International Journal of Engineering & Technology, 7 (2.19) (2018) 97-100

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

Image Segmentation Using K- Means Clustering Method for Brain Tumour Detection

S.Thylashri[1*] ·Udutha Mahesh Yadav[2] ·T.Danush Chowdary[3]

[1] *Assistant Professor*
Department Of Computer Science And Engineering, School Of Computing,
Vel Tech Rangarajan Dr. Sagunthala R&D Institute Of Science And Technology,
Avadi, Chennai-600 062, Tamil Nadu, India.
[2,3] *Ug Scholar*
Department Of Computer Science And Engineering, School Of Computing,
Vel Tech Rangarajan Dr. Sagunthala R&D Institute Of Science And Technology,
Avadi, Chennai-600 062, Tamil Nadu, India.
** Thylashri93@Gmail.Com*

Abstract

Brain tumour is an irregular development by cells imitating among them in an unstoppable way. Specific identification of size and area of Brain tumour assumes a fundamental part in the analysis of tumour. Image processing is a dynamic research territory in which processing of image in medical field is an exceedingly difficult field. Segmentation of image assumes a critical part in handling of image as it helps in the finding of suspicious districts from the restorative image. In this paper a proficient algorithm is proposed for detection of tumour based on segmentation of brain by means of clustering technique. The main idea in this clustering algorithm is to transfer a given gray-level image and then separate tumour objects position from other items of an MR image by using K-means clustering. Experiments say that segmentation for MR brain images can be done to help medical professionals to identify exactly size and region of the tumour located area in brain.

Keywords: *Segmentation, clustering, Brain tumour, k-means, Magnetic Resonance Imaging (MRI)*

1. Introduction

Malignancy (cancer) is a gathering of maladies starts in cells that are the essential building squares of a body. There are diverse sorts of malignancies yet all begins with the cells becoming wild. The sort and phase of disease can be dictated by figuring out where the strange development happens in the body and the kind of cells that begin to develop anomalous. The brain zone has been distinguished as a standout amongst the most influenced regions for tumours than different parts of the human body. A considerable measure of information has been gathered and gone over. The precarious part is the manner by which to recognize the brain disease tumour into something significant for the patient or specialist or rather the people engaged with it or the people who offer treatment. This is the place information mining ventures in and characterization of the mind disease information helps in such endeavours. The ways to deal with locate a reasonable business related to the mind malignancy division. The proposed demonstrate points and uses information picture mining or division highlights to discover brain malignancy tumours and evacuate them.

Image segmentation is the method of dividing an image into many parts. The main aim of segmentation is to simply change the view of an image into something that is more meaningful and easier to understand. In 16 e segmentation is generally used to locate objects and its edges, lines, curves, etc. images. When applied to a group of images, in medical / construction field, the results after image segmentation can be used to create 3D reconstructions with the help of many algorithms. Image segmentation algorithms depend on one of the two basic properties of image intensity va1ves: discontinuity and similarity. In the formal category, the segmentation approach is depends on partitioning he processed image based on changes in intensity, such as edges and corners. The second one depends on partitioning an image into regions that are similar because of an arrangement of predefined criteria. In this manner, there are numerous division strategies which can be extensively utilized, for example, histogram based techniques, edge-based techniques and clustering methods (K-means Gathering). There are numerous difficult issues to image segmentation like expansion of a fused approach that can be connected to a wide range of images and applications. Indeed, the choice of a proper system for a specific sort of image is a troublesome issue. Hence, there is no all inclusive acknowledged strategy for image segmentation. In this way, it remains a testing issue in image processing and computer vision field.

2. Algorithm Technique

The clustering of k-means algorithm is a method that is helps in the segmentation process. A cluster is a gathering of different objects which are comparable amongst them and are nonsimilar to the objects belonging to different clusters. Clustering is ansingly learning method which manages finding a structure in a grouping of unfabled information. The meaning of clustering could be e

way toward arranging objects into cluster whose individuals are comparable somehow, K-means clustering is an algorithm to group objects depending on specialities into k[positive whole no of groups] number of groups. The groupingis made by reducing the Euclidean distance amongst information and comparing the cluster centroid. Consequently reason for k-means cluster is grouping the information,

In an image each distance is calculated between center and data point and assigns the points in the cluster which have less distance. Every group in the division is characterized by its part and also its centre point (G). The (G) for every cluster is the point to which the whole of separations from every one of the articles in that group is diminished. So K -means clustering is an algorithm in which it limits total of separations from every object to its cluster centre point, from all other clusters.

