International Journal of Scientific Research & Engineering Trends
Volume 9, Issue 2, Mar-Apr-2023, ISSN (Online): 2395-566X

Computer Aided Diagnosis System for Brain Tumor Detection

Konda Shiva Teja Ravinder, Devaraju Sai Vandith, Dr. A Venkataramana, AkkepallyAvanthika, A Jaya Krishna Murthy
Department of ECE
Government Polytechnic, Medchal
Telangana, India
Shivatejakonda2004@gmail.com, vandithdevaraj@gmail.com, akkepallyavanthika@gmail.com

Abstract-A brain tumor is a mass of abnormal cells in the brain. A brain tumor occurs when abnormal cells form within the brain.This paper presents a brief review of brain tumor detection methods. The computer aided diagnosis system for brain tumor detection consists of step by step procedures namely input of brain images, filtering, thresholding, morphological operations, bounding box, getting tumor outline encoding, inserting the outline in filtered image and displaying images. Simulation results are carried out by considering standard brain images and found that this algorithm works well in detecting the brain tumor.

Keywords-Brain Tumor, Computer Aided Diagnosis, MRI image.

I. INTRODUCTION

Brain tumor is abnormal growth of tissues which grow uncontrollably and unchecked by the check point which control the growth of cells normally. This leads to the unsafe work of the cerebrum.They are two kinds of cerebrum tumors they are Benign tumors and Malignant tumors.And the Brain tumor can be either primary or metastatic. A Malignant Brain tumor is a cancerous growth in the brain.most Malignant brain tumors are caused by a cancer that started somewhere else in the in the body and spread to the brain, through the bloodstream.these are known as secondary tumors. A benign (non cancerous) brain tumor is a mass of cells that grows relatively slowly in thebrain.It tends to stay in on place and do not spread in children brain tumor are the cause of one quarter of all cancer deaths.These are about 200 different types of tumors diagnosed in UK each year.The most common symptoms of a brain tumor are headaches,seizuresor convulsion,Difficulty thinking, speaking or finding words,vision loss, loss of appetite,involuntary movements and so on.

Brain tumor that begin in the brain when normal cells develop mutations. In their DNA the mutations tells the cells to grow and divide rapidly and to continue living when healthy cells would die and results a mass of abnormal cells,which forms a tumor.

Most brain tumors are diagnosed after symptoms appear. In general,diagnosing a brain tumor usually begins with magnetic resonance imaging(MRI).The MRI uses magnetic fields,not X-Rays,to produce detailed images and MRI is used for anatomical analysis of brain development and brain abnormalities. It is used to detect the tumor in the brain. MRI is a technological development in the medical field that produces images with high resolution to detect and one conditionthat can be identified from reading an MRI image is a brain tumor and by CT scans(computerized tomography) can be done to evaluate the brain for tumors.

The doctors (or)specialists are used to examine the scannings of MRI & CT and used to tell hether there is a existence of tumor or not in the brain.It is difficult to look over the hundreds of scannings in a single day it gets strain to the doctors and time consuming process but, also accuracy depends upon their experience,they can't see the 'n' number of reports and sometimes,it is very perplexing for specialists to detect the small tumors in the brain.So,to figure out all the problems in a easy way by using the MATLAB software. And it can also work as the second opinion for the doctors in case of confusions.

Brain tumors are detected by using MATLAB software by the process of segmentation.The ultimate goal of segmentation is to extract important features from the image data.The segmentation of tumor from MRI images of brain is time consuming process.MATLAB is the fastest algorithm used for detection of brain tumor from MRI images in a very short time.At the end tumor is mapped on to original greyscale image with 255 intensity to make tumor visible in the image.

II. LITERATURE SURVEY

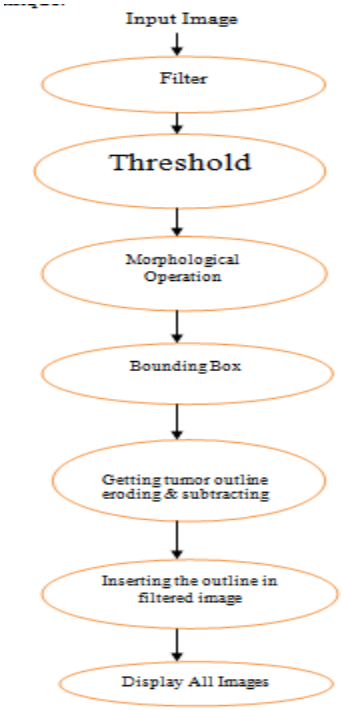
Rajeshwari G tayade et.al [1], in their paper she gave a mixture of wavelet statistical features and also they gave co-occurrence wavelet texture feature procured from the two level distinct riffle remodel was used for the

organization of abnormal brain matters in to benign and malignant. The support vector machine(SVM) was used for tumor segmentation. A Cluster of WST and WCT was used for feature extraction of neoplasm region extracted from second level separate ripple remodel.

