VOL. 9, NO. 10, OCTOBER 2014 ISSN 1819-6608
ARPN Journal of Engineering and Applied Sciences


www.arpnjournals.com

SUPERVISED IMAGE SEGMENTATION USING LOT

B. Suresh Kumar[1] and B. L. Shivakumar[2]
[1]Department of Computer Science, CBM College, Coimbatore, Tamilnadu, India
[2]Department of Computer Applications, Sri Ramakrishna Engineering College, Coimbatore, Tamilnadu, India
E-Mail: Sureshbsk12@gmail.com

ABSTRACT

The image segmentation is used to change or simplify the image representation for the purpose of easy understanding or quicker analysis. Previously K-means classify images based on mean value of the groups formed with the help of centroids. FCM segments images based on the membership value and objective function used in it. Both of these methods work well for images with vast variations in its Pixel values but fails for pixels with slight variations. In order to overcome the disadvantages of various segmentation processes a new method of supervised segmentation is proposed using LOT (Linked Outlyingness Tree). The advantage of proposed method accuracy is more due to outlyingness Process and Process time is less.

Keywords: image, fuzzy C means, K-means clustering, robust outlyingness ratio, shilhoutte measure, supervised clustering, linked outlyingness tree.

INTRODUCTION

Image segmentation is a process of segmenting an image into groups of pixels based on some criterions. The image segmentation is used for various applications such as medical images, Satellite images, content based image retrieval, machine vision, Recognition Tasks and Video Surveillance. There are so many methods are used for segmentations such as compression based methods, thresholding, and clustering. The clustering methods can be divided into two parts namely supervised and unsupervised. Supervised clustering involves predefining the cluster size for segmenting whereas unsupervised segmentation segments by its own cluster values.

The Problem of supervised learning is that of trying to find hidden Structure in unlabeled data. The distinguishes unsupervised learning from supervised learning and reinforcement learning clustering algorithms have successfully been applied as a digital image segmentation technique in various fields and applications. However those clustering algorithms are only applicable for specific images such as medical images, microscopic images etc.

There are some segmentation methods are available such as clustering, compression - based, histogram based, Edge detection, Region - growing, Split - and - merge methods, Partial differential equation-based and graph partitioning methods.

The advantage of clustering base method

a) Clustering define relation of the pixel which can be used for many applications.
b) User can define the segmentation number
c) More flexible to extract Particular gray values.

Related works

In the traditional clustering algorithm it has limitations of getting number of cluster centers by means of its users. This makes cluster algorithm difficult to use in an non-linear data, where there is a unpredictable data sets are available. There are many algorithms to offer image clustering they are

a) K-means
b) FCM

These are the data mining techniques mostly used for image based clustering These algorithm usually take a initial centroids or cluster centers from the dataset and iterate the Process by taking nearest point / pixels of centroids clustering algorithms for remote sensing images are used to being divided into two categories. Pixel-based and object-based approaches.

Fuzzy c-means of supervised clustering techniques used on established outstanding results in automated segmenting medical images in a robust manner. Efficiency of the original K-means algorithm heavily relies on the initial centroids.

MATERIALS AND METHODS

To improve the performance, we consider the algorithm ROR executes the segmentation with the user dependency. The input image is getting for high frequency noise removal and removal of blurring effect, then the user can define the value which depends on accuracy user needed for segmentation.

ROR PROCESSING

- MED = MEDIAN(Y)
- MAD = MEDIAN($|Y - MED|$)
- MADN = $\frac{MAD}{0.6457}$
- ROR = $\left|\frac{Y - MED}{MADN}\right|$

In order to overcome the disadvantages of various segmentation Processes a new method of supervised segmentation is proposed using LOT (Linked Outlying ness Tree). In certain dataset there will need for algorithm

which can cluster the data without any initialization. This is the reason the problem has to be solved. The proposed supervised algorithm is used for clustering it will identify the number of actual groups available and we may able to use it according to our requirement.

