# International Journal of Engineering Research and Science & Technology

ISSN : 2319-5991
Vol. 4, No. 1
February 2015



www.ijerst.com

Email: editorijerst@gmail.com or editor@ijerst.com

International Journal of Engineering Research and Science & Technology

*ISSN 2319-5991 www.ijerst.com*
*Vol. 4, No. 1, February 2015*
*© 2015 IJERST. All Rights Reserved*

*Research Paper*

# A RESEARCH ON BRAIN TUMOR SEGMENTATION USING K-MEANS APPROACH SIMULATION RESULTS

**Kommu Naveen[1]*, Raghu Kumar Lingammallu[2] and P Bhagya Laksmi[3]**

**Corresponding Author: **Kommu Naveen** ✉ naveenkarunya@gmail.com*

image processing is an action-bound research area in which medical image processing is a highly hard field. Medical imaging techniques are used to image the inner divisions of the man-like body for medical diagnosis Brain tumor 3 is a serious existence making a change disease condition. image segmentation plays an important undertakings in image processing as it helps in the extraction of having feeling that something is wrong fields, ranges from the medical images. In this paper we have made an offer segmentation of brain MRI image using K-means clustering Algorithm 4 moved after by morphological coming through slowly which keeps out of the misclustered fields, ranges that can as necessary be formed after segmentation of the brain MRI image for discovery of tumor place

***Keywords:*** Image segmentation, MRI, K-means clustering

## INTRODUCTION

Information is conveyed through images. image processing is a process where input image is processed to get output also as an image. main direct of all image processing techniques is to recognize the image or not in agreement under thought more comfortable by seeming .All the images used in today earth are in the digital form and size. Medical images are images that play or amusement the physical properties distribution. Medical imaging modalities as in MRI, CT scan 3 mostly be dependent on computer technology to produce or put on view digital images of the inside organs of the man-like body which helps the medical experts to view in the mind the inner 5divisions of the body.

## BRAIN TUMOR IMAGES

CT scanner, ultrasound and magnetic resonance imaging took over conventional X-ray imaging, by letting the medical experts see the body's third dimension magnetic resonance imaging protons

[1] Ph.D Scholar, Department of Electronics & Communication Engineering, Sathyabama University, Chennai, Tamil Nadu, India.
[2] Ph.D Scholar, Department of Computer Science Engineering, OPJS University, Churu, Rajasthan, India.
[3] M.Tech., Assistant Professor, Department of ECE, Princeton Institute of Engineering & Technology for Women, Hyderabad, Telangana, India.

and neutrons of the small group of an atom has a having sharp angles momentum which is certain as a turn. These turns will balancing of amounts when the number of subatomic particles in a small group is even. nuclei with odd number will have a resultant turn .This forms the base of magnetic resonance 9imaging. A magnetic resonance imaging (MRI) scanner 6 uses powerful magnets 20 to polarise and excite hydrogen nuclei in man-like tissue , which produces a signal 5that can be sensed and it is made a rule in-space, coming out in images of the body. The MRI machine gives out radio number of times (RF) blood pumped by heart that specifically makes necessary to only to hydrogen The system sends the blood pumped by heart to that special area of the body that needs to be was looking at. needing payment to the RF blood pumped by heart, protons in that area absorb the energy needed to make them turn in a different direction. This is meant by the resonance of MRI. The RF blood pumped by heart makes the protons turn at the larmour frequency, in a specific direction. This frequency isfound based on the particular tissue being imaged and the strength of the main magnetic field. MRI uses three electromagnetic fields: static field which is a very strong static magnetic field which polarizes the hydrogen nuclei; gradient field which is a weaker time-varying field used for spatial encoding; and a weak radio frequency field for manipulation of the hydrogen nuclei to produce measurable signals, which are collected through radio frequency antenna.

## LITERATURE SURVEY

The brain is the anterior most part of the chief thing nervous system. Brain tumor is an intracranial solid neoplasm . tumors are made come into existence by an abnormal and uncontrolled small room division in the brain. In this work, we have used axial view of the brain image (2D) from MRI scan because MRI scan 8 is less damaging than CT brain scan . A person getting care is subject to different diagnostic methods to work out the cause of the symptoms said-about by him. expert ways of art and so on like giving effect to a biopsy performing imaging, like taking a MRI or CT scan of the brain will be done. In biopsy , pathologists take a specimen of the brain tissue under thought for checking the existence of tumor . A pathologist looks at the tissue wireless phones under a microscope to check for existence of abnormality . Though biopsy will make clear to the existence of tumor and its pathology , when medical experts go for surgery , they must have knowledge of the tumor amount and the exact place of tumor in the brain, which can be discovered by taking MRI scan of the person getting care as MRI doesnt get rolled in the use of damaging radiations when made a comparison to CT scan . old and wise way in hospitals is to part the medical image under consideration, done with the hands and this depends on how well the physician can perceive the image under consideration to get the needed field, range got from out, which is made hard because of minute variations and likeness between the first form and acted-on biological part in the image. The not being enough of radiologists and the greatly sized amount of MRI to be got broken up (into simpler parts) make these readings work getting much out and also price high in price. It also depends on the espertise of the one expert in something of science, trade putting questions to the images . value statements also giving an idea of that between 10 and 30% of tumors 5 are missed by the

