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Segmentation of Mri Images Using Fuzzy C-Means Clustring

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Abstract: *Segmentation topic is covered wider area which separate the image into region, which makes the group into homogeneous of given condition according to color, motion, texture, shape and similarly. Segmentation is more reliable than human because there are so many variations from human eye into computer vision example: MRI images, CT images which lead better segmentation approach and it took vital role in image processing. Magnetic resonance image (MRI) segmentation which extraction or separates white image, grey image and cerebrospinal fluids. Here we can segment the white image of MRI brain image and analyze the problem using Fuzzy C-means Clustering algorithm.*

Keywords*: Image Processing, Segmentation, FCM (Fuzzy c-means clustering), MRI (Magnetic Resonance Image)*

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I. Introduction

Brain tumor is the abnormal cell which collected in the brain. Tumor can be malignant or benign, It destroy the brain cell and interface with body. The tumors are identified by their location tissue type and cells. They are Gliomas, Meningiomas and Schwannomas types of Brain tumor which mainly affect the human brain systems of brain tumor. Memory loss confusion[7].

1. Weakness.
2. Headaches while sleeping
3. Trouble in walking, reading and talking.
4. Changes smell, taste, hearing, and vision.
5. Bladder problem, changes in mood and behavior

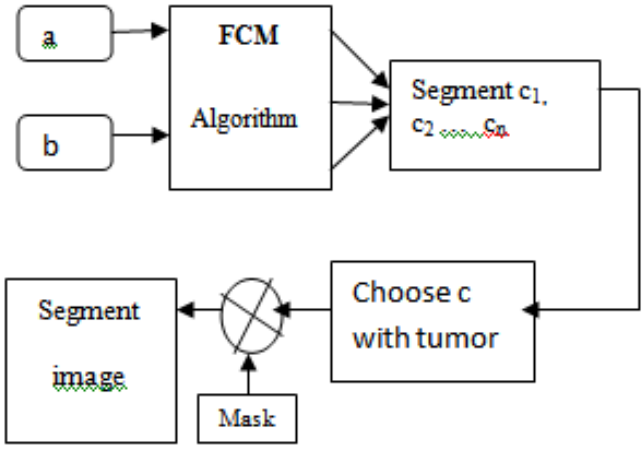
Adult brain tumors diagnosed by Magnetic Resonance Images (MRI) which scan your brains, nerves tissues, clinical computed tomography (CT) scan and an Electroencephalography (EEG)Segmentation takes vital role in Image Processing. Magnetic Resonance (MR) segmentation which extraction or separates white image (T1weigthed), gray image (T2weigthed) and cerebrospinal fluids (PD weighted). MR Images is one of the important tasks in tumor finding. Tumor finding is time consuming one and difficult task, even they are several technologies have been developed for MRI segmentation.Clustering means it organizes the items into -group in this criteria, Fuzzy c-means algorithm clusters more than one group, it does not cluster absolute member of point where us it calculate degree of membership(like hood) which belongs the point that gathered cluster and the number of iteration complete by FCM algorithm. An accuracy calculate by degree of membership from iteration to next with all data points with thresholding parameter, A fuzzy ser algorithm control the parameter level and estimate result of fuzzy clustering mean.

Thresholding:Thresholding is basic image segmentation method which process with pixel gray level and its intensity value. It makes the group of threshold value greater than its threshold value grouping into another cluster but it cannot make group into multichannel images. MRI Images can be classified by 0 to 255 and it has value that is 0 to 255.

Region Growing:Region growing the method which selects the seed point. After evaluating the seed point manually region grow according to the same level of seed, it grow maximum by covering in homogeneous type of point belongs to same region. The main disadvantages the seed point selected by manually with help of human interface is applied and it is time consuming process too.

II. Methology

The block diagram of proposed method of FCM given in **fig** 1. The a and b are two input images with to show the tumor region and to get clear image we need to avoid skull and skin to visual the tumor location more obviously**.**



bock diagram of proposed method fig 1.

In this proposed method of FCM reduces computational time and function cost by pixel of cluster center because immediate neighborhood pixel present approximately same attribute data [1]. So it need different degree of membership for cluster. By Euclidean norm the algorithm of FCM as follows:

$J_n = \sum_{i-1}^{Y} \sum_{j-1}^{B} v_{ij}^{n} \left\| Z_i - C_j \right\|^2 A , \quad 1 \leq n < \infty$

V is the c-partition of fuzzy of Z, c stands for vector of centroids, v_{ij}^{y} is the degree of membership in cluster pixel Z in i^{th} iteration. Y= (y_1, y2, y3….y_{k-1}, Y_K) data set in N-Dimension vector space. A is the definite matrix, $\|Z_i - C_j\|$ is the distance between cluster.