The input image is getting for high frequency noise removal and removal of blurring effect. Then Preprocessing enters user

Can define the value which depends on accuracy user needed for segmentation. After LOT can be proposed in supervised way, the ROR executes the segmentation with the user dependency. If we check for errorless cluster or segment, yes then enter the silhouette measure, no then back to the LOT in supervised way, silhouette is checking for the method of segmented elements. If check is yes then got segmented output image. If no then back to the LOT in supervised way.

Algorithm for ROR segmentation

Step-1:

The image pixel values represented in a matrix are converted to integers, since the image will be present in uint8 (Unsigned Integer 8 bit) standard which is not convenient for further processing.
A=image pixels in uint8 standard.

A1=double (A) →Now A1 contain integer values of pixels.

Step-2:

The median for the converted value are first calculated.

MED1=Median (A1) →MED1 contains median values of A1.

For example,
A1=1,32,14,15,47,82,24,53,87,69,20;
To find median first we have to sort data in ascending order,
Sorted_A1=1,14,15,20,24,32,47,53,69,82,87;
If the total number of elements N,
N=odd, then median=middle value of sorted data=even, then median=average of middle two values.
MED1= Median (A1) =32. Since N=11.

Step-3:

This median value obtained is again subtracted from the integer value of image and again median is taken for the output.
Sub_A1=absolute value (A1-MED1);
For the above example, Sub_A1= 31,0,18,17,15,50,8,21,55,37,12;

For the obtained new data Sub_A1 again a median value is calculated.
MED2=Median (Sub_A1)
For the above example MED2=18

Step-4:

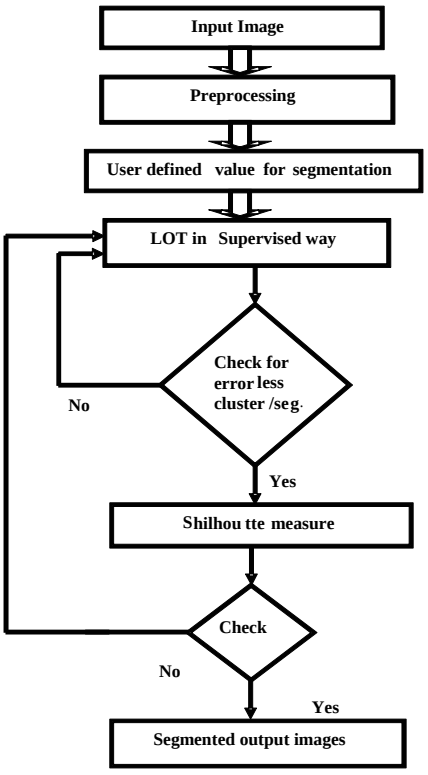
The obtained output is then divided by a value of 0.6457 which is the median of standard normal random variables.

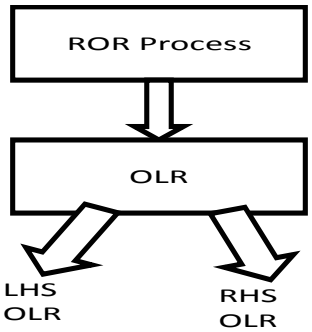
W = MED2 / 0.6457
For the above example it will be, W = 27.87
Finally a matrix of ROR values is obtained by,
ROR = (A1-MED)/W

Step-5:

The whole operation is performed for the image values in matrix form. The new output matrix obtained is called ROR value matrix and the values are known as the median absolute deviation or the ROR value.