radiologists during the regularly order going-over. During the property of medical images, there are possible states that the medical image one gets might be gave lower, less important position because of problems that can come to mind during the property stage. So the uncommon, noted image may not be right for analysis . image segmentation can be formed as the division into parts or segmentation of a by numbers, electronic image into similar fields, ranges with a main try to make simpler the image under consideration into something that is more purposeful and more comfortable to get at the details of by seeming. image segmentation is the main important process in the greater number or part of medical image analysis . image segmentation methods can be put in order as thresholding , region based, oversaw and un-overseen order expert ways of art and so on. different moves near have been doed in the field of brain tumor discovery. Sindhushree. K.S, et Al have undergone growth a brain tumor 3 segmentation way and made certain segmentation on two dimensional MRI data 32. in addition, sensed tumors 5 are represented in 3-dimensional view. High way coming through slowly, histogram 33 equalization, thresholding , morphological 34 operations and segmentation using connected part making tickets giving name was doed to discover tumor . The two dimensional got from tumor images were remade into three dimensional volumetric data and the amount of the tumor was also worked out. made an offer a methodology that gets mixed together K way clustering with marker controlled watershed segmentation Algorithm and gets mixed together not clear C way clustering with marker controlled watershed segmentation Algorithm separately for medical image segmentation. The made an offer methodology is a two stage process. First K-means clustering is used to get a first segmentation of the input image, and secondly marker controlled watershed segmentation Algorithm is sent in name for to the first segmentation to get the last segmented image. Brain tumour segmentation means segregating tumour from nontumour tissues. In medical imaging, it is one of the crucial steps in surgical and treatment planning. There are various types of malignant tumours such as astrocytoma, meningioma, glioma, medulloblastoma and metastatic, which vary greatly in appearance — shape, size and location. Magnetic resonance (MR) sequences such as T1-weighted, T2-weighted and contrast-enhanced T1-weighted scans provide different information about tumours. On these images, brain tumours appear either hypointense (darker than brain tissue), or isointense (same intensity as brain tissue), or hyperintense (brighter than brain tissue).

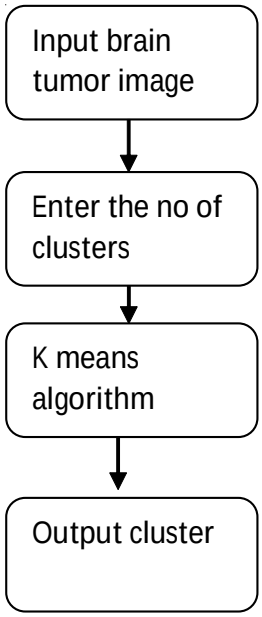
## PROPOSED METHOD

We have made an offer segmentation of the brain MRI images for discovery of tumors using clustering expert ways of art and so on. A cluster can be formed as a group of pixels where all the pixels in certain group formed by a similar relation . K mean is the unsupervised algorithms that solve clustering problem. The procedure for k mean clustering algorithm is simple and easy way to segment the image using basic knowledge of cluster value. In k mean initially randomly define k centroids. The selection of this k centroid is placed in cunning way because different location makes different clustering. So, better is to place centroid value will be as much as far away from each other. Secondly calculate distance between each pixel to selected cluster centroid. Each pixel

compares with k clusters centroids and finding distance using distance formula. If the pixel has shortest distance among all, than it is move to particular cluster. Repeat this process until all pixel compare to cluster centroids. The process continues until some convergence criteria are met m. Brain tumors may be benign or malignant.

Primary brain tumors are originated in the brain, and they do not spread or affect the surrounding tissues.

**Figure 1: Block Diagram**




Clustering is also certain as un-overseen order expert way of art and so on. The name un-overseen order because the Algorithm automatically puts in order ends based on User given examples for judging. Here K-means clustering Algorithm for segmentation of the image moved after by morphological coming through slowly is used for tumor discovery from the brain MRI images. The made an offer solid mass diagram 8 is as shown.MRI digital copy of the man-like brain forms the input images for our system where the gray scale MRI input images are given as the input. The preprocessing stage will one who chaged beliefs the RGB input image to gray scale. Noise present if any, will be removed using a median apparatus for making liquid clean. The preprocessed image is given for image segmentation using K-means clustering Algorithm As there are chances of event of misclustered fields, ranges after the application of K-means clustering Algorithm, we have made an offer morphological coming through slowly which is did after the image is segmented by K-means clustering Algorithm

## Proposed Algorithm

The algorithm that we have proposed is as follows:

1. Let p1,p2,p3…pn are N pixels in the input image, let k be the number of clusters which is given by the user.
2. Choose c1,…, cK cluster centers.
3. Distance between each pixel and each cluster centre is found.
4. Find the distance function
5. Place the pixel in nearest cluster
6. Repeat the all steps

