

# DETECTION OF BRAIN TUMOUR IN MRI IMAGES USING THRESHOLDING SEGMENTATION TECHNIQUES

\*Mrs. Nandini Dhole, \*\*Dr. Vaibhav Dixit, #Dr. Anupam Deshpande

*\*Asst. Prof. E&TC Department RMDSSOE, Warje Pune*

*\*\*Principal/ Director RMDSSOE, Warje Pune*

*#Research Guide, JJTU Rajasthan*

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## ABSTRACT

*Medical Image Processing may be a complicated and challenging area in recent times. Processing of MRI image is one of the parts of this discipline. This paper proposes a method for green detection of a brain tumour in MRI brain images. The methodology consists of the subsequent steps: Pre-processing by using median filter & segmentation of the image is performed by thresholding. This technique is then accompanied via the further application of morphological operations. As part of the defined operations, the outputs are recorded. The recorded outputs are in a position to distinguish between the affected and the non-affected elements of the brain tumour.*

**Keywords** - Brain Tumour Detection, Median Filer, Morphological Operator , Thresholding

## INTRODUCTION

The brain includes billions of cells and with hundreds of complicated functions occurring. whilst the brain is broken, there can be many things affected. The special sorts of brain troubles embody brain accidents and brain tumors. the uncontrolled branch of cells inside the mind affects the normal functionality of the mind and results in tumors[1]. mind tumors can be of sorts, non-cancerous and cancerous. benign tumors the non-cancerous tumors are non-progressive, so they may be considered as grade i, ii whilst malignant tumors the cancerous tumors are of grade iii, iv which expand unexpectedly. once more, tumors are divided as primary tumor and secondary tumor primarily based on their authentic location and increase price. the tumors which originate in the thoughts and increase slowly are taken into consideration as primary tumors and most of them are benign. on the opportunity aspect, the most cancers cells originate in each different organ like breast, lung spread to the mind which comes beneath secondary thoughts tumors. a few of the tumors which broaden from the glial cells are gliomas and meningiomas and those are the most not unusual tumors found in adults. the benign tumors also can take as long as 15 years to show into malignant, but maximum of the instances they convert at a mile's faster charge. Brain most cancers analysis the use of the prevailing Magnetic Resonance Imaging (MRI) strategies is determined to have lesser accuracy compared to other detection schemes. Therefore, researchers increase new findings that subjected segmentation to new mechanism, the purpose behind its cost effectiveness, consuming maximum reminiscence little time of responding [2,3].The segmentation refers the partitioning of an image into smaller areas to identify or find the location of abnormality. Many strategies are available for image segmentation, however nevertheless it requires introducing green, rapid medical image segmentation techniques. Therefore, it's miles crucial to use

detection technique of the brain tumor the usage of morphological operators and MRI segmentation. It will think about the Input Image, Pre-processing, Segmentation, Feature Extraction and Classification. The proposed technique begin by means of reads the MRI brain image as Input image. Then hold to the pre-processing this is composed of image smoothing. The Image smoothing may be executed through using Median Filter [4,5]. The segmentation level is to phase the brain tumor the use of thresholding algorithm. Many segmentation strategies had been applied in the work to hit upon and extract the tumor place, on this form of segmentation a few algorithms have been adopted like thresholding. The performance of the proposed method is evaluated in terms of accuracy, Specificity & Sensitivity. Then classifying MRI as abnormal or normal. Morphological operators is applied to the output image which provides a better detection of tumor [6]

### PROPOSED METHOD

The proposed set of rules is designed to separate out the tumor place from brain tumor MRI image and to degree the tumor region. The brain tumor MRI image is as shown in figure1

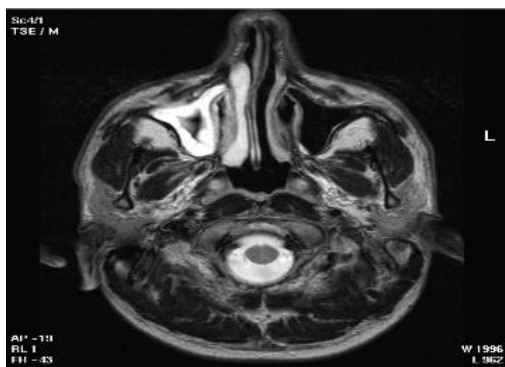


Figure 1: MRI Image

The following is the flow graph (Figure.2) to be proceeded step by step for detecting the tumour efficiently in MRI images. The major steps are