Iterative optimization techniques are

$$v_{ij}^{n} = \frac{1}{\sum_{k-1}^{c} \left(\frac{\left\| z_i - c_j \right\|}{\left\| z_i - c_k \right\|} \right)}, c_j = \frac{\sum_{i-1}^{Y} v_{ij}^{b} - z_i}{\sum_{i-1}^{Y} v_{ij}^{b}}$$

The iteration stops maximum of the final value that is v_{ij}^{y} or $v_{ij}^{y-1} < \infty$, which represent between zero or one assume that is i^{th} iteration

Algorithm steps follows:

Step 1: Mention or initiate the values of matrix c,n and A.

Step 2: Select the Fuzzy Matrix of partition matrix V ie.(v_{ij})

Step 3: Compute c with the degree of membership x

$$c_j = \frac{\sum_{i=1}^{Y} v_{ij}^{n} . z_i}{\sum_{i=1}^{Y} v_{ij}^{n}} \quad (i,j=0,1,\ldots c)$$

Step 4: Calculate matrix $v^{(k)}$, $v^{(k+1)}$ by:

$$v_{ij} = \frac{1}{\sum_{k-1}^{c} \left(\frac{\left\| z_1 - c_j \right\|}{\left\| z_i - c_k \right\|} \right)^{\frac{2}{n-1}}}$$

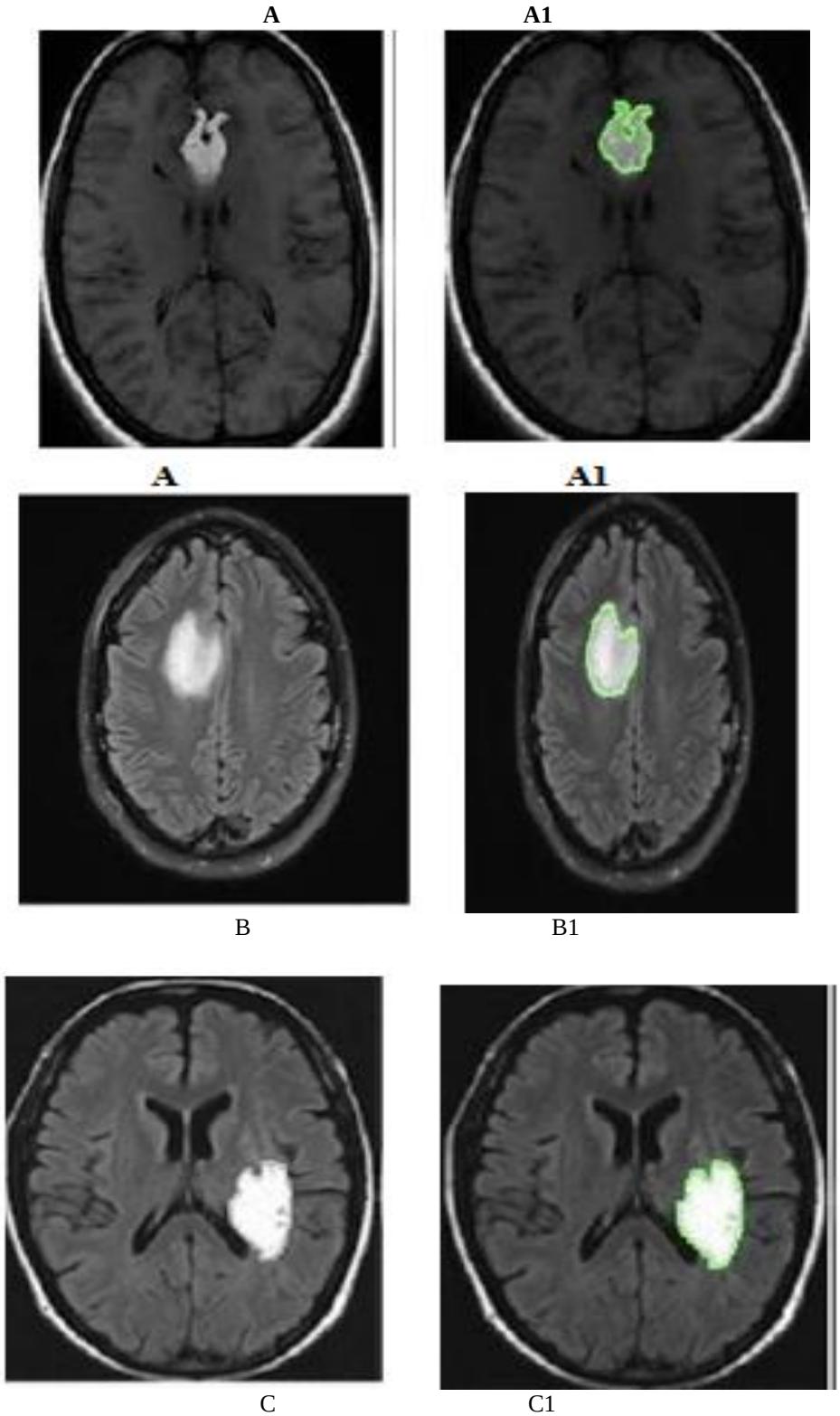
$$1 \leq k \leq Y, 1 \leq i \leq C$$

Step 5: Compare $V^{(k+1)}$ with $V^{(K)}$ in optimal matrix.

