IJNRD.ORG
ISSN : 2456-4184

INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG

An International Open Access, Peer-reviewed, Refereed Journal

BRAIN TUMOR DETECTION USING IMAGE PROCESSING TECHNIQUES

[1]Divyashree, [2]Deepa Nayak, [3]Manthana, [4]Chandrakala, [5]Vijayalatha Devadiga

[1]Student, [2] Student, [3] Student, [4] Student, [5]Assistant Professor
Electronics and Communication Engineering
Shri Madhwa Vadiraja Institute of Technology and Management, Udupi,India

Abstract : Brain tumor at early stage is very difficult task for doctors to identify. MRI images are more prone to noise and other environmental interference. So it becomes difficult for doctors to identify tumor and their causes. So here we come up with the system, where system will detect brain tumor from images. Here we convert image into gray scale image. We apply filter to image to remove noise and other environmental interference from image. User has to select the image. System will process the image by applying image processing steps. We applied a unique algorithm to detect tumor from brain image. But edges of the image are not sharp in early stage of brain tumor. So we apply image segmentation on image to detect edges of the images. In this method we applied image segmentation to detect tumor. Here we proposed image segmentation process and image filtering techniques for accuracy. Morphological operations will be applied to obtain information on areas of the possible tumor locations. Morphological operation include erosion. Erosion making object less visible and by this tumor outline can be obtained. Then it is used to deliver final detection result. This system is implemented in matlab.

IndexTerms - **Brain Tumor, Matlab, MRI.**

I. INTRODUCTION

Nowadays we have seen most of the tumors are life threatening where brain tumor being one of them. As we know that brain tumor can be of any shape, size, location, therefore it is very difficult to detect tumor and diagnose it. The manual identification of tumor from MRI images is subjective in nature and may vary from expert to expert depending on their expertise and other factors, which include lack of specific and accurate quantitative measure to classify the MRI images as it is brain tumor or not. So automated identification of brain tumor from MRI images help in reducing the major issues and provide better results. Detection of brain tumor from the various symptoms of the patients is always been a major issue for the medical practitioner and pathologist for diagnosis and treatment planning. It is also a fact that some test may be time consuming and gives workloads and difficulty for the pathologists to obtain the accuracy of the presence of the tumor[1].

Tumor is defined as the abnormal growth of cells. Brain tumor is an abnormal mass of tissue in which cells grow and multiply uncontrollably, similarly unchecked by the mechanisms that control normal cells. The symptoms of brain tumor depend on the tumor size, type and location. Some common symptoms of brain tumor are-Headaches. Nausea and Vomiting. Changes in speech, vision or hearing. Problems in walking. Changes in mood, personality or ability to concentrate and problems with memory[2]. There are two types of tumor that can develop in brain, primary tumor and secondary tumor. The primary tumor in brain is classified as low grade or high grade. A low-grade tumor mostly grows very slowly, but with the pace of time, it can turn out to be of a high-grade tumor. High-grade tumor grows very rapidly and hits the brain. In adults, secondary brain tumors which are also called brain metastases, occurs more frequently in adults than the primary tumors. In this project we are going to diagnose brain tumor using digital image processing. The main approach of this project is to detect tumor in more efficient way[3].

II. METHODOLOGY

Image processing is one of most growing research area these days. We are proposing an effective scheme to detect abnormal formation of cells in the brain. Here we prsent an approach the detects the tumor from the brain image. In this proposed approach, we have applied series of operations first to enhance the image and then to detect the tumor from the brain image. There are mainly three processes: Image pre-processing, image segmentation, feature extraction. MATLAB software is used for every process. These are the steps used for detection of tumor:

Step 1: Input the image

Step 2: Convert the RGB image to grey

Step 3: Use filters for noise removal

Step 4: Apply Threshold segmentation for tumor detection

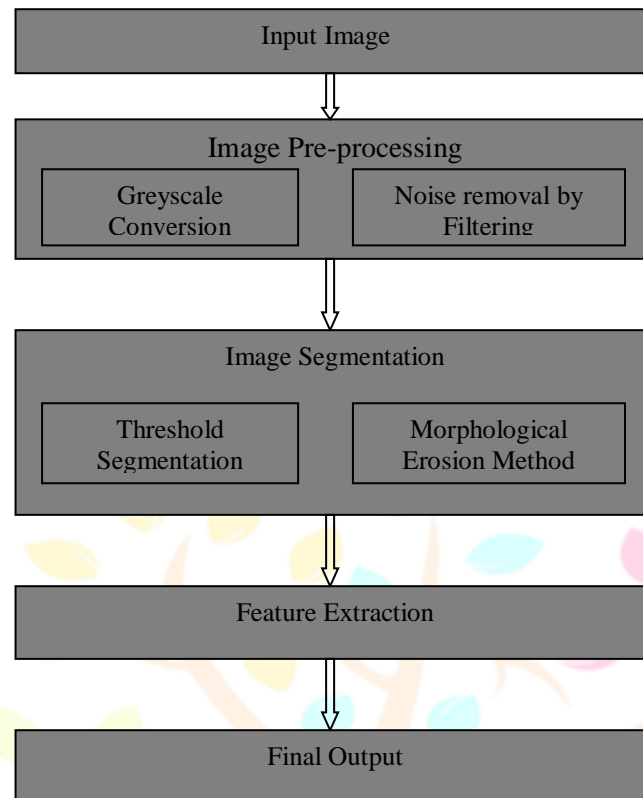Step 5: Perform morphological operation to find tumor