Clustering should be possible by the accompanying advances

1. Introduce cluster k and centre.

2. Calculate the Euclidean distance d, for every pixel of a image.

3. Allocate every one of the pixels to the closest centre in view of separation d.

4. After the sum total of what pixels are allocated, once again calculate new position of the middle utilizing connection given.

5. Rehash the procedure until the point when it full fills the above advances.

6. Reshape the bunch pixels into picture. In spite of the fact that k-implies has the immense favourable position of being anything but difficult to actualize, it has a few disadvantages. The nature of the last grouping outcomes is relies upon the discretionary choice of starting focus position.

So if the underlying (G) is randomly picked, it will get distinctive outcomes for various starting focuses. So the underlying focus will be precisely picked with the goal that we get our want division. And furthermore computational intricacy is another term which we have to consider while outlining the K means cluster. It depends on the quantity of information components, number of groups and number of cycle.

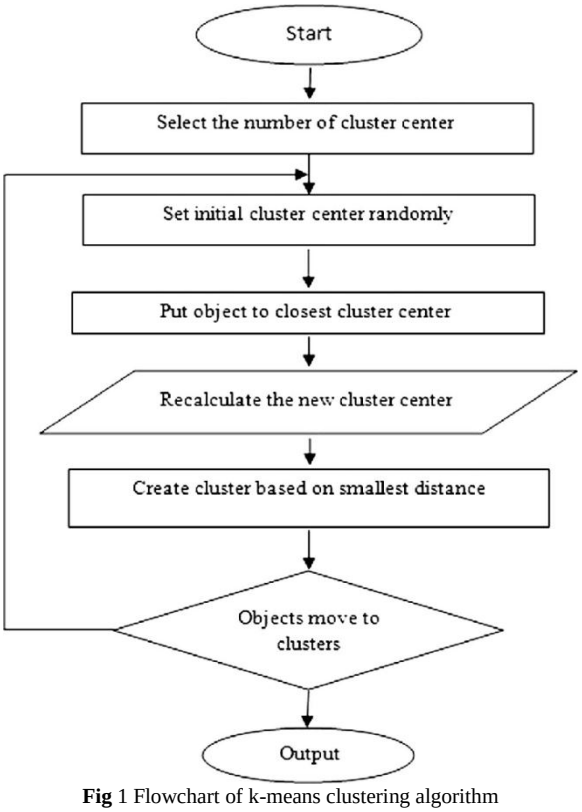

Fig 1 Flowchart of k-means clustering algorithm

3. Proposed method

Here, the proposed method is using K-mean clustering algorithm for detection of MRI scan images. The two most important tasks for detecting brain tumour are segmentation and clustering.

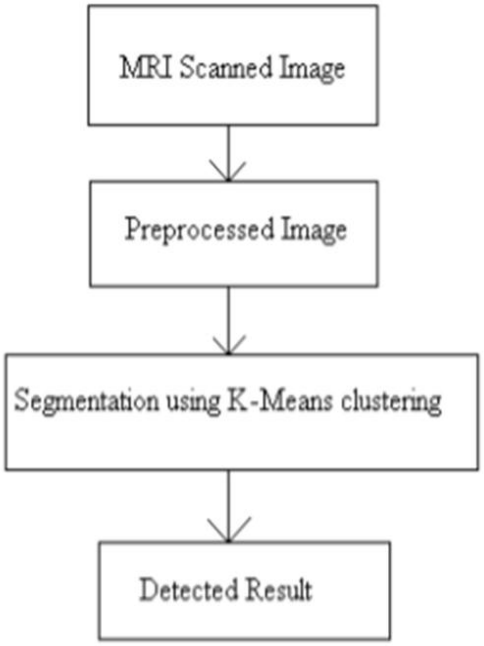

Fig 2 Flowchart of proposed method

MRI scan images are given as the input. While the processing stage will transfer the RGB input image to gray scale image .if any Noise is present it will be minimised with the help of a filter. Then the image is passed through a mask which contains gaussian filter .Then the pre processed image is sent for image Segmentation which is to be done by clustering K Means algorithm.

3.1. Image Acquisition

Image acquisition is the stage where image enhancement is done .Images which we get after MRI Scan are shown in the form of a two dimensional matrix which depends on view and also its size in which we have pixels as its elements .The pre processed images are stored and shown out as a image which is in grey scale .The grey scale image values are in the range of 0 to 266. In which 0 means total black and 266 means Total white colour.By increasing in the intensity the colours may change.

