ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 3, Special Issue 16, March 2016

Segmentation of Tumor And Edema Extraction In MRI Brain Image Using Effective Binary Masking

V.AARTHI,R.CHITRA DEVI[2],P.ISWARYA[3],K.MADHUBALA[4],E.MALLIKA[5]
aarthiguru123@gmail.com,madhuswety2295@gmail.com
1,2,3,4 Students,FINAL YEAR,5 Asst.Professor
1,2,3,4,5 P.S.R.RENGASAMY COLLEGE OF ENGINEERING FOR WOMEN

***Abstract*---Effective brain magnetic resonance(MR) segmentation algorithms are complex to evaluate tissues,tumor and edema. We used segmentation algorithm to segments the MR images into edema,tumor,gray matter,white matter.The Image segmentation is a process of separating a digital image into multiple segments.Thegoal of segmentation is to simplify and/or change the representation of the image something that is more meaningful and easier to analyse.Edge is one of the prime features of image.It helps us to analyze and take decision in various image processing applications.Before segmentation process we developed an algorithm for stripping the skull.**

***Keywords*—Brain Magnetic Resonance (MR), Thresholding, Morphological, Binarization, Color map**

I.INTRODUCTION

Brain magnetic resonanace(MR) is most important in the site of diagnosing brain tumors.Brain tumors have various characteristics such as size,shape,location and image intensities.Over 90% of all tumors in 20 years old persons are glial tumors[1].The system proposes the statistical inference and global spatial properties.It would improve the segmentation of ROIs(Rate of Interest) with heterogeneity and blurred boundaries in medical images.The system considers an image in a continuous domain to be partitioned into two segments:the foreground and background[2].Manual segmentation of brain MR images take more time and tiring process that can show differences when performed different experts[4].In existing project we used segmentation algorithms are self-organizing feature map (SOM) and learning vector quantization (LVQ).In proposed we using Thresholding, Morphological, Binarization [5] and Color map.

II.MATERIALS AND METHODS

Materials and Techniques are used to perform tissue segmentation algorithm in brain MR scans.Flow diagram explains the overall process in figure 1.The Implementation details are explained in following steps.

A. *Brain MR Images*

We used the T1 weighted (TR/TE:1860/20) T2 weighted (TR/TE:5750/130), and FLAIR (TR/TE:8800/130) MR sequences are acquired on a 1.5 T General Electric MR machine.All MR images are 16 bits depth and 512 × 512 pixels size.

B.*Preprocessing*

First browse the given input image from the dataset.Image preprocessing,also called as image restoration,involves the correction of degradation,and noise introduced during the imaging process.preprocessing process produces a accurate image that is as close as possible,both geometrically and radiometrically to the radiant energy characteristics of the original scene.Radiometric and Geometric calculation are the most common types of errors encountered in remotely sensed imagery

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 3, Special Issue 16, March 2016

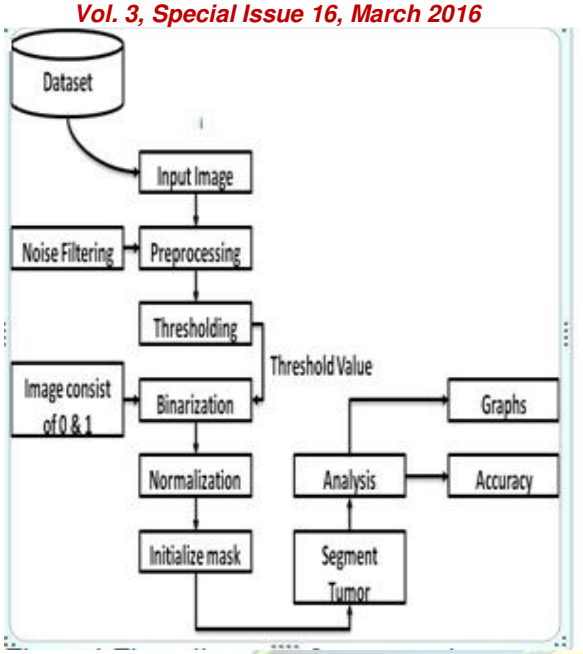


Figure 1:Flow diagram of segmentation

.C.***Thresholding***

Thresholding is the simplest method of image segmentation.From a gray scale normal image,thresholding can be usedto create binary images.The simplest thresholding methods it replace the each pixel in an image with a black pixel if the image intensity I{i,j} is less than some fixed constant T (that is,I{I,j}<T),or a white pixel will appear if the image intensity is greater than that constant value.

