International Journal of Innovative Research in Engineering
Volume 2, Issue 6 (November-December 2021), PP: 33-37
ISSN No: 2582-8746
www.theijire.com

ANALYSIS ON IMAGE SEGMENTATION TECHNIQUES

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How to cite this paper:

Astha Srivastava[1],Ankita Singh[2],Ankita Gupta[3], "ANALYSIS ON IMAGE SEGMENTATION TECHNIQUES", IJIRE-V2I06-33-37.

Abstract: *Image Segmentation is a way of processing the Visual Information and turn them into something that is more meaningful and easier to analyse by partitioning the image into multiple segments (sets of pixcels ,also known as image objects),according to there features and properties. Image Identification is a wonderful concept , where we simplify the image for proper and easier understanding. It is simply used to label the segmented parts (objects and boundaries)based on certain characterstic's to reduce the complexity. In this report, we are going to study about a large aspect of machine vision system and its various techniques. Segmentation is a key for understanding the images.*

Keywords: *Image Segmentation , Edge – Based Techniques , Region Based Techniques ,Clustering ,Supervised- CNN Techniques.*

I. INTRODUCTION

Image Segmentation is a way of processing the Visual Information and turn them into something that is more meaningful and easier to analyse by partitioning the image into multiple segments (sets of pixcels ,also known as image objects),according to there features and properties. Segmentation is a set of segments that collectively vision the entire image view or a set of segments extracted from the image. Each of these image object also known as pixcels grouped or collected together in a region are similar with respect to some characterstics and properties , such as color ,intensity , texture ,and farther similar attributes.

Due to possibility of Image Segmentation and its understanding it could be used for farther implementation such as Image analysis ,Robotics , Medical diagnosis , information based image retrival, Machine vision , object detection , Recognition ,Surveillance etc. Segmentation is the first step in analysis.without segmentation ,performing vision implementation would be considered impossible.

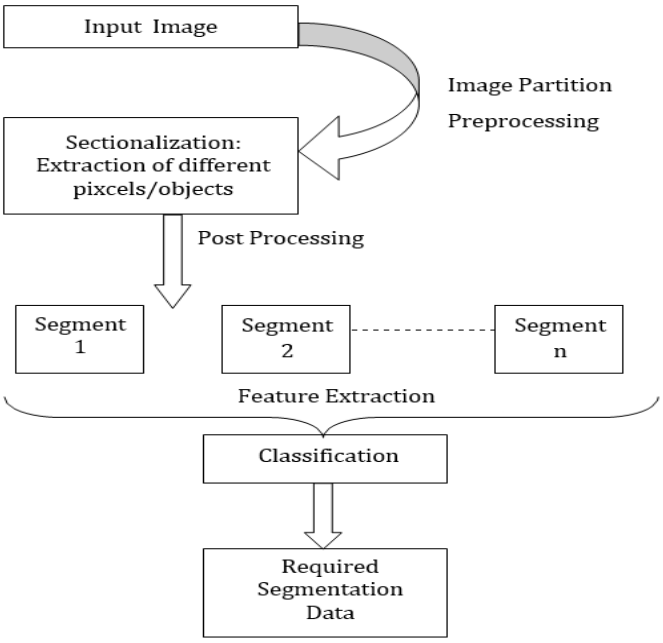


Fig 1 Process of Image Segmentation.

By segmentation technique, we divide and group pixcels assign them labels and classify further pixcels based on these pre assigned labels. It also helps in drawing lines , specific border , separating objects and editing the magnified images. In Machine learning these helps in supervised training of datas, and allows to help complex conditions and business problems.

Image Ssectionalization is very broad topic and has different ways to achieve which makes a MASSIVE impact today's era. We can classify image segmentation according to following parameters:
Approach – Based Classification.
Technique – Based Classification.

