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Automatic Detection of Brain Tumor Using ROI (Region of Interest)

V.Sabaresan [1], R. Vinoth[2], R.Vidhya[3]

Assistant Professor[1, 2, 3], Department Of Information Technology[1, 2, 3],
Agni College of Technology[1, 2, 3], Chennai-600130[1, 2, 3], Tamil Nadu[1, 2, 3], India[1, 2, 3],
sabaresan.it@act.edu.in[1],vinoth.it@act.edu.in[2], vidhya.it@act.edu.in[3]

ABSTRACT:

Image Enrichment is the first and foremost step that has to be done in all image processing applications. It is used to improve the quality of digital images.The main objective of this project is to implement automatic detection of brain tumor using ROI (Region Of Interest).Using pre-processing noises are removed from images and using segmentation, Region of Interest (ROI) is found and Histogram smoothing is applied for a specific portion of the images. This dataset is trained with inflamed and non-inflamed values and with the help of neural network and deep learning Techniques.

I. INTRODUCTION

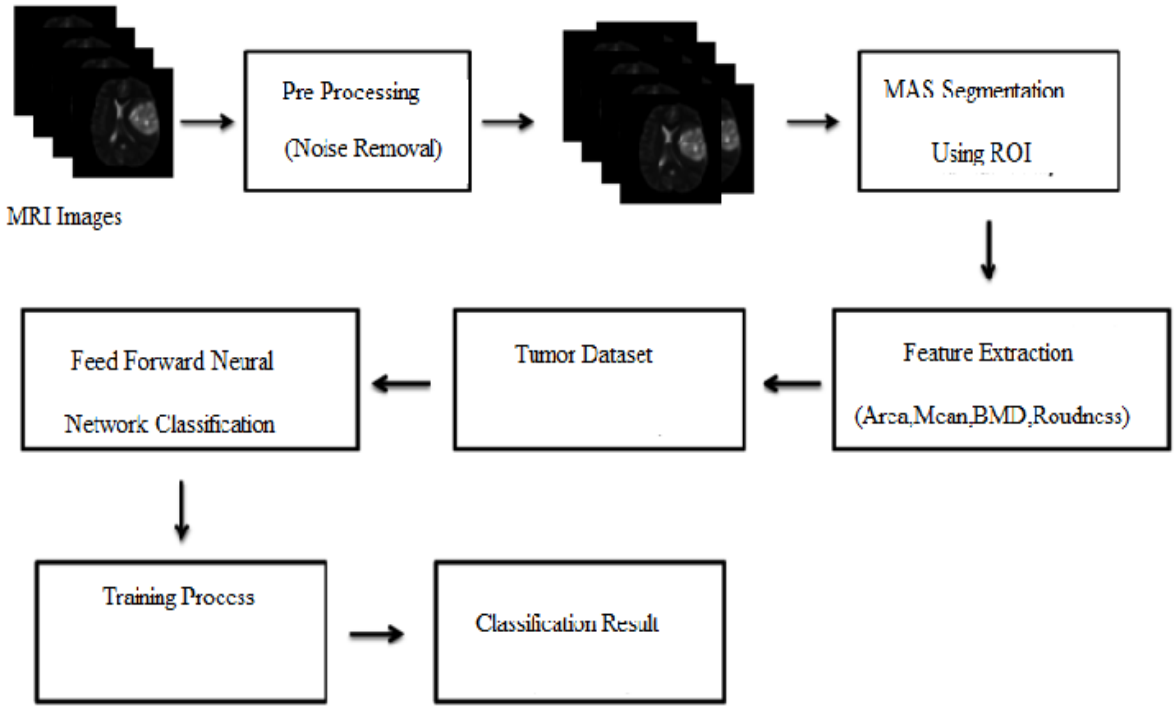
The objective of proposed methods is to use a series of techniques on brain scans, so as to detect the occurrence of brain tumor as accurately as possible. Amongst other techniques existing in the field our proposed system tends to be more effective as it depends on new methodologies Multi-atlas segmentation using Region of Interest(ROI) that have been proved to be better and more consistent than others.Computer aided diagnosis will provide more accurate and infallible rate of consistency that will help to improve the efficiency of the system.The image first undergoes histogram smoothing and specification, morphing operation, boundary detection by edge following algorithm and finally image subtraction to determine the presence of brain tumor using neural network analysis.

A. Existing system

Existing System, the diagnosis of the disease brain tumor is identified by using CT scan images .Shapes of tumors identified by the point of interest.

B.Proposed system

Thresholding (ROI) is the process used to segment the tumor image. The proposed approach mainly focuses on extracting the features in order to enhance the performance of the automatic diagnosis of brain tumor.



II. Implementations

1. Image Pre-Processing And Histogram Smoothing.

The given image is converted into binary image. Noise may be accumulated in the image during image acquisition. So, the given image is subjected to various filtering techniques in order to enhance the image. Choosing the best filtering technique makes the result more accurate.