3.2. Pre processing:

During stage a picture is adjusted in how every one of its inconspicuous segments are updated and Mayhem is expelled from the photograph. Most reliably utilized change and racket structures are acknowledged with the target that we may get phenomenal outcomes. Change will accomplish more right edges and a honed picture is gotten, racket will be expelled along these picture nonattendance of definition will be lessened. Not with standing change, picture division will correspondingly be related. This enhanced and refreshed picture helps in seeing corners and updating possibility of aggregate picture. Corner exposure will help in finding the ideal place where tumour is found

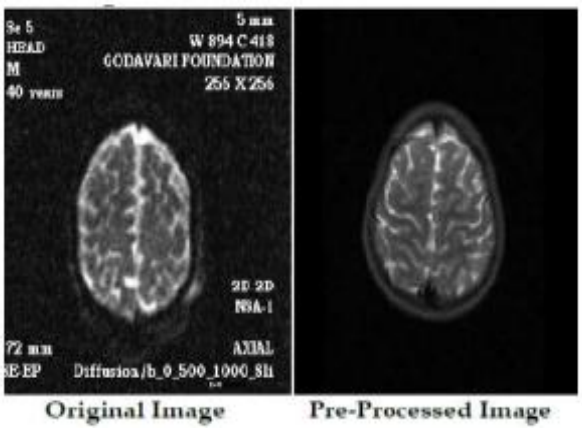

Fig. 3 Output image for pre-processing

3.3. Noise Removal

Numerous channels are utilized as a part of expulsion of clamor from the pictures. Direct channels can likewise be utilized like Gaussian, averaging channels. For instance normal channels are utilized as a part of the expulsion of salt and pepper commotion from the picture. Since in this normal channel the pixel estimation of a picture is supplanted with its nearby esteems. Middle channel is likewise utilized for the expulsion of the clamor as like normal channel and weighted normal channel is the variety of this channel and can be actualized effortlessly and give great outcomes. In the middle channel pixel esteem is controlled by the middle of the neighbouring pixels.

3.4. Image Sharpening

Picture sharpening can be performed by using unmistakable high pass channels. As now agitating impact sounds are being emptied by using assorted sorts of channels, we need to improve the clarity of the photo for sharp edges since this allows us to distinguish the point of confinement of tumour and its location. Gaussian high pass channel provides awesome high assessed outcomes and helps for the most part to improve the qualities of the photo.

K- means clustering technique for Segmentation

Segmentation is a system to remove information from various remedial pictures. The central purpose for the photo division is to isolate a photo into various parts to such a degree, to the point that each part is completely touching and pixels are homogeneous inside the region.

1. Let D be the data points in the given input image.
2. Partition the data points into k equal sets.
3. In each set, take the middle point as the initial centroid.
4. Compute the distance between each data point $di(1 \leq i \leq n)$ to all initial centroids $cj(1 \leq j \leq k)$.
5. For each data point di, find the closest centroid cj and assign di to cluster j.
6. Set $clusterId[i] = j$.
7. Set $NearestDist[i] = d(di, cj)$.
8. For each cluster $j(1 \leq j \leq k)$, recalculate the centroids.
9. For each data point di,
   (i) Compute its distance from the centroid of the present nearest cluster.
   (ii) If this distance is less than or equal to the present nearest distance, the data point stays in the same cluster. Otherwise compute the distance $d(di, cj)$ for every centroid $cj(1 \leq j \leq k)$.
10. Repeat from steps 5 to 9 until convergence is met.