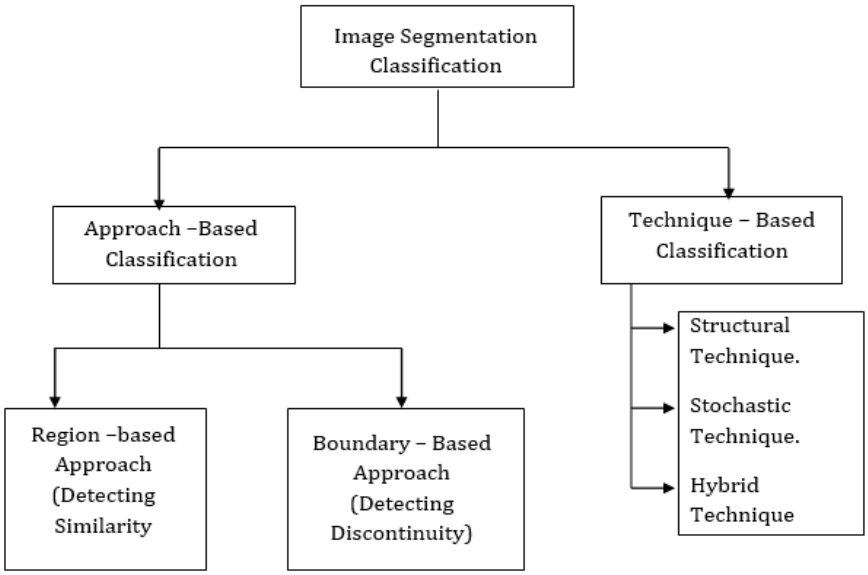


Fig 2 : Image Segmentation Classification.

In its most basic sense , image partitioning is object identification. Any technique within any algorithm cannot identify an object/pixcels without identifying an object first. From simple to complicated images segmentation is fixed on identification.So we can indirectly say that every segmentation method is established on the way its identifies the object , which means a way to collect similar regions, cluster ,and similar pixcels.which is easily achieved in Region based technique, but when no similarity could be detected the segmentation gets complex, here comes the second way of identification—based on Boundary. Unlike region based detection ,where similarity is main concept , in Boundary based we find the pixels having that are dissimilar to each other . Point Detection , Edge Detection , Line Detection and other algorithms follow this procedure, where we digout the edge of variant pixels and separate them.

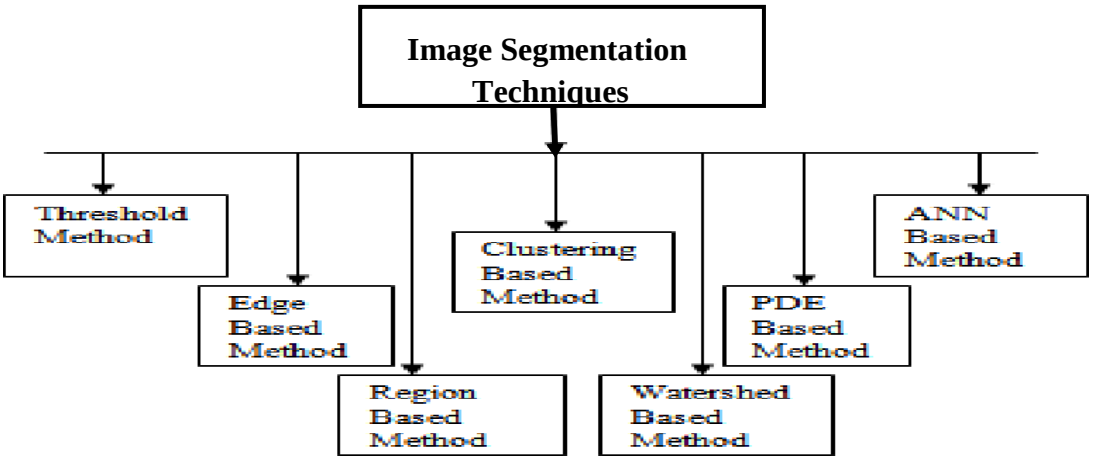


Fig 3 : Image Segmentation Approaches

II. IMAGE SEGMENTATION TECHNIQUE:

EDGE – BASED TECHNIQUE.