Fig. 1.: Block diagram of brain tumor detection

2.1 Input Image

This is the first step of the proposed system. The resulting MRI images may not be of very good quality for analysis. Images can be noisy, blurry, low-contrast. The area of interest can be difficult to extract. Here, MRI image of brain are provided as input to the system.

2.2 Image Pre processing

All the images has to undergo several preprocessing processes such as noise removal and enhancement. The input image is MRI image. The greyscale image contains noises such as white noise, salt, pepper noise, etc. White noise is most common problems in image processing. This can be removed by using filters from the extracted brain image.

Image enhancement defined as a way to improve the quality of images, so that the resulting image is better than the original one. It is the process of improving the quality of a digitally stored image by manuplating the imagr with MATLAB software. The aim of image enhancement is to improve the visual appearence of an image, or to provide a better transform representatio for future automated image processing. Many images like medical images, satellite images, aerial images and real life photographs suffer from poor contrasdt and noise. It is necessary to enhance the contrast and remove the noise to increase image quality. In our system we use anisotropic filter to enhance the image quality.

2.3 Image Segmentation

The purpose of image segmentation is to partition the image into meaningful region and to identify the object or relevent information from the image. There are different techniques used for performing segmentation depending upon the spesific application, imagimg modality and other factors, proper analysis of image can be done after segmentration as it makes the image more meaningful and easier to analyse. It is used to clearcut the boundaries and object in image. More precisely, image segmentation is the process of assigning a label to the pixels with the same visual characteristics in an image. The result of image segmentation is a set of segments that colleectively cover the entire image or a set of contours obtained from the image. Segmentation is the process of segmenting object form background. To segment the image we have used the Thresholding method.

Morphological operations apply a structuring element to an input image, creating an output image of the same size. In morphological operations, the value of each pixel in the output image is based on the comparision of the corresponding pixel in the input image with its neighbors. By choosing the size and shape of the nieghborhood, we can construct a morphological operations that is sensitive to specific shapes in the input image. The most basic morphological operations are dialation and erosion. Here we use erosion operation, which removes pixel on object boundaries.

2.4 Feature Extraction

This stage is to isolate to preferred shapes or positions of the image. In image processing methods, different algorithms are used to determine normality and abnormality of an image from the final result of segmentation. The area, perimeter, centroid and diameter are main features which help to form the classification of tumor region.

2.5 Final Output

The original image is displayed first. Then anisotroic filtered image is displayed. After morphological operation is applied, morphological image and result is displayed. Thus, tumor region is detected and displayed if it is present.

III. RESULTS AND DISCUSSION

Next figures show the images as an output i.e. input image, filtered image, bounding box image, threshold image,tumor outline. Finally extracted tumor from MRI image and image with tumor. For this system 3 images the intensity more than its background so it become very easy to locate tumor and Results are as follows:-
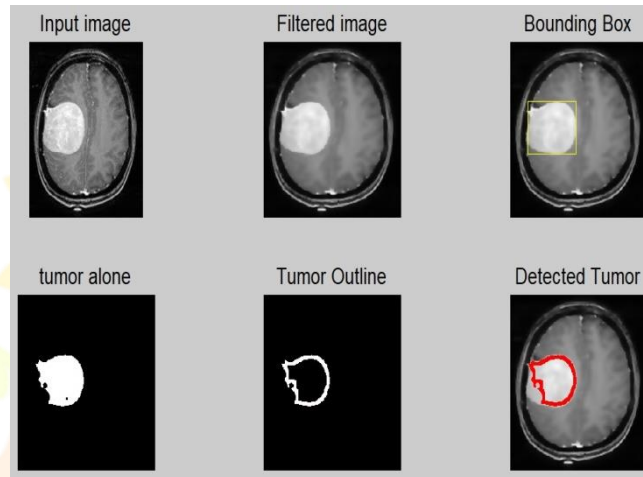