D.*Binarization*

Binarization is the process of converting pixel value to a binary image.Binarization is the basis of segmentation.At first the image converted into grayscale then it convert the binary image using threshold value.Typically,the two colors used for a binary image usually black and white,but in nature any two colors can be used.The particular color used for the concerned object(s) in the image is the foreground color and the rest of the image is the background color.

E.*Normalization*

Normalization is a procedure that changes the range of pixel intensity values.It transform on n-dimensional gray scale image with intensity values in the range (Min,Max),into a particular new image with intensity values in the range of (newMin,newMax).

The linear normalization process of a grayscale digital image is performed according to the concerned formula.

$$I_N = (I\text{-}Min)\frac{newMax-newMin}{Max-Min} + newMin$$

F.*Masking*

A mask is a filter and the filtering is just extracting .Concept of masking is also known as spatial type filtering.Masking is also known as filtering.masking concept we just deal with the filtering or extracting operation that is performed directly on the given image.Mask is a small matrix useful for non clear,sharpening,embossing,edge-detection,and more.This is accomplished by means of convolution operation between a kernel and an image.It is a process used to specify the region of tumor.That masking region only we will segment.

G.*Segmentation*

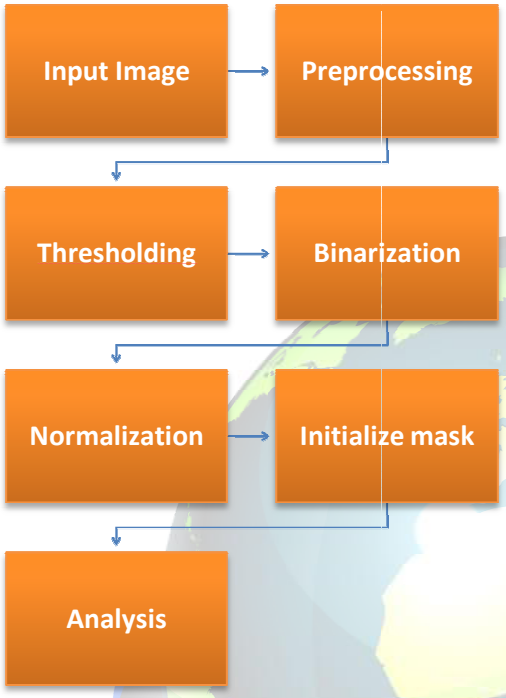
Image segmentation,also called labeling,is the process of dividing the individual elements of an image or set of groups,so that all elements in a group have a common property.In the medical domain,the elements belong to the same tissue type or organ.Segmentation of anatomical structure is a key technology for medical applications such as diagnostics,planning and guidance.Medical images contain a more number of information,and only one or two structures are of interest.Segmentation allows visualization of the structures of interestand it extract the unnecessary information.

H. *Analysis*

Segmentation of various ROIs from different routine clinical medical images including MR and CT images was done using the algorithms.All segmentation methods are implemented for the comparision require initialization.Different initializations may lead to difference and difference in the segmentation

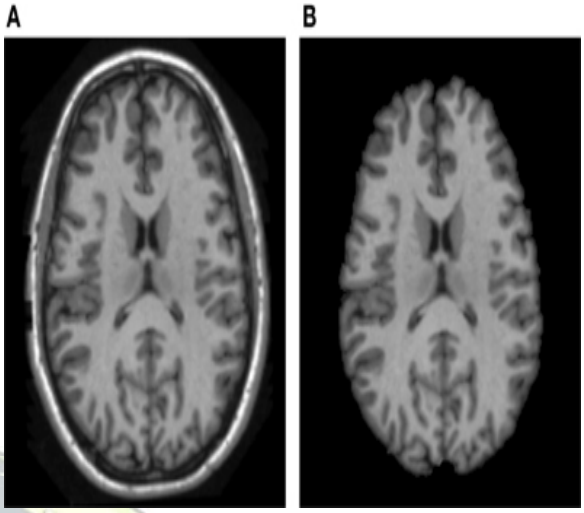
ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 3, Special Issue 16, March 2016

results.To evaluate the robustness of these segmentation models,for each test dataset,five different initializations were provided to calculate the DSC mean and standard deviation in the following experimental comparision groups.



I.*Skull stripping*

Skull stripping is always used to remove the noncerebral tissues such as skin,skull,fat,muscle and connective tissues.skull stripping otherwise called as wholebrainsegmentation.