Finally the best filter which is effective for all kinds of noise is chosen as the filter for the proposed work. Smoothing operations are performed using histogram equalization. Histogram smoothing is used to identify the different types of objects appearing in the image.

2. Edge Detection Process

Edge detection is a part of image segmentation which is used to separate the region of interest accurately. Some common functionality is needed for edge detection algorithms such as insensitive to noise, good location, object oriented, speed of detection and accuracy. In this paper, we made a comparative analysis of various edge detection algorithms.

3. Image Segmentation Using Threshold Approach

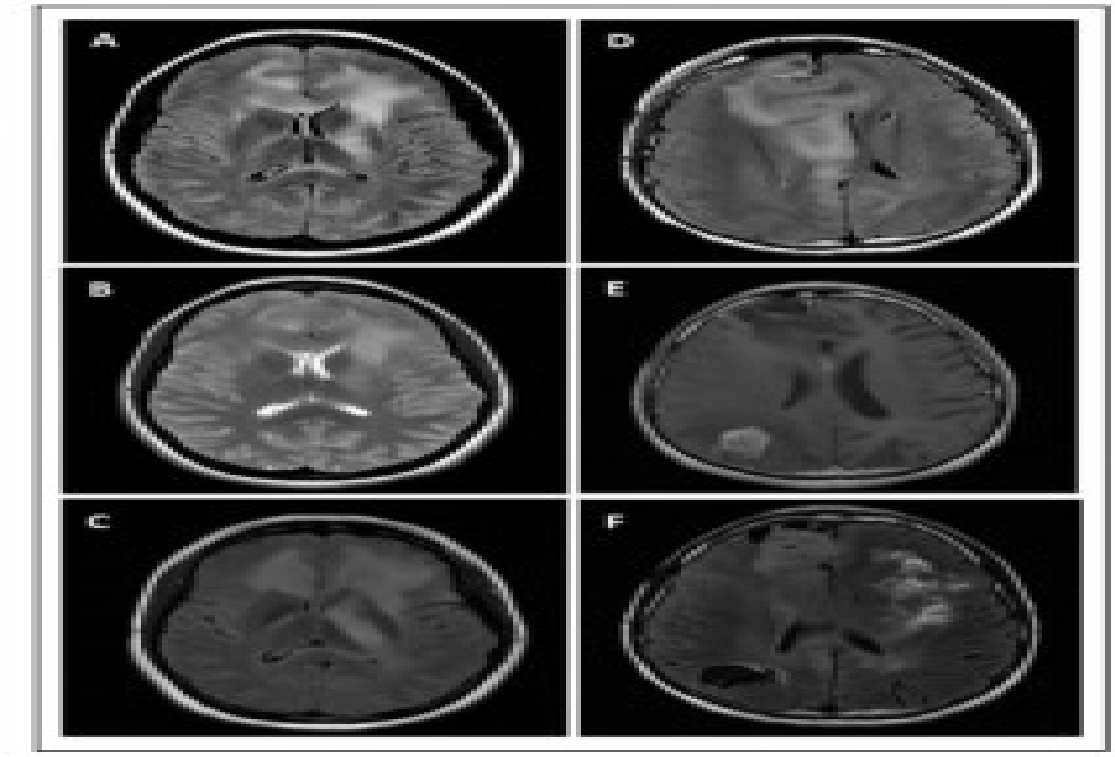
This process involves splitting up of given brain images into multiple segments in order to identify the region of interest. Threshold based segmentation algorithm detects the Region of Interest more accurately. Our proposed method consists of a stepwise processing where first the image is normalized through histogram smoothing and specification, and then it undergoes morphological operation of dilation and erosion to enable extraction of the brain area termed as the region of interest (ROI).

4. Feature Extraction

Gray Level Co-occurrence Matrix (GLCM) features (Energy, Entropy, Contrast, Homogeneity and Correlation) for sample tumor images are calculated. Some more features like Mean, Median, Variance and standard deviation are also derived for both normal and abnormal brain images.

5. Analysis of Extracted Features Using Neural Network

A dataset is created from the above method with the reference images containing both normal and abnormal images. This data set is used to train the classifier.In the propose approach Neural networks are used as classifier.



III. Conclusion

The proposed method of brain tumor segmentation helps surgeon in detecting tumor automatically in lesser time as compare to manually calculation and it also provide accuracy. The final tumor region is highlighted in color and then this image is overlap on original image for showing accuracy of the applied.

IV. Future Enhancement

The proposed algorithm apply on particular case of tumor i.e. Hemangiopericytoma. For the future work this algorithm can be applied on other slices of the selected case and other cases of tumor as well. The future scope of this project is to segment all types of tumor automatically and a general system can be proposed with higher accuracy and lesser time. Volume of the tumor can be calculated for neurosurgeries. The research can be extended to detect cancer in MRI slabs of other body parts.

V. References

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