Lukas let.Al [2],presented the work on information among the medical image and vastly impove upon the machine speed for growth segmentation results.Axial slices of weighted brain pictures with distinction improvement are analyzed.To extract vital feature points within the image, applied a feature purpose extraction rule based on a fusion of edge maps exploitation morphological and wave ways analysis of feature points so, obtained has been done by geometric transformation and image scaling.

III. PROPOSED METHOD

In this project,the detection of brain tumor that is the presence of the tumor in the provided MRI.Here,it contains the classification of the tumor.we will analyze the MRI images which will conclude the stage of the tumor.The input images will undergo various processes.We can detect brain tumors using image processing technique.



Flow chart

1. Input of brain images (MRI):
This is the first step for processing of image.Original format of MRI images are collected and given as the input.Most of the MRI images are from digital imaging and communications in medicine.Gray scale images are been provided as input to the system as shown in fig.1

Fig1.InputImage.

2. Filter:
An anisotropic filter is a type of image processing filter that is designed to preserve the edges and fine details of an image while smoothing out other parts. This type of filter works by using different smoothing algorithms.Anisotropic filters are commonly used in computer graphics and image processing for tasks such as removing noise, improving the quality of images, and reducing artifacts. They are particularly useful for preserving fine details and structures in images that contain edges, such as text, line drawings, and photographs with high-frequency content**.** as shown in fig.2

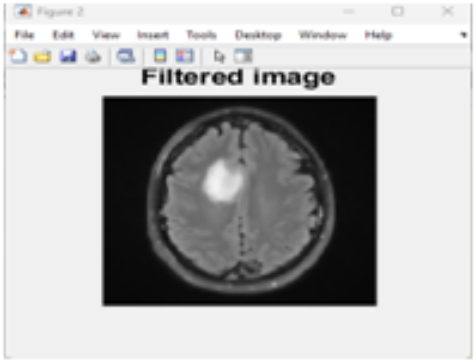


Fig2.Filtered Image

3. Threshold:
This code resizes the input image **inp** to a 256x256 image using the **imresize** function and stores the result in **sout**. It then sets a threshold **th** based on the minimum and maximum pixel values of **inp** and a constant **t0**. Finally, it sets each pixel of **sout** to 1 if the corresponding pixel in **inp** is greater than **th**, and 0 otherwise.

4. Morphological Operation:
This code segment uses image processing techniques to identify and isolate a tumor from an input image. The code calculates the region properties of the labeled image, and identifies the highest density region with an area greater than 100 as the tumor. If a tumor is found, a binary mask is created to isolate the tumor region, and it is displayed

using imshow. If no tumor is found, a message box is displayed.

5. Bounding Box:

This code uses to plot a bounding box around a tumor region in an image. It first computes the statistics of the tumor region using the function "stats" and extracts the bounding box coordinates from the resulting structure using the field "BoundingBox". It then displays the original image using "imshow", adds a title to the plot, and overlays a yellow rectangle with the same dimensions as the bounding box using the "rectangle" function. The "hold on" and "hold off" commands are used to prevent the plot from being cleared between the image and rectangle commands as shown in fig.3

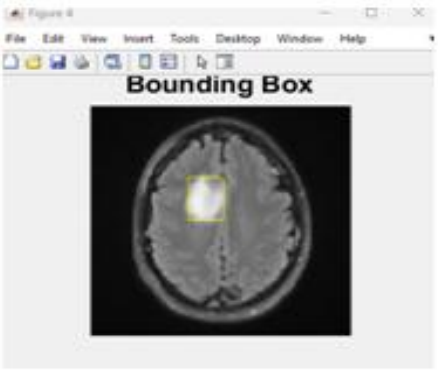


Fig3.Bounding Box.

6. Getting tumor outlines Eroding &subtracting:

The code performs image erosion on a binary image using a structuring element of a disk with a radius of 5 pixels. The erosion operation is performed by iterating over each pixel in the image and replacing its value with the minimum value of the pixels within the structuring element centered on that pixel. The resulting eroded image is displayed using the imshow function. The imfill function is used to fill any holes in the binary image before the erosion operation. Image erosion is a morphological operation used to remove small objects and reduce the size of larger objects in binary images as shown in fig.4

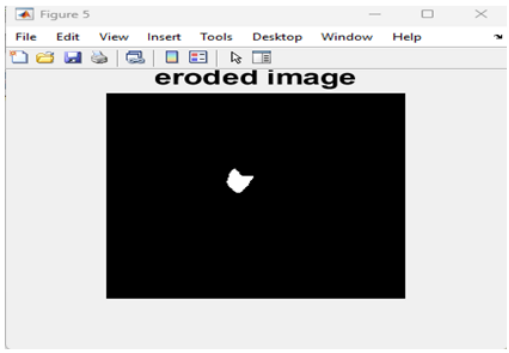


Fig4. Eroded image.