SYSTEM OVERVIEW





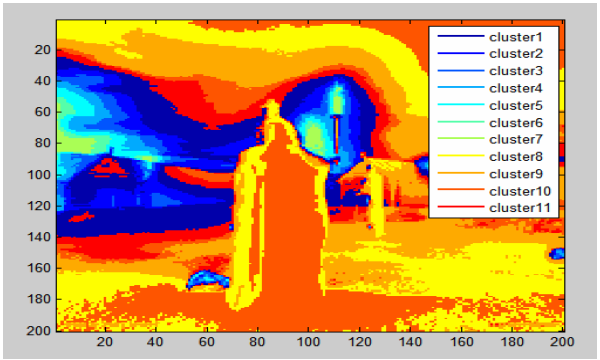
RESULTS AND DISCUSSIONS

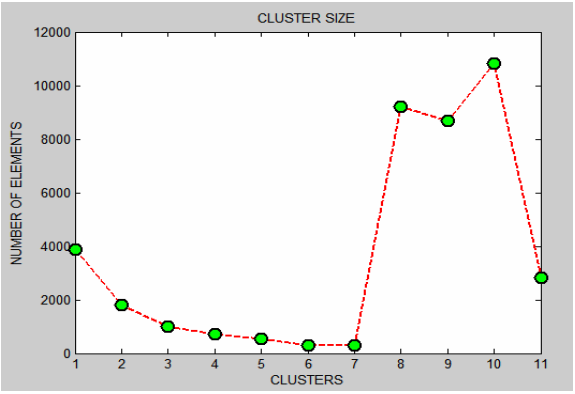
The below table shows that, the user can define the number of segments in supervised way, the proposed algorithm is achieved speed of time. The user can define the segment number according to that speed of time is achieved.

Table-1. Shows the comparison result for six images

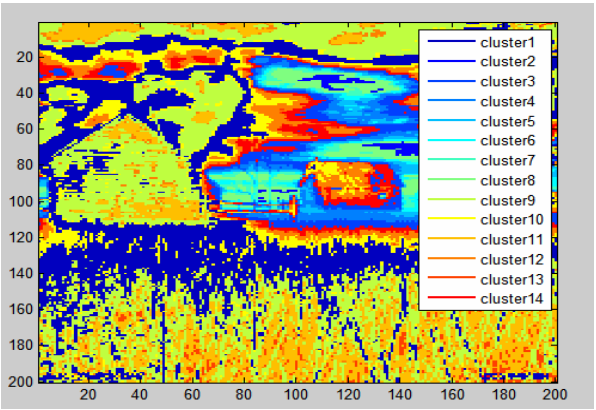
S. No.	Image name	No. of cluster	Time
1	Image 1	9	3.303
2	Image 2	11	3.043
3	Image 3	7	2.352
4	Image 4	6	2.381
5	Image 5	6	2.497
6	Image 6	8	2.294

