

Trilogy of MSG Algorithm for the Recognizing the Tumor in Brain

Maduguri Sudhir¹, Annavajjula Krishna Teja Sree², Bolla Pooja Reddy³, Ankolu Vijaya Lakshmi⁴, Chinthabathina Kalpana⁵.

¹Asst Professor, Dept of ECE, KITS, Guntur, AP, India

^{2,3,4,5} Students of Engineering, Dept of ECE, KITS, Guntur, AP, India

Email: sudhir3801@gmail.com¹, tejasri1802@gmail.com, poojabolla25@gmail.com³,

ankoluvijayalakshmi@gmail.com⁴, kalpana7771998@gmail.com⁵

Abstract-In recent years Brain Tumor is the most endagerous disease in children and adults. Generally, in MRI images the tumor may appear clearly. This Trilogy MSG algorithm uses three algorithms to detect the Brain Tumor. MSG represents those three algorithms. M means mean of means, it comes about to a decision the presence of the tumor based on the average of the image values after weigh against with the threshold value. S means Sensitivity of area reorganization, it computes and segment the tumor area with image segmentation concept, and G means Graph of intensities, it measures the high intensity area pixels and counts them. The MRI image is given as input to these three methods and uses AND operation (i.e.) if all the outputs are positive then it is clear that the Tumor exists.

Index Terms-Sensitive Area, Mean of Meand, Graph of high Intensities

I. INTRODUCTION

Biomedical imaging gives attention to the capture of images for both diagnostic and therapeutic use. The brain is the body organ composed of nerve cells and supportive tissues like glial cells and meninges – there are three major parts – they control your activity like breathing (brain stem), activity like moving muscles to walk (cerebellum) and your senses like sight and our memory, emotions, thinking and personality (cerebrum).

A brain tumor is a group, or mass, of abnormal cells in your brain. Your skull, which encloses your brain, is very firm. Any growth inside such a confined space can cause problems. Brain tumors can be cancerous (malignant) or noncancerous (benign). When benign or malignant tumors grow, they can cause the pressure inside your skull to increase. This can cause brain damage, and it can make our lives hazardous.

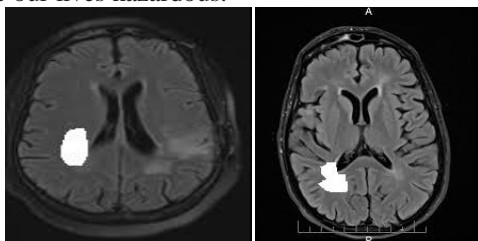


Figure 1 Brain Tumour Images

Brain tumors are categorized as primary or secondary. A primary brain tumor develops in your brain. Many primary brain tumors are benign. A secondary brain tumor, also known as a metastatic brain tumor, occurs when cancer cells spread to your brain from another organ, such as your lung or breast.

The Brain Tumor is upsetting lots of public universally. It is not only restricted with the old age people but also spotted in the premature period. Brain Tumor is the unusual expansion of cell inside the brain cranium which restricts the role of the brain. Early uncovering of the brain tumor is promising with the advancement of machine learning (ML) and image processing (IP). This paper endow with idea of technologies which able to be used to envisage brain tumor.

II. PROPOSED METHOD

The entire algorithm depends upon the MRI image (Magnetic Resonance Image). MRI makes use of a strong magnetic field and radio waves to produce images in detail of the organs and tissues of the body. Since its invention, doctors and researchers carry on to refine MRI performance to assist in medical procedures and research. The development of MRI revolutionized medicine.



Figure 2 MRI Scanning

The MRI image of the brain which consists of tumor has a large number of white pixels compared to tumor less image. These white pixels are called as high intensity pixels. The proposed method focused on those high intensity pixels. The proposed method is based on three algorithms. By using these three algorithms brain tumor is detected. The block diagram for proposed method is as shown below.

The algorithms used in this method are

1. Mean calculation.
2. Graph of high intensities.
3. Sensitive area calculation.

Using these above three methods Brain tumor is detected. The Tri level MSG algorithm is based on the above three detection techniques.

2.1 FLOW CHART

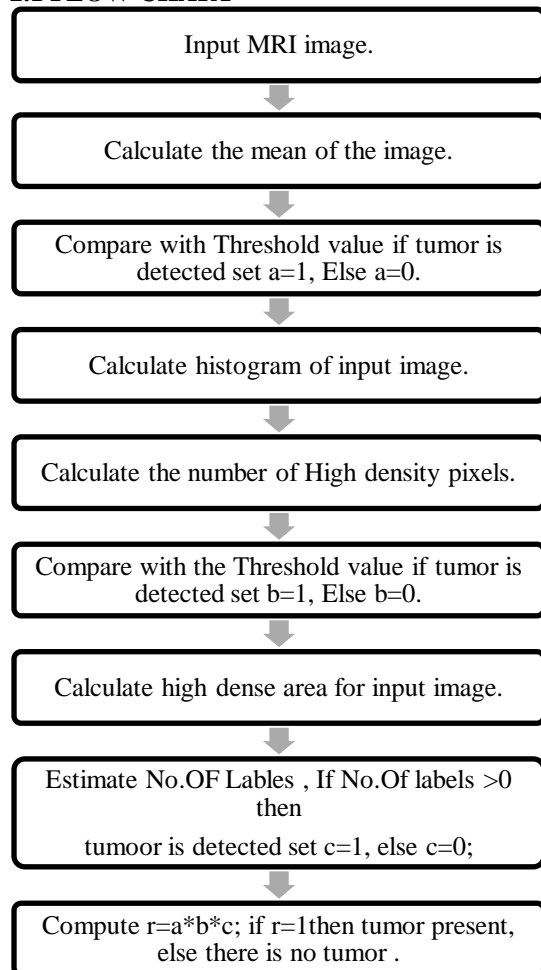


Figure 3 Flow Chart

2.2 MEAN OF MEANS CALCULATION

As we know the addition of white pixels or high intensity pixels the average value of the images is increases. Based on the same concept, the mean of means is done by comparing an image mean with a threshold value. The threshold value is stted by calculating the mean of 30 to 50 non tumor images .

