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TUMOR IDENTIFICATION IN BRAIN MR IMAGES USING DIGITAL IMAGE PROCESSING BASED ALGORITHMS

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ABSTRACT-- *This paper presents an automatic identification of brain tumor location and its size in Brain MR Images. The input of this method is patient study which consists of a set of MR images or slices. The output of the method is corresponding with the set of the slices or an image with the tumor contains the axis parallel boxing around the tumor with the exact location name and the size of the tumor. This proposed method is highly based on the detection that having most dissimilar region between both the left and the right side of the brain in an axial location view in MR images. The detection process is done by using the novel based algorithm called as Bhattacharya coefficient which can be used to provide gray level intensity histograms. Boxing and mean shift clustering algorithm is used to provide a box for the entire tumor. This method shows good results in complex situation.*

Keywords-- Brain Tumor, MR images, Boxing and Mean shift clustering, Bhattacharya Efficient.

1. INTRODUCTION:

A brain tumor is an abnormal growth of cells within the brain or spinal canal in centre. Nowadays brain tumor is a deadly disease in the world. Detection of brain tumor is always done by biopsy, human inspection referred by using MR images or CT images. MRI is a stand for Magnetic Resonance Imaging is seriously used in the medical field to detect and analyse fine details in the internal structure of the body. MRI uses strong magnetic field for align the nuclear magnetization this can be used to detected by the scanner. The signal must be processed to provide the extra information of the internal body. In general there are many different types of brain tumors have makes decision very complicated. This identification process leads to take right decision in right time and provide good result.

In general the treatment for the tumor may different for each type of the patients and usually determined by:

Type and Location
Size of the tumor

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2. MAGNETIC RESONANCE IMAGING (MRI):

MRI is highly used in the biomedical for identify and detect the internal part of the body. In this method can be used to detect and differences in the tissues which have a far technique as compared with the Computerized Tomography i.e., CT method. This technique is one of the special for brain tumor detection and cancer imaging.

3. LITERATURE SURVEY:

The size can be achieved by using MR image database are high, it is also important for indexed the content very effectively. The images are typically based on the patient identifies, name, date of admission, keywords, patient ID, and manual significance, But this does not allows to retrieve the similar meaningful images.

In existing systems, Fuzzy models, watershed algorithm, Discrete Cosine Transform and Probabilistic Neural Networks are been used, but the major drawbacks of this system is time taken for segment the images. The Fuzzy models having thresholding and morphological operators, it is a pre or post processing method for bordered the enhancing or non enhanced images that are tumor having very few bright pixels. In many papers, the researchers are using Markovin Random Field (MRF) process, but this method is not provide a pixel ranges in the tumor and also the MRF method having limited region consistency for the neighborhoods pixels.

4. FUNCTIONAL BLOCK DIAGRAM FOR PROPOSED SYSTEM:

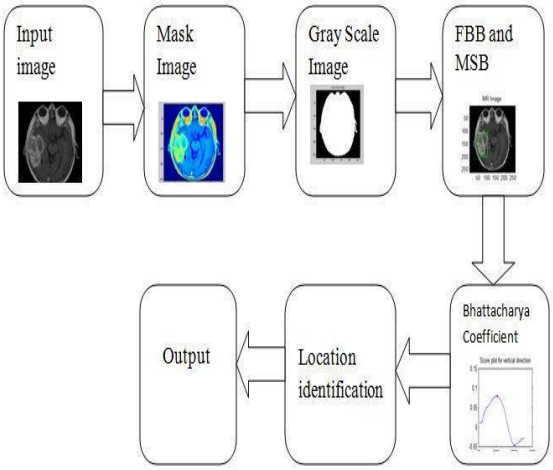

Figure 1: Block diagram

The input of this method is set of MR images for single patient study. The output is a also slices of images which contains tumor location and also the location name and also the size of the tumor. Here the size can be calculated in percentage. The tumor location must be covered by the box, that box having a parallel line which creates the box on the tumor.