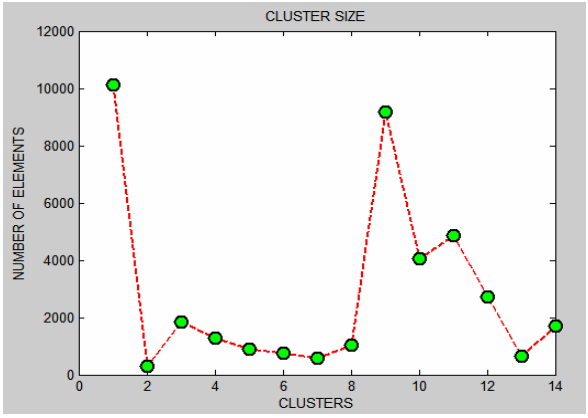
1) IMAGE 1



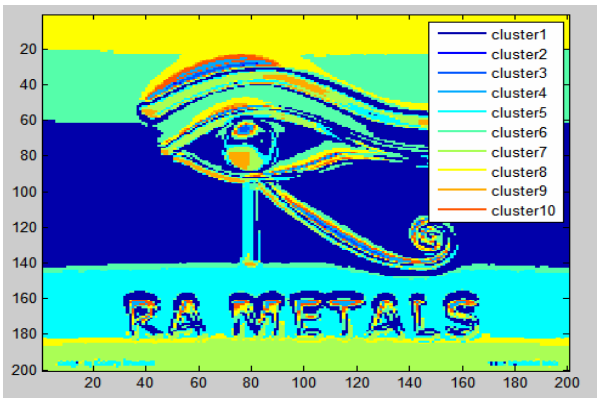


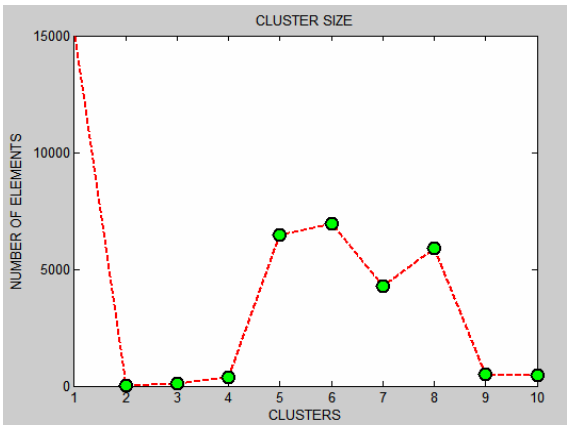
2) IMAGE 2



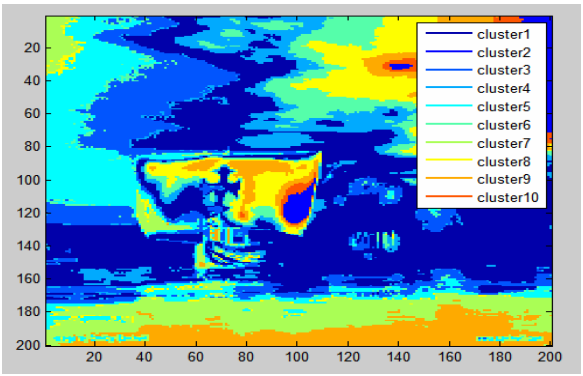


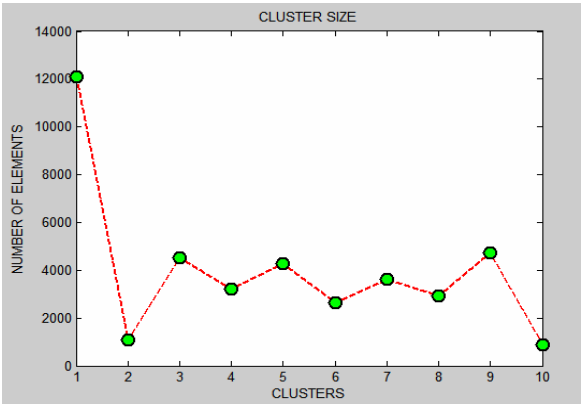
3) IMAGE 3



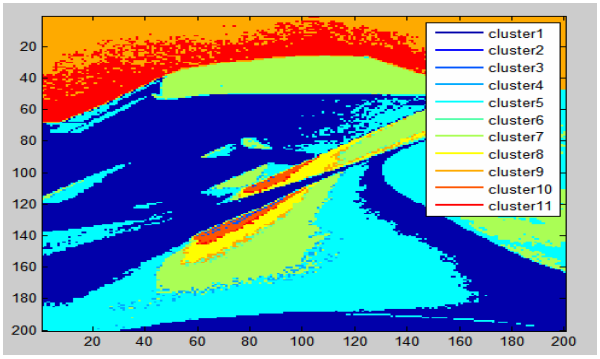


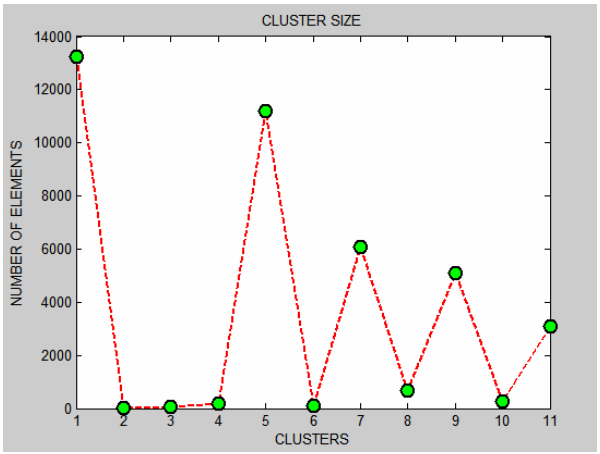
4) IMAGE 4



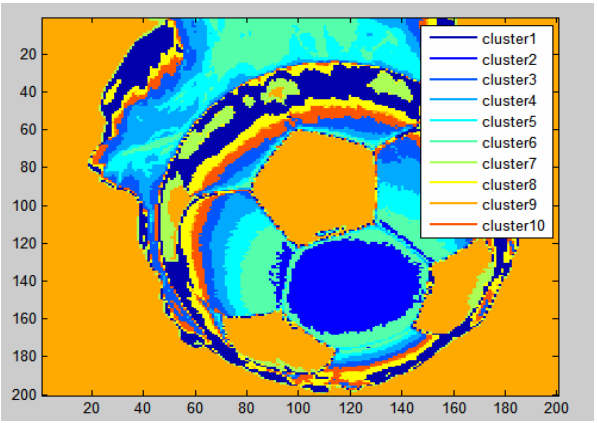


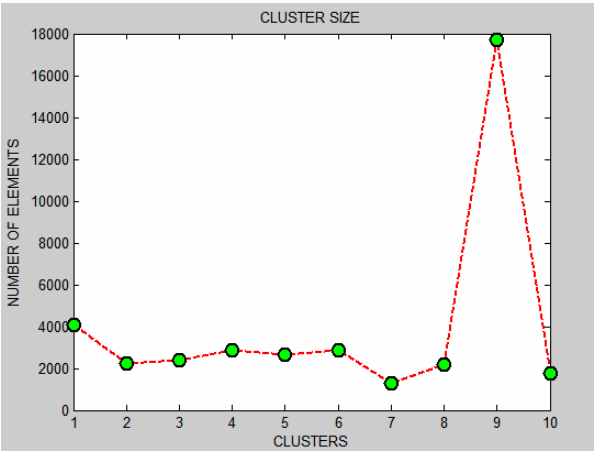
5) IMAGE 5





6) IMAGE 6





CONCLUSIONS

This paper presented a supervised image segmentation using LOT with improved cluster for supervised method. The proposed method has higher segmentation accuracy in clustering of images. The segmentation accuracy is obtained using silhouette value results of the proposed method. LOT is compared with other methods number of iteration will always being one, accuracy is more due to outlyingness process and

processing time is less. In future it will enhance the unsupervised way for ROR segmentation.

ACKNOWLEDGEMENTS

- LOT is used for due to outlyingness process.
- Clustering is used for supervised segments.
- LOT is compared with other methods; the number of iteration is always being one.
- The proposed algorithm is simple.
- As per the time consuming, time will be reduced and quicker analysis.

REFERENCES

F. Aguera, F.J. Aguilar and M.A. Aguilar. 2008. Using texture analysis to improve per-pixel classification of very high resolution images for mapping plastic greenhouse. In: the journal of ISPRS J. Photogramm. Remote sense. 63(6): 635-646.

