RESEARCH ARTICLE

BRAIN TUMOR DETECTION AND CLASSIFICATION

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ARTICLE INFO	ABSTRACT
	Brain tumor is a very critical problem of the human life. In recent years, brain tumor is one of the major causes for death in people. Manually identifying the tumor is difficult. The physicians may also take risk to identify the tumor because they used for computer programming to perform operation on image. The detection of brain tumor at its early stage with its accurate diagnosis is very important. The computerized method to be used for detection of tumor on early stage. The proposed strategies to detect the extract location of brain tumor using the MRI scan images. A magnetic resonance imaging which produces a single that can be detected and its enclosed spatially results in images of the body. These methods are incorporated with noise removal, edge detection, morphological operation, classification and tumor detection. MRI plays on vital role in identify accurate location and type of brain tumor.

INTRODUCTION

The image processing technique is analysis and manipulation of a digitized image; especially it's improving the quality. This method converts to image into digital form in order to get an enhanced or extract image from it. MR image provide extract detailed information about human anatomical structure and tissues. MR images are basically used in the bio-medical to detect and visualize finer details in the internal structure of the body. A magnetic resonance imaging which produces a single that can be detected and its enclosed spatially results in images of the body. The symptoms of brain tumor depend on the tumor size, type and location. Brain tumor is very serious and life threatening for invasive and limited space. Brain tumor is group of abnormal cells that grows inside of the brain or around the brain. Tumor can be directly destroying all healthy brain cells and It can also indirectly damage healthy cells by crowding other parts of the brain. The proposed methods are process to MRI scan of the human brain forms the input images or original images for our system. The pre-processing stage will convert the RGB input images to grayscale at the same time histogram equalization methods are processed. If any noises are present they will be removed from the image. Then the edge detection techniques are processed and identify the extract location of tumor.

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Finally the morphological operation and classification methods are applied for the images then accurately detection of the tumor in the human brain.

Review of Literature

The Detection of brain tumor in MRI images using image processing techniques. The Medical Image Techniques are used by Medical diagnosis. Brain tumor is a serious life of the threatening disease.

Kimmi Verma, Aru mehorta, Vijayeta pandey and Shardendu singh (2013) paper proposed Detecting the Brain tumor using Image Processing techniques are involves four stages namely as Image Preprocessing, Image segmentation, Feature Extraction, and Classification.

A. Sindhu and S. Meera (2015) suggested the Enhancement of brain tumor patterns they proposed by the Brain tumor analysis is done by physician but its grading gives different conclusions it should be vary from one doctor to another. So for the doctor's use of software as edge detection and segmentation methods, this gave the edge pattern and segment of brain and brain tumor itself.

Pratibha Sharma, Manoj Diwakar and Sangam Choudhary (2012) suggested the medical image segmentation is a vital point of research; it inherited complex problems for the proper

diagnosis of brain disorders. It should be provide the foundation of segmentation and edge detection as brain tumor grading.

Dr. Samir kumar Bandyopadhyay (2012) developed the efficient algorithm for detecting the edges of brain tumor, this paper is providing the digital imaging techniques are applied for MRI scan of brain image getting the exact location of tumor. The first noise filters are used for noise removal and the enhancement techniques are applied to the MRI scan of brain. After the basic morphological operations are applied for extracting the region suffering from the tumor.

Simran Arora and Gurjit Singh (2015) suggested Application of Edge Detection in Brain images it provides to edge detection is a critical element in image processing, since edges contain a major function of image information. They many edge detection algorithms are developed by the computation of the intensity gradient vector, which, in general, is sensitive to noise in the image.

Roshan G.Selkar and Prof. M. N. Thakare (2014) this paper proposed to medical and engineering technologies both are joined together and developing new innovations in the medical field. The innovations are enlightening the life of human it should be providing the proper treatment. Medical field reached a tremendous are placed in diagnosing tumors after the discovery of CT and MR Image. Recent bio-engineering researchers involved in medical image segmentation algorithms to speed up the physician's diagnostic process. Tumor segmentation from magnetic resonance imaging (MRI) data is an important but time consuming manual task performed by medical expert's.