Initially mean is calculated for the 30 to 50 non tumor brain MRI images. Then mean of means is calculated to determine threshold value.

Steps for a mean of means calculation

Step 1: Reading an MRI image.

Step 2: Calculate the mean of the image.

Step 3: Compare with a threshold value. If the tumor is detected set a=1, Else a=0

2.2 GRAPH OF HIGH INTENSITIES CALCULATION

The Graph of high intensities method consists of high intensity pixels(white color pixels) in the given input image. This is done by performing the histogram processing. As mentioned in the above method the threshold value is calculated from 40 to 60 brain MRI images

Steps for Graph of high intensities calculation

Step 1: Reading an MRI image.

Step 2: It is necessary to create the histogram of the given MRI input image.

Step 3: To calculate the number of high intensity pixels for the given input MRI image.

Step 4: Compare the high density pixels with the threshold value, which are calculated earlier for the non tumor images. If tumor is detected set b=1, otherwise b=0.

2.3 SENSITIVE AREA CALCULATION

The sensitive area means tumor detected area is calculated by measuring the properties of the image. As we know that in the MRI image the sensitive area present in whitish color than the remaining area, this method highlights the tumor area with enhancement techniques. Later then the noise (unwanted portion of the MRI image) is removed and then required area is segmented. The MATLAB command “bwlabel” and “strel” are used to measure properties of image regions. It is done in three steps

Steps for calculating the sensitive area

Step 1: Reading an MRI image.

Step 2: Create a binary Image.

Step 3: Calculate Image Object Properties using Pixel values of Grayscale image.

Step 4: Calculate Required Pixel value using strel properties.

Step 5: Find the no.of labels in the image

Step 6: If no.of Labels greater than 1 then tumor is present. If tumor is detected set c=1, otherwise c=0.

Now computes the $r=a*b*c$.

If any one of the variable is equal to zero then it take as no tumor is present. If a=1,b=1 and c=1 then only the tumor is detected.

3. RESULT

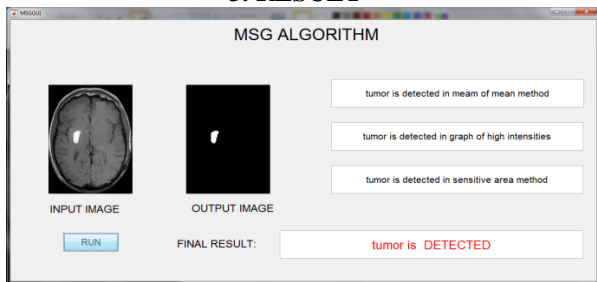


Figure 4 Result for case study

In the above case study Brain MRI Image is the input for the algorithm. The algorithm processes the image with three techniques and produces the three outputs along with tumor. The three methods generates tumor is present (tumor is detected in mean of mean method, tumor is detected in graph of high intensities method and tumor is detected in Sensitive area detection method). The finally it took the decision based on the results of three algorithms.

III.CONCLUSION

The accomplished method using MATLAB programming is inputted in gray scale images of brain that contain tumor which is used to perform mathematical function very efficiently and fast. The system is very useful to detect a tumor because this uses three methods for recognizing the tumor. Those are Mean of means, Graphs of high intensities and Sensitive area calculation. This method is useful to doctors as well as patients. Application is useful to protect tumor patients life by providing proper information about the presence of brain tumor.

REFERENCES

- [1] Maduguri Sudhir “Tri-Level MSG Algorithm for Detection of Brain Tumor” in Journal of Multi Disciplinary Engineering Technologies, Vol. 12, Issue 1
- [2] W. Gonzalez, “Digital Image Processing”, 2nd ed. Prentice Hall, Year of Publication 2008, Page no 378.
- [3] S. Murugavalli, V. Rajamani, “A high speed parallel fuzzy c-mean algorithm for brain tumor segmentation”, BIME Journal”, Vol. no: 06, Issue (1), Dec., 2006.
- [4] O. N. Pandey, SandeepPanwarJogi, SarikaYadav, Veer Arjun, Vivek Kumar N Review on Brain Tumor Detection Using Digital Image Processing. International Journal of Scientific & Engineering Research, Volume 5, Issue 5, May-2014.
- [5] Vipin Y. Borole1 , Sunil S. Nimbhore2 , Dr. Seema S. Kawthekar2Image Processing Techniques for Brain Tumor Detection: A Review, International Journal of Emerging Trends & Technology in Computer Science (IJETTCS).

[6] Bountris P, Farantatos E and Apostolou N (2005) Advanced image analysis tool development for the early stage bronchial cancer detection. PWASET. 9, 151-156.