U.C. Benz, P. Hofmann, G. willhauck, I. Lingenfelder and M. Heynen. 2004. Multiresolution, object-oriented fuzzy analysis of remote sensing data for GIS ready information. In: the journal of ISPRS J. Photogramm Remote Sense. 58(3/4): 239-258.

A.M. Fahim, A.M. Salem, F.A. Torkeyand M.A. Ramadan. 2006. An efficient enhanced K-means clustering algorithm. In: the Journal of Zhejiang University. 10(7): 1626-1633.

K.A. AbdulNasser and M.P. Sebastian. 2009. Improving the accuracy and efficiency of the K-means clustering algorithm. In: International conference on Data mining and knowledge Engineering (ICDMKE), Proceedings of the word congress on Engineering (WCE-2009), Vol.1, July 2009, London, UK and knowledge Engineering (ICDMKE), Proceedings of the word congress on Engineering (WCE-2009), Vol. 1, London, UK.

Koheri Arai and Ali Ridho Berrakhab. 2007. Hierarchical K-means: an algorithm for centroids initialization for K-means. Department of information science and Electrical Engineering Politechnique in Surabaya, Faculty of science and engineering, Saga University. 36(1).

H. Bay, V. ferraris and L. Van Gool. 2005. Wide baseline stereo matching with line segments. IEEE Conf. on Comp. Vis. and Patt. Rec. 1: 329-336.

Akansha Mehrotra, Krishna KantSingh and M.J. Nigam. 2012. A Novel Algorithm for Impulse Noise Removal and Edge Detection. International journal of computer applications (0975-8887). 38(7).