T.Logeswari and M.Karnan (2014) presents a Physical segmentation of medical image by the radiologist is a monotonous and prolonged process. MRI is a highly developed medical imaging method providing rich information about the person soft-tissue structure.

Riddhi, S. Kapse, Dr.S.S.Salankar and Madhuri.Babar (2015) this paper proposed to varied brain tumor recognition and segmentation methods to detect and segment a brain tumor from MRI images. This is well thought-out to be one of the most significant but tricky part of the process of detecting brain tumor.

Dipanshu N. Masalkar and Mr. Shitole A.S (2014) developed the method for Detection and classification of tumor from MRI brain image is becoming most challenging area to research. This system includes several steps segmentation for tumor detection, feature extraction, dimensionality reduction of extracted feature for removing redundant features and classification of tumor. Previously this decision is taken manually by humans with the help of MR (Magnetic resonance) or CT (Computerized Tomography) scan image of brain. But the time require for this is more and result may not be accurate.

S.U.Sumathi and S. Geetha (2015) proposed the conventional method for medical resonance brain images classification and

tumors detection is by human inspection. Operator-assisted classification methods are impractical for large amounts of data and are also non-reproducible. Medical Resonance images contain a noise caused by operator performance which can lead to serious inaccuracies classification.

MATERIALS AND METHODS

Preprocessing

The pre – processing stage is an improvement of an image that suppresses unwanted distortions or displaying obvious portions of images. The input image change for grey color and it improves an image quality. It is a common name for operations with images at the lowest level of abstraction. Preprocessing techniques are used to improve the detection of the suspicious region from Magnetic Resonance Image.
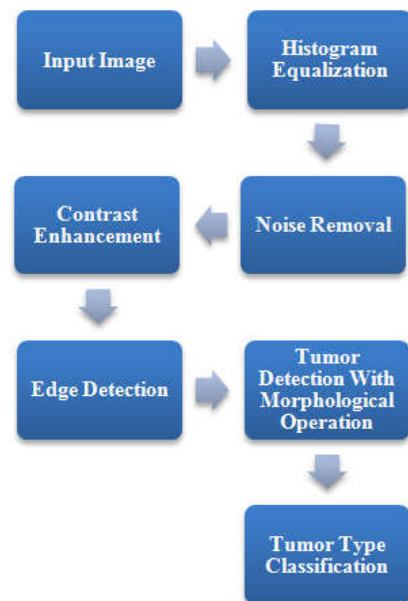
Flow Diagram

Probability Distribution

The histogram computes the frequency distribution of the elements in each column of the input. Elements of each column into the number of discrete bins are specified by the Number of bins parameter, n. it's a graphical representation of the distribution of data. The total of a histogram used for probability density is always normalized to 1. They stretch out the grey levels at the dark end to produce a more uniformly distributed histogram then the image would become much clear.

Noise Removal

Noise will be reduced thus reducing the blurring effect from the images. The average filters are used to remove the salt and pepper noise from the image because the pixel Values are replaces with neighborhood values. There are many filters are used to remove the noise from the images. Arithmetic and geometric filters are suited for remove noise like Gaussian. Mostly used by the enhancement and noise reduction techniques are implemented and The image processing

researcher commonly used effective method for removing noise while preserving the edges that can be give the best possible results.

Enhancement

Enhanced image will help in detecting the edges and improving the quality of the overall image. This method for brain MR images which is based on the first derivative and local statistics. It is easy to make an image lighter or darker and increase or decrease contrast. The enhanced image process detection of exact location of tumor begins. The result in more prominent edges and sharpened image is obtained.