Here three novel based algorithms are used, they are

Parallel Bounding box method
Mean shift boxing method
Bhattacharya efficient method

5. PBB (PARALLEL BOUNDING BOX METHOD):

The each input MR images, PBB first locates the right – left axis of the symmetry of the brain.
PBB operates in two methods:

First, the input of the 2D or 3D MR images are processes to determine the axis – parallel square or rectangles or depends on the tumor shape. Next, the box are clustered to above the image which the pixel having different value in the image, the box will not create exactly above the tumor, this process will be done by using MSB method.

6. MEAN SHIFT BOXING METHOD:

The mean shift boxing method is one of the non – parametric space analysis technique, so it is also called as the seeking mood algorithm and also called as Mean shift clustering method.

The MSB can be used to provide the box on the exact location of the tumor, which depends on the pixel values on the images. For Example, the tumor contained location having a pixel value 1 and the absence of tumor contained location having a pixel value 0. Depends on this pixel value the location can be identified and provide the Parallel box on the tumor.

7. BHATTACHARYA EFFICIENT METHOD:

The Bhattacharya efficient method can be used to measures the similarity of the two discrete or continues probability distributions. This is closely related to the amount overlapping between the two samples. The calculations involved integration of overlap of the two signals or samples. This can be used in each partition of the following formula,

$$\mathbf{BC} = \sum_{i=1}^{n} \sqrt{(\Sigma \mathbf{a}_i \cdot \Sigma \mathbf{b}_i)}$$

Which denotes the two normalized histogram a_i and b_i

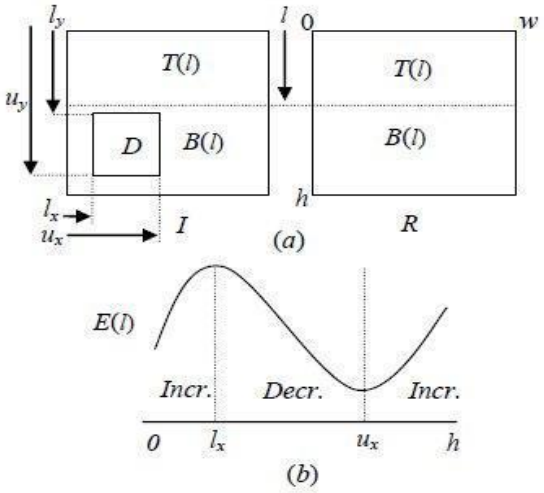

Figure 2: Tumor identified using PBB, MSB and BE

Here I and R is represent the test and reference images which having the same height h and the width w of the region.

The rectangular region D is the tumor contained area, D = [u_x, l_x] x [u_y, l_y] which represents region of the image changes I and R.

T(l) and B(l) having two regions for top and bottom of the images which having the distance l from the top of images.

$$T(l) = [w,0] \text{ x } [l,0] \text{ and } B = [w,0] \text{ x } [h,l]$$

Here define the vertical function for scoring as:

$$E(l) = BE(P_I^{T(l)}, P_R^{T(l)}) - BE(P_I^{B(l)}, P_R^{B(l)})$$

8. LOCATION IDENTIFICATION:

The efficient methods are present in diagnosis are human inspection, biopsy and experts opinion etc. In general, biopsy method takes around ten to fifteen days of time to take result about the tumor. The human prediction is always not at all correct so it becomes wrong but the computer cannot do. The experts cannot be take own decision himself he again refers another experts opinion, this process continues for long time. In this proposed method the exact location and name of the location for the better recognition about tumor.