Fig. 4 Proposed Algorithm

4. RESULTS

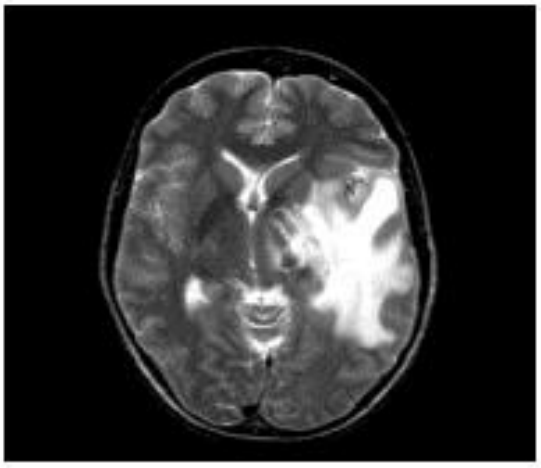

Fig. 5 Input image of brain

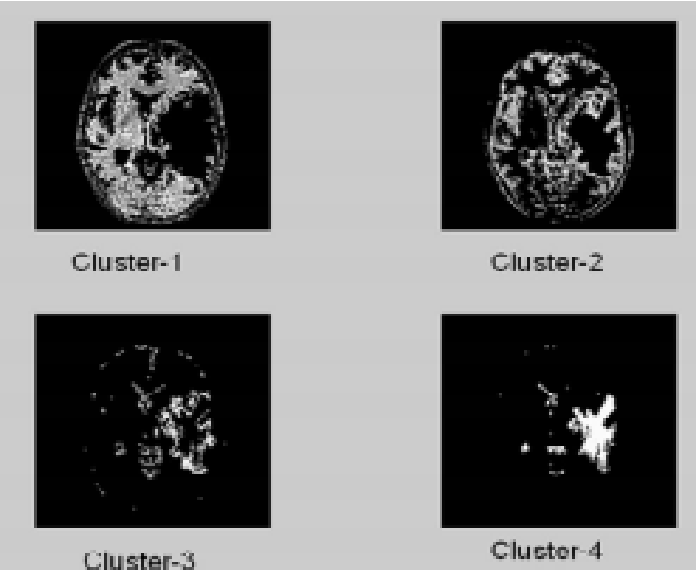

Fig. 6 Clustering

Few of the MR images having brain tumour are taken for verifying algorithm. MR images containing tumour. The tumour located area in brain can be known by applying algorithm. After the application of algorithm is completed it displays the final clustering of MR image of brain after being processed by algorithm. Final tumour will identified from image.

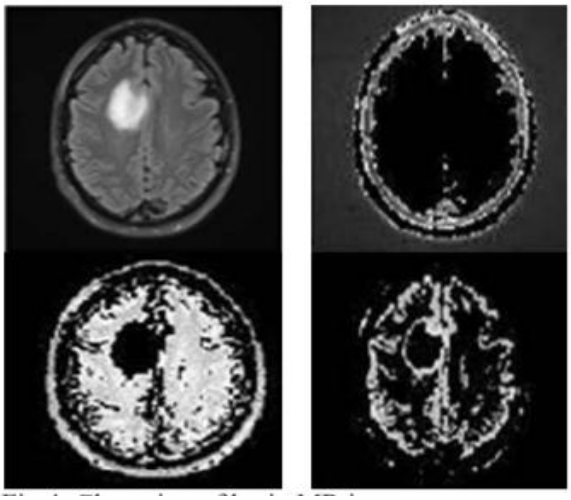

Fig. 7 Brain image clustering

Fig. 8 Tumour Detected

5. Conclusion

Image segmentation in brain is very important in viewing the reports and treating the patients in the field of medicine. The above work can be used for processing segmentation of image for tumour identification in brain area using clustering of K means algorithm. The proposed tumour detection of brain can be done using the above mentioned steps and hence tumour detection can be done.

References

[1]. A.R.Kavitha,Dr.C.Chellamuthu, Ms.KavinRupa, "An Efficient Approach for Brain Tumour Detection Based on Modified Region Growing and Network in MRIImages," IEEE, 2012.

[2]. S.Roy and S.K.Bandyopadhyay, "Detection and Quantification of Brain Tumor from MRI of Brain and its Symmetric Analysis", International Journal of Information and Communication Technology Research, vol. 2, 2012.

[3]. AjalaFunmilola A, Oke O.A, Adedeji T.O, Alade O.M, Oyo Adewusi E.A, "Fuzzy k-c-means Clustering Algorithm for Medical Image Segmentation||", Journal of Information Engineering and Applications, ISSN 2224-5782 (print) , ISSN 2225-0506 (online), Vol 2, No.6, 2012.

[4]. David Rivest-Henault, Mohamed Cheriet, "Unsupervised MRI segmentation of brain tissues using a local linear model and set,"Elsevier, 2011.

[5]. T. Logeswari, M.Karnan, "An Improved Implementati7 of Brain Tumor Detection using Segmentation Based on Hierarchical Self Organizing Map," IEEE, 2010.

[6]. Brijesh Shah, Satish Shah, Y P Kosta,"Novel Improved Fuzzy C-Mean Algorithm MR-images Segmentation,"IJSCE,2010

[7]. P.Vasuda, S.Satheesh, "Improved Fuzzy C-Means Algorithm for MR Brain Image Segmentation", in International Journal on Computer Science and Engineering(1JCSE), vol. 02, no. 05, pp. 1713-1715, 2010.

[8]. A. Sheila and T. Ried, "Interphase Cytogenetics of Sputum Cells for the Early Detection of Lung Carcinogenesis||", Journal of Cancer Prevention Research, vol. 3, no. 4, pp. 416-419, March, 2010.

[9]. El-Sayed Ahmed El-Dahshan, Tamer Hosny, Abdel-BadeehM.Salem, "Hybrid intelligent techniques for

MRI Brain Images classification," Elsevier Itd, 2009