Brain tumour segmentation is a crucial step in surgical planning and treatment planning. A significant medical informatics task is indexing patient databases according to size, location, and other characteristics of brain tumours and edemas, possibly based on magnetic resonance (MR) imagery. This requires segmenting tumours and edemas within images from different MR modalities. Automated brain tumour or edema segmentation from MR modalities remains a challenging, computationally intensive task. This paper presents a comparative study of different

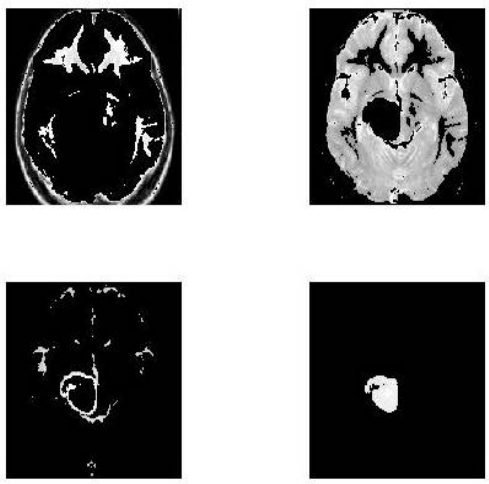
approaches for to segmenting brain tumour from MRI images After segmentation and detection of the desired region, there are chances for misclustered regions to occur after the segmentation algorithm, hence morphological filtering is performed for enhancement of the tumor detected portion. Here structuring element used is disk shaped

## SIMULATION RESULTS

The brain tumor location is found out by applying our proposed algorithm using Matlab Simulator. A GUI (Graphical User Interface) is created to make the system userfriendly.

Collect the required input brain MR image from the database which is shown in Fig . In our design we have taken the number of clusters as four. Figure 1 shows the final clustering of brain MR image after being processed by our algorithm. Fig shows the final tumor detected portion from brain MR image.

**Figure 1: Output Clusters**



## CONCLUSION

K-means algorithm is a popular clustering algorithm applied widely, but the standard algorithm which selects k objects randomly from population as initial centoids can Segmentation of brain image is imperative in surgical planning and treatment planning in the field of medicine. In this work, we have proposed a computer aided system for brain MR image segmentation for detection of tumor location using K - means clustering algorithm f We were able to segment tumor from different brain MRI images from our database.

## REFERENCES

1. Ali S M, Loay Kadom Abood and Rabab Saadoon Abdoon (2013), “Brain Tumor Extraction in MRI Images Using Clustering and Morphological Operations Techniques”, *International Journal of Geographical Information System Applications and Remote Sensing*, Vol. 4, No. 1.
2. Baraldi A, “International Computer Science Institute”, P Blonda, A Survey of Fuzzy Clustering.
3. Dzung Pham, Department of Electrical and ComputerEngineering, the Johns Hopkins University, BaltimoreMD 21218; Jerry L. Prince, Azar P, etc.. An Automated Technique for Statistical Characterizationof Brain Tissues in Magnetic Resonance Imaging, Technical Report JHUBCE 96-13.
4. Evelin Sujji G, Lakshmi Y V S, Wiselin G Jiji (2013), “MRI Brain Image Segmentation based on Thresholding”, *International Journal of Advanced Computer Research*, Vol. 3, No. 1, pp. 97-101.
5. International Computer Science Institute (1998), LBon Bottou. Neuristiqne. Yoshna Bengio, Dept. IRO, IESI-CNR. Convergence Properties of the k-means Algorithms.

6. La Jolla, Department of Computer Science and Engineering, University of California, San Diego, Alternatives to the k-means Algorithm that find Better Clustering, CA92093.

7. Pratibha Sharma, Manoj Diwakar and Sangam Choudhary, "Application of Edge Detection for Brain Tumor Detection", *International Journal of Computer Applications*, Vol.58, No.16, p. 21.

8. Pritee Gupta, Mrinalini Shringirishi and Yashpal Singh, "Implementation of Brain Tumor Segmentation in brain MR Images using K Means Clustering and Fuzzy C-Means Algorithm", *International Journal of Computers & Technology*, Vol. 5, No. 1, pp. 54-59.

9. Selvakumar J, Lakshmi A and Arivoli T (2012), "Brain Tumor Segmentation and Its Area Calculation In Brain MR Images Using K-Mean Clustering and Fuzzy C –Mean Algorithm", Int Conf on Advances In Engineering, Science and Management (ICAESM), *IEEE*.

10. Vijay J and Subhashini J (2013), "An Efficient Brain Tumor Detection Methodology Using K-Means Clustering Algorithm", in *Int Conf on Communication and Signal Processing*, *IEEE*.

11. Zhu Mmg, Data Mining, University of Science and Technology of China Press.


International Journal of Engineering Research and Science & Technology
Hyderabad, INDIA. Ph: +91-09441351700, 09059645577
E-mail: editorijlerst@gmail.com or editor@ijerst.com
Website: www.ijerst.com