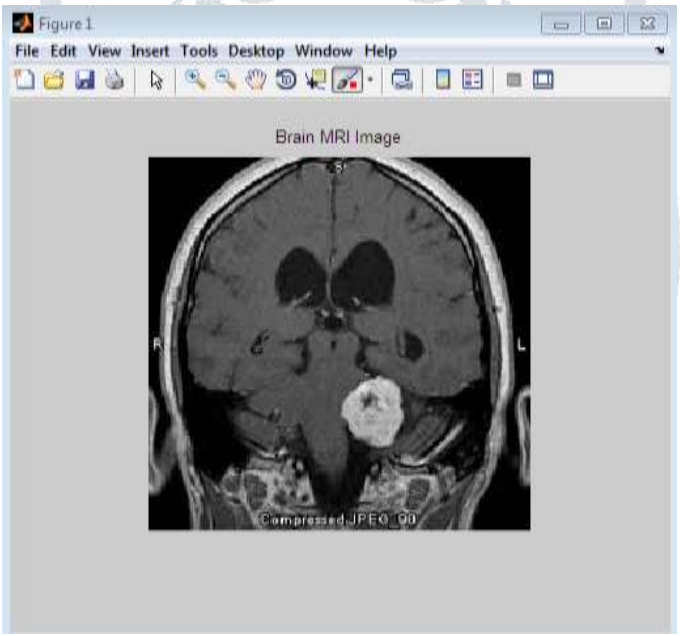

Fig 3:Brain MRI image under test

After Clustering the different objects using K-means clustering a Thresholding operation will be applied to select the abnormal objects.

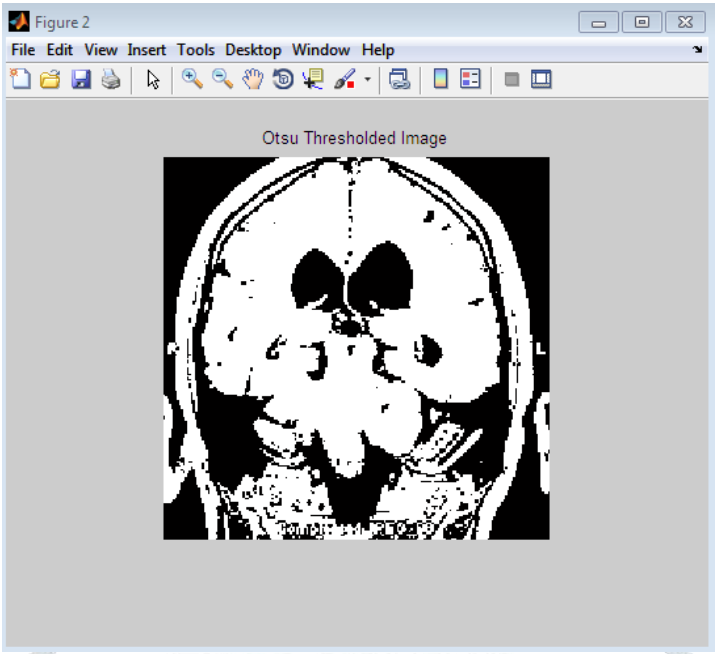

Fig 4: Clustered and Threshold Brain Image

Analyze the objects using a Hierarchical Centroids Shape Descriptors (HCSD).