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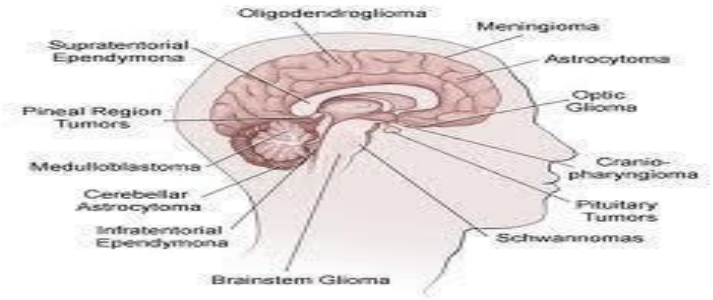

Figure 3: Tumor location in brain

9. EXPERIMENTAL RESULTS:

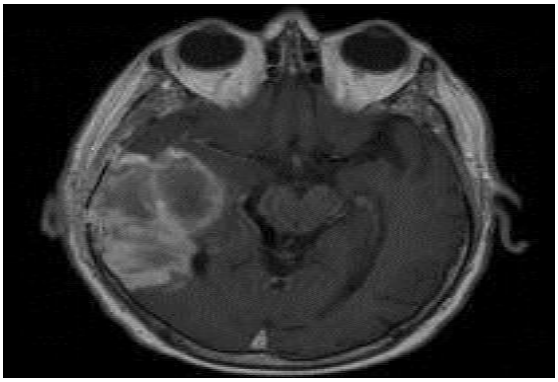

Figure 4(a): Input Image

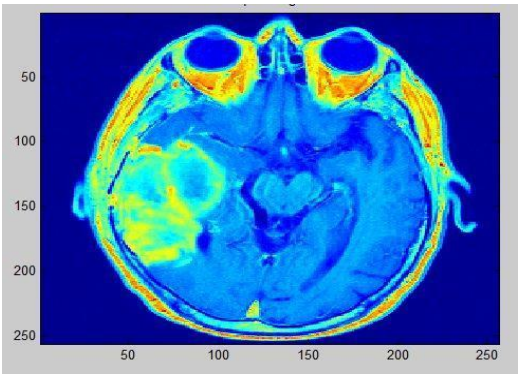

Figure 4(b): Input Mask Image

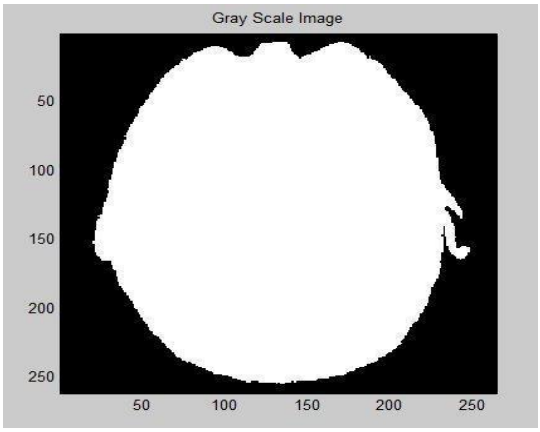

Figure 4(c): Gray scale image

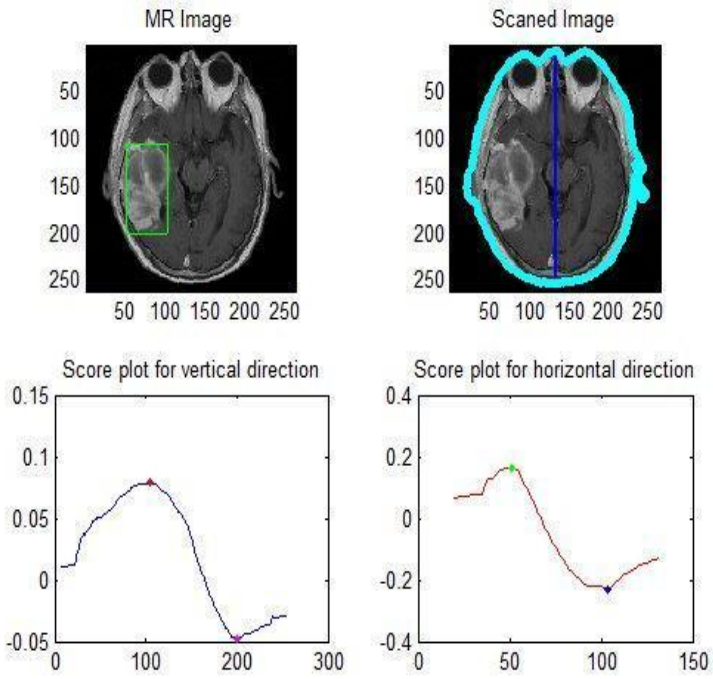

Figure 4(d): Tumor will be detected using PBB, MSB and BE

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Figure 4(e): Brain tumor location