If, $\left\| V^{k+1} - V^{(k)} \right\| < k$, (stop as per maximum value of end point) stops otherwise, set $V^{(k+1)} = V^{(k)}$ and go back to step 3.

The short process of the algorithm is read the input image. Remove the noise, calculate the centroid points. Compute the segment image using points and formulas find the tumor region more accurately and evaluate.

III. Result And Discussion



Real abnormal images of (image A, B, C)[2].
All (A1, B1, C1) Segmented using FCM with (n=3, ∞=0.1)

IV. Conclusion

Image process plays more over in electronic, remote sensing, bio-medical (diagnosis for tissue purpose) etc., because FCM is very easy to grasp and catch the concept. Mainly used to calculate very accuracy method of segmentation with input image not only MRI images our future work will be improving accuracy, reduce noise, minimal human interaction increasing processing speed make role more robustness**.**

Reference

[1]. Fariba Beiramzadeh Azar "Detecting Lesions in MRI Brain Images Combining Pseudo-Color Segmentation with Fuzzy C-Means Clustering" Eastern Mediterranean University August 2013 Gazimağusa, North Cyprus

[2]. M. Prastawa, E. Bullitt, and G. Gerig, "Simulation of Brain Tumors in MR Images for Evaluation of Segmentation Efficiency," Includes Special Section on Functional imageing and Modelling of the heart, vol 13, no. 2, pp. 297-311, 2009.

[3]. Juraj Horváth "Image Segmentation Using Fuzzy C-Means" Department of Cybernetics and Artificial Intelligence, Faculty of Electrical Engineering and Informatics, Technical University of Košice Letná 9, 042 00 Košice, Slovakia, E-mail: Juraj.Horvath@tuke.sk

[4]. P.Kalavathi and A.Dhavapandiammal "Segmentation of Lung Tumor in CT Scan Images using FA-FCM Algorithms IOSR Journal of Computer Engineering (IOSR-JCE)e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 18, Issue 5, Ver. IV (Sep. - Oct. 2016), PP 74-79www.iosrjournals.org DOI: 10.9790

[5]. Iraky khalifa,Aliaa Youssif and Howida Youssry" MRI Brain Image Segmentation based on Wavelet and

[6]. FCM Algorithm" International Journal of Computer Applications (0975 – 888) Volume 47– No.16, June 2012 32

[7]. Sonali Wadgure , Prof. Mrs. Pooja Thakre "Detection of Brain Tumor from MRI of Brain Using Fuzzy C-mean (FCM)"International Journal of Science, Engineering and Technology Research (IJSETR), Volume 3, Issue 8, August 2014 2222 ISSN: 2278 – 7798 All Rights Reserved © 2014 IJSETR

[8]. ADeepali Aneja , Tarun Kumar Rawat ' Fuzzy Clustering Algorithms for Effective Medical Image Segmentation" I.J. Intelligent Systems and Applications, 2013, 11, 55-61 Published Online October 2013 in MECS (http://www.mecs -press.org/) DOI: 10.5815/ijisa.2013.11.06 Copyright © 2013 MECS I.J. Intelligent Systems and Applications, 2013, 11, 55-61

[9]. Brain tumor - Symptoms and causes - Mayo Clinic http://www.mayoclinic.org/diseases-conditions/brain-tumor/symptoms-causes/syc-20350084 Brain tumor — Comprehensive overview covers signs, symptoms and treatments, including surgery [refered on 12.12.2017]

[10]. www.tutorialspoint.com/dipDigital Image Processing Tutorial forBeginnersLearn Digital Image Processing insimple and easy steps starting from basic to advanced concepts with examples . [refered on 15.12.2017]

[11]. Getting Started with Image Processing Toolbox - MathWorks ww.mathworks.com/help/images/getting-started-with-image-processing-toolbox.htmlGetting Started with Image Processing Toolbox. Image ... System Requirements; Acknowledgments; Tutorials. Basic Image Import, Processing, [refered on 19.12.2017]

[12]. MRI Images Overview - MR-TIP.com http://www.mr-tip.com/serv1.php?type=isimgThis InfoSheet provides information about MRI images in different anatomic regions, planes and with different sequences. [refered on 15.12.2017]

[13]. Magnetic resonance imaging - Wikipediahttps://en.wikipedia.org/wiki/MRI Magnetic resonance imaging is a medical imaging technique used in radiology to form pictures of the anatomy and the physiological processes of the body in both health [refered on 15.12.2017]

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