Edge Detection

The edge detection techniques are detecting the edges of the region of interest on the digital images. The function of edge detection is to identify the boundaries of homogeneous region in an image based on properties such as intensity and texture. The edges are calculated by using difference between corresponding pixel intensities of an image. Edge detection will lead to finding the exact location of the tumor.

Morphological Operation

The mathematical morphology is a tool for extracting image components that are useful to represent and describe region shape such as boundaries, skeletons and convex hull. The morphology commonly denotes a branch of biology that deals with the form and structure of animals and plants. It should be reduce to all objects in image to lines and without changing to the essential structure of the image. The number of pixels are added or removed from the object in an image it should be depends on the size and shape of the structuring element. The elements are typically much smaller than the image being processed. Using morphological operation we can separate the background of the given image and the predefined function is used to find out the background. They many structural elements are available in the MATLAB by using the disk can be find the background of the given image.

Classification

Classification method is process to categorize all pixels in a digital image. It is employed to implement an MR image classification of brain tumors into normal, benign and malignant. Correct classification rate is proportion of accurate classifications to the total number of classification tests. Image classification techniques are used to the original input image at a fixed feature scale may result in intra object classification.

RESULT AND DISCUSSION

The MRI input images are given as the human brain forms for our system. The image color value or range is separately defined by the histogram equalization. They stretch out the grey levels at the dark end to produce a more uniformly distributed histogram then the image would become much clear. At the same time the preprocessing functions as process by the images. The preprocessing stage will convert into RGB

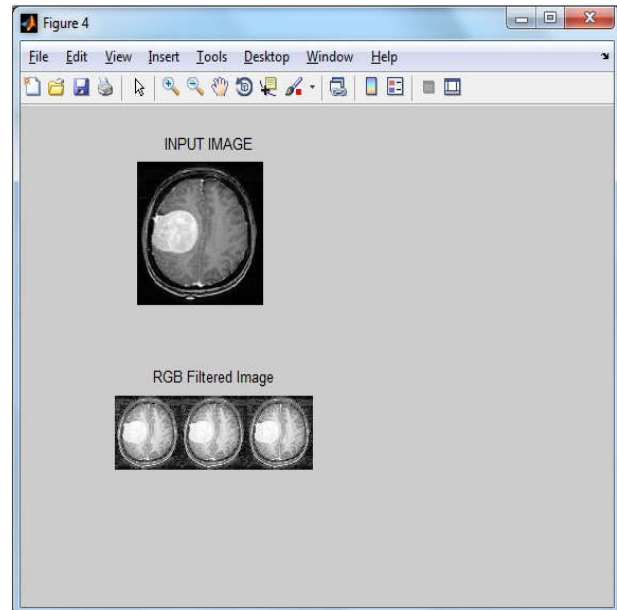input image to grayscale. After preprocessing the noise are removed from the brain images.

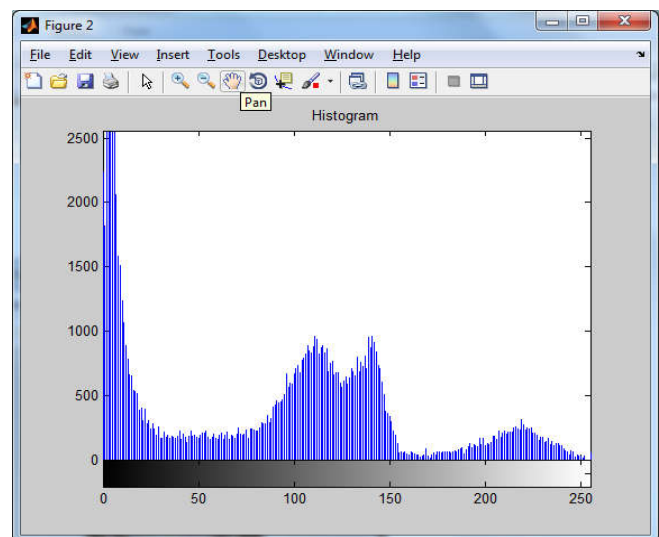**Figure 1. RGB Filtered Image**

Figure 2. Histogram Equalization

They using the filters used by removing the noise because the images are shown clearly. It should be improves the image quality and removes the noise. Finally the detection of edges for extract result is obtained. They finding the accurate location of the tumor easily to identified the tumor location of the images.