- i. Pre-processing
- ii. Segmentation
- iii. Tumor Detection

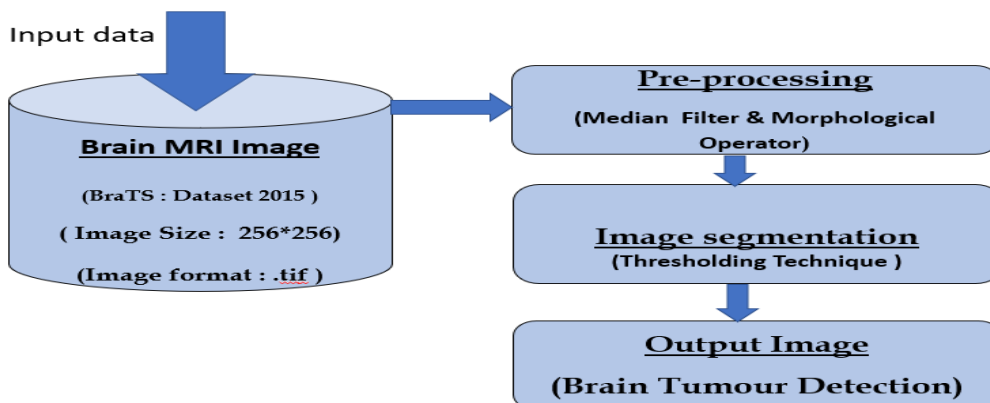


Figure 2 : Methodology adopted for detection of tumour

## A] Preprocessing

The MRI image of brain tumor is an enter for this proposed set of rules. The MRI photograph is a blur image. The noise is present in this image. Noise disturbances may also purpose due to electronic imaging sensors, sensor temperature, insufficient Light degrees, and channel noise. So preprocessing is essential for such pix to get rid of blurriness from it and make it sharper. So at this degree initially the enter picture is filtered.

### 1 Median Filter:

There are linear and nonlinear varieties of filters. The nonlinear filters are median filter out, max filter out and min filter. Median filter smoothes the image simply by means of changing middle pixel intensity with the aid of the median of the neighborhood. In this proposed set of rules median filter is used. Median filter gets rid of the noise from an image, also enhance the image and make it sharper. This provides greater contrast image. The median filter does now not require convolution. The center pixel replaced via the median of the pixel values below the filter out.

### 2.Morphological operation

Morphological operations are simple to use and works on the basis of set idea. The goal of the usage of morphological operations is to eliminate the imperfections inside the structure of photo. Most of the operations used here are aggregate of two tactics, dilation and erosion [6]

## B] Thresholding

Segmentation is the method of partitioning a digital image into more than one segments (units of pixels, additionally known as notable pixels). The purpose of segmentation is to simplify and/or change the illustration of an picture into something this is extra meaningful and easier to analyze. Image segmentation is normally used to locate gadgets and boundaries (strains, curves, etc.) in images [8]. More exactly, image segmentation is the approach of assigning a label to every pixel in an image such that pixels with the identical label share positive visual traits. Each of the pixels in location are similar with admire to a few feature or computed belongings, inclusive of coloration, depth, or texture. Adjacent regions are considerably different with appreciate to the same traits. The simplest approach of image segmentation is referred to as the thresholding approach [9]. This technique is based totally on a threshold cost to turn a gray-scale image right into a binary image. The key function of this approach is to pick the brink price

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## IMPLEMENTATION

### 1.Required dataset

The MRI images obtained from barts 2015 are used to evaluate the accuracy of the proposed approach There are 32 images in the database which contain 16 abnormal and 16 normal (with and without tumor) brain MRI images. All images are 256 x 256 pixels, 8-bit grayscale and in tif format.

## 2. Framework execution

In this take a look at, all pix within the database have been examined. To evaluate the accuracy, Sensitivity and specificity the subsequent attributes are used within the calculations.

- A (True Positive): Existing tumor and detected correctly.
- B (True Negative): Non-existing tumor and not detected.
- C (False Positive): Non-existing tumor and detected.
- D (False Negative): Existing tumor and not detected.