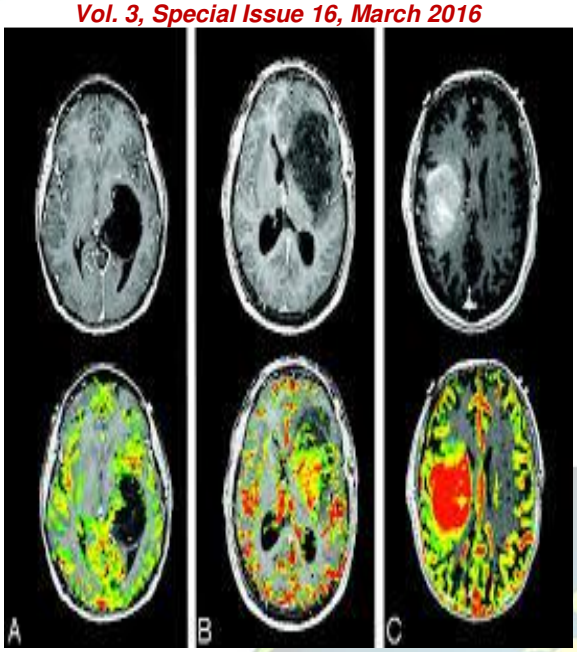
J. *Morphological*

Morphological image processing is a collection of non-linear operations related to the shape or morphology of features in an image. Christo Ananth et al. [3] proposed a system, this system has concentrated on finding a fast and interactive segmentation method for liver and tumor segmentation. In the pre-processing stage, Mean shift filter is applied to CT image process and statistical thresholding method is applied for reducing processing area with improving detections rate. In the Second stage, the liver region has been segmented using the algorithm of the proposed method. Next, the tumor region has been segmented using Geodesic Graph cut method. Results show that the proposed method is less prone to shortcutting than typical graph cut methods while being less sensitive to seed placement and better at edge localization than geodesic methods. This leads to increased segmentation accuracy and reduced effort on the part of the user. Finally Segmented Liver and Tumor Regions were shown from the abdominal Computed Tomographic image.

K. *Color Map*

Color Mapping is a function that transforms the colors of source image to colors of target image.color mapping is also sometimes called color transfer or,when grayscale images are involved,brightness transfer function (BTF).

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 3, Special Issue 16, March 2016



III.RESULT AND DISCUSSION

The comparision between the existing and proposed algorithms are quantative and qualitative experimental results which are obtained.We reach 100% segmentation accuracy for cerebrospinal fluid (CSF),mean segmentation accuracies of white matter and gray matter are 91% and 87% respectively. We reached 77% true segmentation ratio for edema and 61% for tumors.The reasons of that segmenting the tumor is a more challenging task are as follows.

1.Segmented tumor type,glial tumors are very heterogeneous in nature and includes different types of regions such as necrotic and active.

2.There is no clear border between the necrotic and active regions and some tumors contain necrotic areas whereas other does not.

3.There are exceptional features of our comparatively large dataset that our system does not capture entirely,such as some tumors appear like edema or CSF when its protein and blood content is high.

In the segmented image we use blue to represent white matter,turquoise for gray matter,yellow for CSF,orange for edema and dark red for tumor.These colors are selected orbiterly.

CONCLUSION

We segmented brain MR images into healthy tissues with tumors and edema.The skull stripping is not our region of interest.Brain MR into one coordinate system after filtering with anisotropic diffusion filter.performance is well compare to other segmentation algorithm. The analysis of algorithm is segmented the brain images with more accuracy.The advantages of the algorithm is to improving the segmentation accuracy of the system

REFERENCES

[1] D. D. Langleben and G. M. Segall, "PET in differentiation of recurrentbrain tumor from radiation injury,"J. Nucl. Med., vol. 41, pp. 1861–1867,2000.

[2] A. Demirhan andI. Guler, "Image segmentation using self-organizingmaps and gray level co-occurrence matrices,"J. Fac. Eng. Arch. GaziUniv., vol. 25, no. 2, pp. 285–291, 2010.

[3] Christo Ananth, D.L.Roshni Bai , K.Renuka, C.Savithra, A.Vidhya, "Interactive Automatic Hepatic Tumor CT Image Segmentation", International Journal of Emerging Research in Management &Technology (IJERMT), Volume-3, Issue-1, January 2014,pp 16-20

[4] M. Straka, A. L. Cruz, A. Kochl, M. Sramek, M. E. Groller, andD. Fleischmann, "3D watershed transform combined with a probabilisticatlas for medical image segmentation," inProc. MIT2003 ,pp. 1–8.

[5] H.-H. Chang, D. J. Valentino, G. R. Duckwiler, and A. W. Toga, "Seg-mentation of brain MR images using a charged fluid model,"IEEE Trans.Biomed. Eng., vol. 54, no. 10, pp. 1798–1813, Oct. 2007.