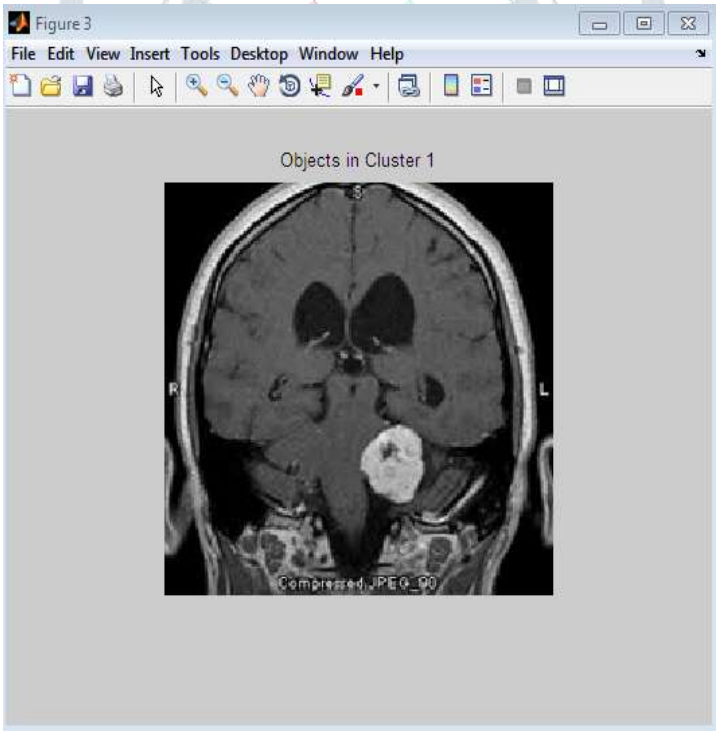

Fig 5: Analyze the Brain Objects in Clusters

Analyze the objects using a Hierarchical Centroids Shape Descriptors (HCSD).

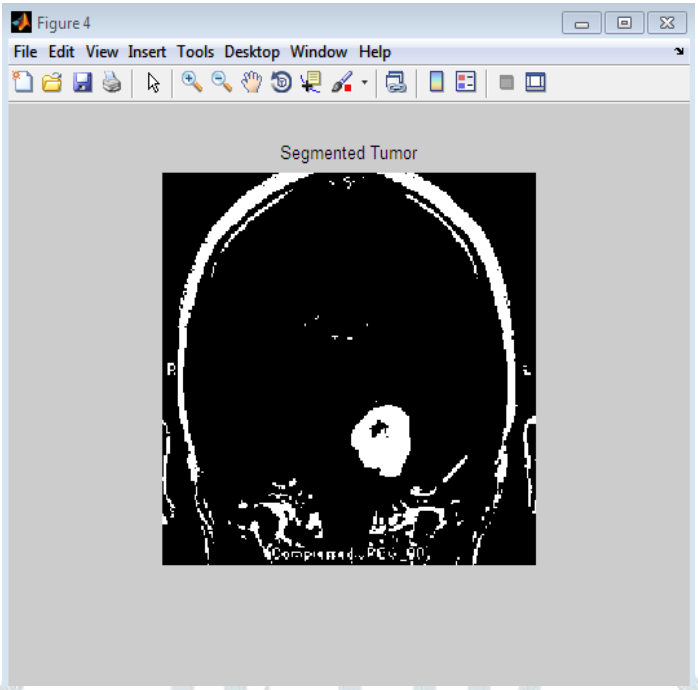

Fig 6 : Detected Tumour with its Shape Using HCSD

Summary of Results

Hence from the above it is clearly visible that we have detected the tumor area by using water shedding algorithm. We can clearly see the tumor present in the given MRI image. So water shedding algorithm gives efficient results and it is less time consuming method for the detection of tumor when compared to the other techniques.

TABLE – I: COMPARISON TABLE FOR VARIOUS METHODS

S.No	Segmentation method	Degree of accuracy of segmentation (out of 10)
1	Otsu's method	8.1
2	Mean shift method	6.1
3	K-means method	6.0
4	Fuzzy c-means method	5.2
5	Expectation maximization method	4.5
6	Discrete topological derivative method	4.2
7	Continuum topological derivative method	3.9
8	Iterative thresholding method	3.8
9	Two seed region growing method	2.2
10	One seed region growing method	2.2
11	**Proposed method**	**8.4**

VII. CONCLUSION AND FUTURE SCOPE

In this paper, the tumor structures are found in stayed paired components yet they are frequently encompassed by solid structures. The exploratory outcomes have demonstrated that this method is hearty in recognizing and jumping the unusual cells in MRI pictures in spite of the in homogeneity force or the convolute state of the tumor. Medical imaging creates use of the

technology to noninvasively make known the interior structure of the human body. By way of medical imaging modalities patient's life be able to be improved.

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