Sensitivity is the measure of successful determination of the person having a tumor.

$$\text{Sensitivity}(\%) = A / (A + D)$$

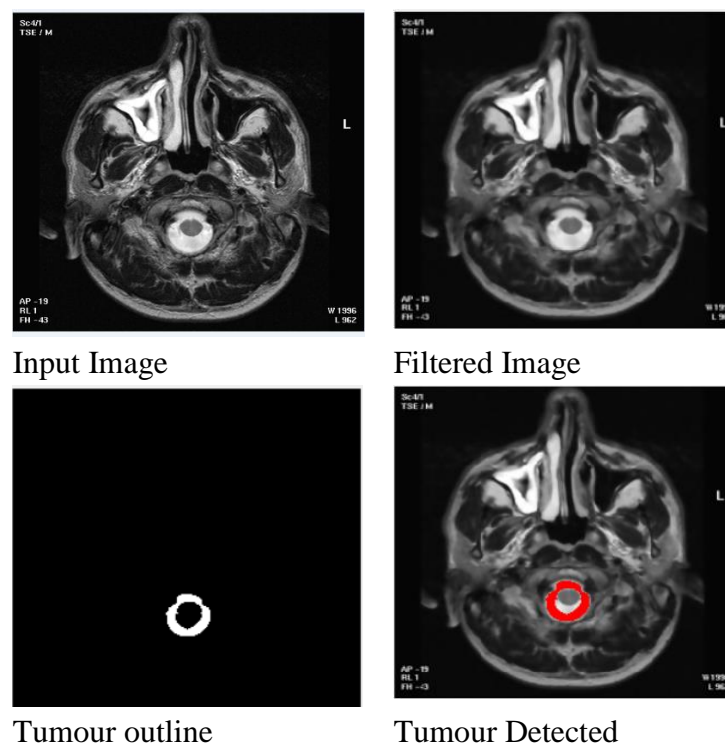
Specificity is the measure of successful determination of the person not having a tumor.

$$\text{Specificity}(\%) = B / (B + D)$$

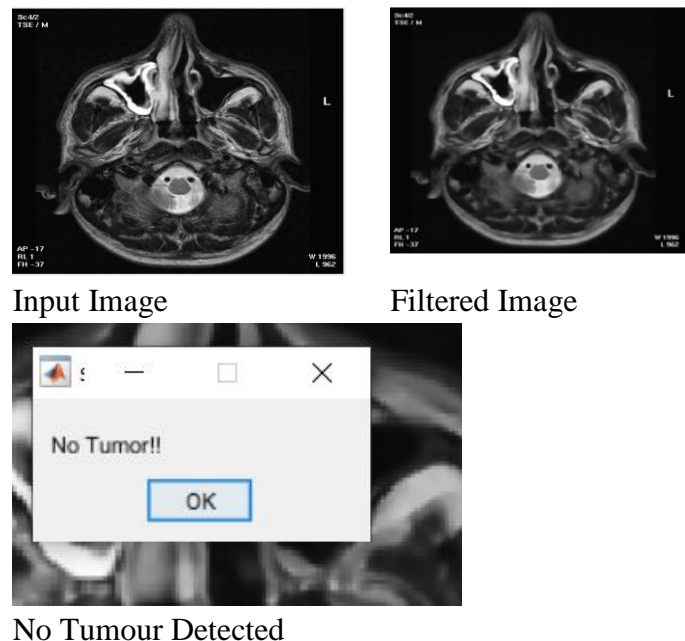
Accuracy is the measure of successful classification.

$$\text{Accuracy}(\%) = A + B / (A + B + C + D)$$

## FIGURES AND TABLES



**Figure 3 Experimental Results**



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**Table No 1: Performance of proposed system**

Total Image	A	B	C	D	Sensitivity	Specificity	Accuracy
32	16	15	0	01	94.11	93	96

Out of 32 images with the tumor 31 images evaluated correctly by the system. Other 1 image is identified as without a tumor incorrectly. The reason of this malfunctioning was due to the fact that there is no clear distinction between the tumor area and the rest of the brain in terms of intensity of the pixels. 15 images without a tumor were correctly identified by the system as images without a tumor.

**CONCLUSION**

Developed System in this study is an aid for the medical people to diagnose the brain cancer using MRI images. The images obtained from bars data set 2015 are used in this study. Morphological processing technique has proved miraculously beneficial in various picture extraction and filtering strategies. The morphological operators can exchange the structuring factors of the image in step with their use. Some operators like open, spur, dilate and close have proved beneficial in extracting the mind tumor from the MRI brain pictures. Pre-processing of the MRI became achieved the use of filtering techniques. Threshold segmentation became used to paintings on the desired location of the image. The proposed approach has 94.11% Sensitivity rate on the images with a tumor and 93% Specificity rate on the ones without a tumor. The overall success rate of our system is 96% which shows a better performance in comparison.

## **FUTURE SCOPE**

For the future work, there are two issues that are to be improved in our system. First one is the inaccurately classified images that have a tumour. Here maybe different methods of classification like neuro-fuzzy or support vector machine, PCA Fuzzy Teaching Algorithm should be tried

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