Fig. 2.: Result of detected tumor of sample image 1 which is highlighted with red colour around tumor
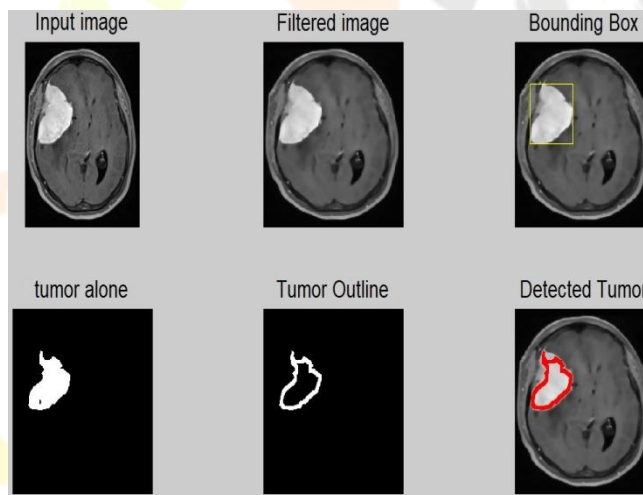

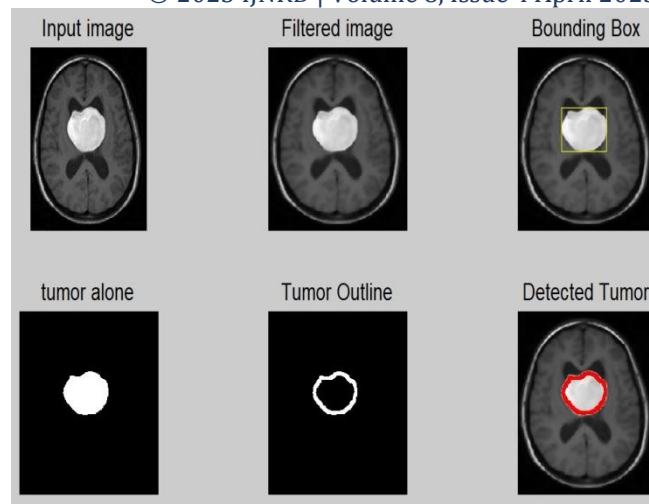Fig. 3.: Result of detected tumor of sample image 2 which is highlighted with red colour around tumor

Fig. 4.: Result of detected tumor of sample image 3 which is highlighted with red colour around tumor

IV. CONCLUSION

Brain tumor is the most dangerous and widespread in the world. The studies prove that this deadly disease should be detected in its early stage, it may causs loss of life otherwise. This gives us the indication that the process of detection of this disease place a very important and essential role to avoid serious stages and to reduse its percentage distribution in world. In this proposed work we worked on the MRI brain images and performed series of operations to enhance the image quality, to analyze and detect the tumor thresholding segmentation is used. In order to recognize the exact location of tumor mark its outline, morphological operations are performed. When this proposed methodology is applied to an abnormal brain MRI image, the tumor, if any, can be accurately detected.

REFERENCES

[1] Sheeba Khan, "Detection of Brain Tumor Using Digital Image Processing", Journal of Health & Medical Informatics, vol. 13, Issue 06, pp. 421, 2022.
[2] N. Sravanthi, Nagari Swetha, "Tumor Detection using Image Processing", International Journal of Scientific Research in Computer Science, Engineering and Information Technology, vol. 7, Issue 3, pp. 348-352, 2021.
[3] Dr. Umar Alqasemi, Mohammed Bamaleibd, "Classification of Brain MRI Tumor Images", International Journal of Engineering Research & Technology, vol. 10, Issue 03, ISSN: 2278-0181, 2021.
[4] Prof. Akshada Dighe , Vaibhav Pol, "Survey on Brain Tumor Detection Using Image Processing and Machine Learning Algorithms", International Journal for Research in Applied Science & Engineering Technology, vol. 10 Issue IV, 2022.
[5] R. Geetha Ramani, Febronica Faustina, "Automatic brain tumour detection using image processing and data mining techniques", Int. J. Information Technology and Management, vol. 20, 2021.
[6] A. Divya , V. Divya Dharshini, " Brain Tumor Detection Using Image Processing Technique from MRI Images Based on OTSU Algorithm", Central Asian Journal of Theoretical and Applied Sciences, vol. 03, Issue 05, ISSN: 2660-5317, 2022.
[7] Isselmou Abd El Kader, Guizhi Xu, "Brain Tumor Detection and Classification on MR Images by a Deep Wavelet Auto-Encoder Model", vol. 11, Issue 9, 2021.
[8] Md Anwar Hossain1, AFM Zainul Abadin, "Brain Tumor Location Identification and Patient Observation from MRI Images", Journal of Image Processing and Artificial Intelligence, vol. 7, Issue 1, e-ISSN: 2581-3803, 2021.