7. Inserting the outline in filtered:

The code performs image erosion on a binary image using a structuring element of a disk with a radius of 5 pixels. The erosion operation is performed by iterating over each pixel in the image and replacing its value with the minimum value of the pixels within the structuring element centered on that pixel. The resulting eroded image is displayed using the imshow function. The imfill function is used to fill any holes in the binary image before the erosion operation. Image erosion is a morphological operation used to remove small objects and reduce the size of larger objects in binary images as shown in fig5

8. Display All Images:

The code performs image erosion on a binary image using a structuring element of a disk with a radius of 5 pixels. The erosion operation is performed by iterating over each pixel in the image and replacing its value with the minimum value of the pixels within the structuring element centered on that pixel. The resulting eroded image is displayed using the imshow function. The imfill function is used to fill any holes in the binary image before the erosion operation. Image erosion is a morphological operation used to remove small objects and reduce the size of larger objects in binary images.

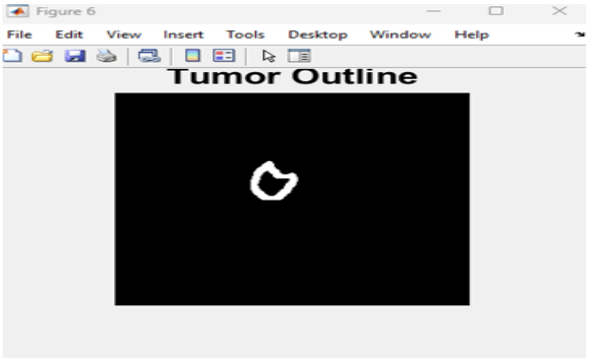
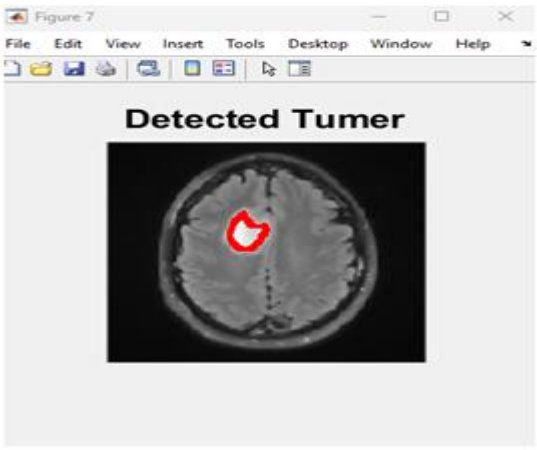


Fig 5.Tumor outline



Detected tumor

IV. RESULTS

In order to verify this method, we have taken 60 brain images with tumor and non tumor. Some of the simulation results are shown in below Fig6&7

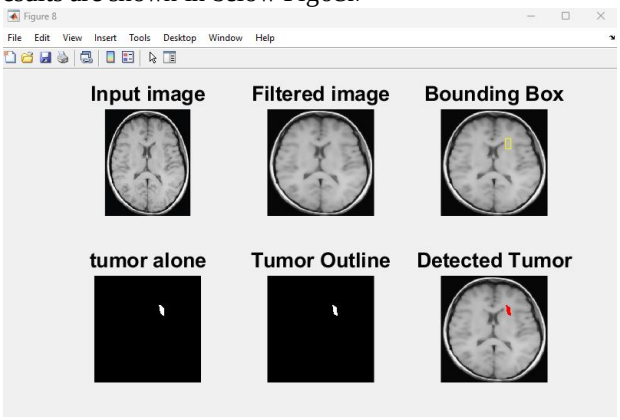


Fig 6 test result 1

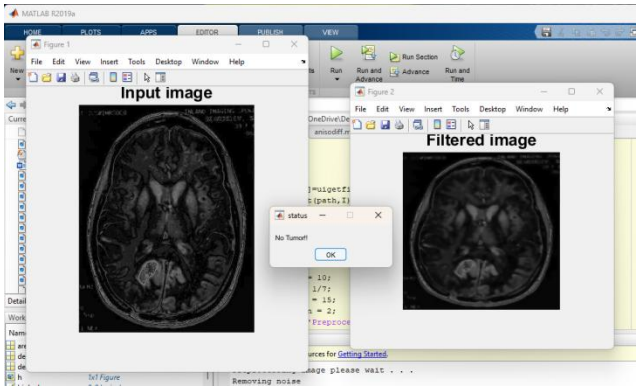


Fig.7 test result 2

V. CONCLUSIONS

A brain tumor is an abnormal mass of tissue in which cells grow and multiply uncontrollably. A brain tumor is a mass of abnormal cells in the brain. A brain tumor occurs when abnormal cells form within the brain. This paper presents a brief review of brain tumor detection methods. The computer aided diagnosis system for brain tumor detection consists of step by step procedures namely input of brain images, filtering, thresholding, morphological operations, bounding box, getting tumor outline encoding, inserting the outline in filtered image and displaying images. Simulation results are carried out by considering standard brain images and found that this algorithm works well in detecting the brain tumor.

REFERENCES

[1] Rajeshwari G tayade,Michel Crucian ,"unsupervised And Semi-Supervised Clustering: A Brief Survey,"InriaRocquencourt,B.P. 105 78153 Le ChesnayCedex,France.

[2] Lukas L. et Al. Brain Tumor Classification Based On Long Echo Proton Mrs Signals.Artificial Intelligence In Medicine,31:73-89, 2004.