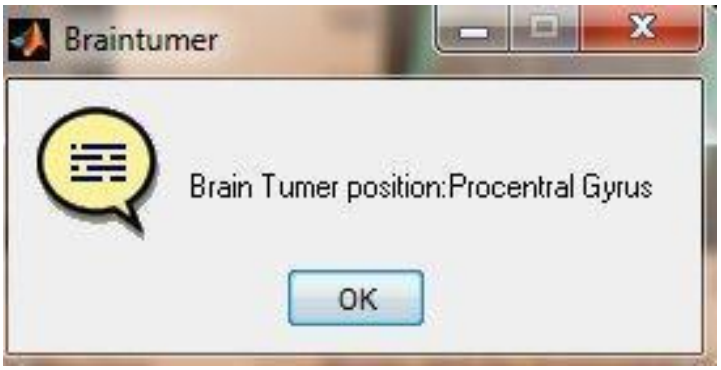

Figure 4(f): Brain tumor Position name

10. CONCLUSION AND FUTURE ENHANCEMENT:

This method is efficient for analyze the tumor identification for doctors and pathologist. This process makes right decision on right time.

In future planned to works with large number of brain structures.

REFERENCES

[1] Sudipta Roy Samir, K Bandyopadhyay, "Detection and Quantification of Brain Tumor from MRI of Brain and its Symmetric Analysis", International Journals of information and Communication Technology Research, Volume 2 No.6, June 2012.

[2] Evangelia I. Zacharaki and Anastasios Bezerianos, "Abnormality Segmentation in Brain Images Via Distributed Estimation", IEEE transactions on information technology in biomedical, vol. 16, no. 3 may 2012.

[3] Andac Hamamci, Nadir Kucuk, Kutlay Karaman, Kayihan Engin and Gozde Unal, " Tumor – Cut: Segmentation of brain Tumors on contrast Enhanced MR images for Radiosurgery Applications", IEEE transactions on medical imaging, vol.31, no.3, march 2012.

[4] R.L.Eisner, R.J.Lewine, "Automatic detection of brain contours in MRI data sets", IEEE Trans.Medical Imaging, Vol.12,No.2,pp.153 – 93.

[5] Anam Mustaqeem, Tehseen Fatima, "An Efficient Brain Tumor Detection Algorithm Using Watershed & Thresholding Based Segmentation', I.J.Image. graphics and signal Processing,2012.

[6] R. L. Eisner, R. J. Lewine, "Automatic detection of brain contours in MRI data sets", IEEE Trans. Medical Imaging, vol. 12, no. 2, pp. 153 – 166, 1993.

[7] A. S. Capelle, O. Alata, C. Fernandez, S. Lefevre, J. C. Ferrie, "Unsupervised segmentation for automatic detection of brain tumors in MRI", Proceedings of International Conference onImage Processing", vol. 1, pp. 613 – 616, 2000.

[8] M. B. Caudra, J. Gomez, P. Hagmann, C. Pollo, J. G. Villemure, B. M. Dawant and J. Ph. Thiran, "Atlas-based segmentation of pathological brains using a model of tumor growth", Medical Image Computing and Computer Assisted Intervention MICCAI, pp. 380 – 387, 2002.

[9] T. F. Chan and L. A. Vese, "Active contour without edges." IEEE Transactions on Image Processing, vol.10, pp.266-277, 2001.

[10] Z. Wang, Q. Hu, K. Loe, A. Aziz, W. L. Nowinski, "Rapid and Automatic Detection ofBrain Tumors in MR Images", Proceeding of SPIE, vol. 5369, pp. 602 – 612, 2004.

BIOGRAPHY

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