The number of pixels are added or removed from the object in an image it should be depends on the size and shape of the structuring element. Using morphological operation we can separate the background of the given image and the predefined function is used to find out the background. Finally process to the tumor classification these methods categorize all pixels in a digital image. It is employed to implement an MR image classification of brain tumors. After the classification tests they find the accurate tumor in the original image.
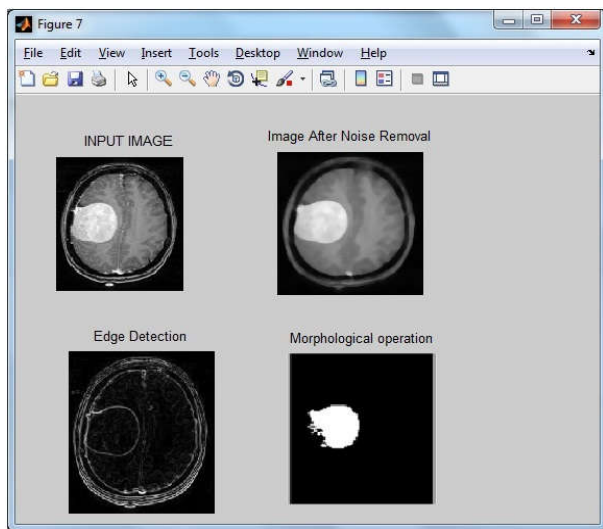
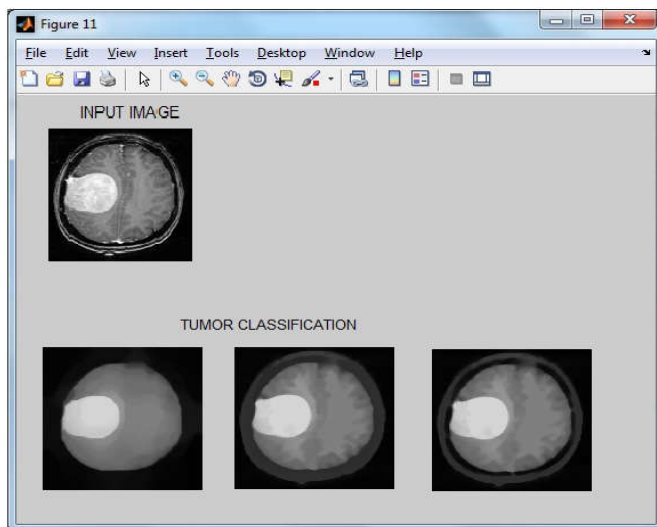**Figure 3. Noise Removal, Edge detection and Morphological operation**

Figure 4. Tumor Classifications

Conclusion

The images taken here is a scanned MRI images. This technique is able to segment tumors clearly and gives the structural element which outlines the shape and size of the tumor. This will help the doctor or the physician to analyze the tumor shape and size, which plays a vital role in the treatment of tumor. The tumor identification is difficult results which may different from the physicians. Doctors may also take the risk for identify the tumor. The problems are solved by using the some image processing tools.

The medical image segmentation is difficult process but this software is easily to identify the accurate detection of size and location of brain tumor. Noise removal and enhancement techniques are applied to the MRI scan of brain. The final step is detection of edges from the tumor. In this paper provide the results are obtained were good and efficient. The proposed method can be applied for detection of lung cancer. The method can be applied to the CT scan of the lungs and suffering from cancerous cells can be identified. This method will give fast and more accurate result and helps physician for proper treatment.

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