Edge – based technique detects edges of the images entrenched on discontinuities/dissimilarity in grey level , colour, ,texture , brightness, saturation , contrast etc. Edge s are local substitute in the portrayal intensity. Edges typically occurs between two boundary regions. Edge based detection falls under two categories –Gradient based methods, direction to link the neighborhood edges and Gray Histograms. If two edges have a similar direction vector then they can be linked.Edge can be divided in two ways: Search-Based margin Detection and Zero-Crossing Based Edge Detection.

Fig 4 : Edge – Based Detection .

Limitations:

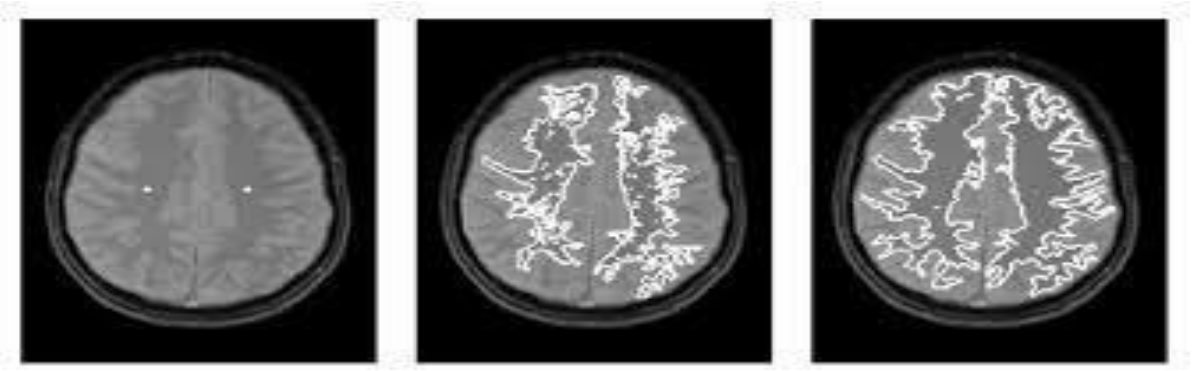
Does not work well on images with smooth transitions and low contrast.
Sensitive to noise.
Robust edge linking is not trivial and uncomplicated to perform.

III. REGION- BASED TECHNIQUE.

Region Based Detection method are grounded on similarity and continuity. These technique divides the entire representstion in parts engage upon the rules such as having similar characterstics. These components are nothing but set of pixcels. And these sets of pixcels found by locating a seed(smaller parts) or bigger chunks(large portion) of the input statue. After finding this source the region based algorithm either adds or subtract more pixcels by expanding or shrinking these regions with other sub parts with reference to there similarity.

Region Merging Technique: A region growing algorithm would select any random subpart in the image, process it by comparing it with the other sub parts/pixcels and start expanding rather increasing the region if matches are found with the sub parts. There are many regions merging methods namely as Watershed algorithm, Split and merge algorithm, etc**.** when a particular region can't grow any farther the algorithm will pick another subpart for comparision which might not corresponds with earlier parts. Since it performs simple threshold calculation, it is faster. Region-based segmentation works better when the object and background have high contrast and saturation as it defines the region sharply

Limitations:
It did not produce many precise segmentation outcomes when there are no important dissimilaritybetween dot. values of the article and the framework



.Fig 5 : Region Based Technique.

IV. CLUSTERING-BASED SEGMENTATION TECHNIQUE

Clustering – Based Technique is an unsupervised a algorithm , that helps in identifying hidden details in the image which are often neglected by normal vision. Thse hidden data includes statistics such asclusters,shading ,contrast , structures etc. A clustering algorithm divides the depiction in clusters of pixcels that have similar property. Data points in the identical group are more indistinguishable to other data points in that alike group than those in other groups. In Machine Learning , this methods helps in identifying hoe different data are realated to each other helps in creating a new segment firm on this relationship.

Popular Clustering Algorithms include fuzzy c-means(FCM), k-means clustering and improved k-means algorithms.Clustering its simple and efficient.

V. DISCUSSION

Segmentation in image is a broad topic with a heaps of sub-sections. Image Segmentation plays a vital rolein image understanding/image processing .segmentation is broadly categorized based on detection of dissimilarity or similarity of the resemblance. Utilising just a few straightforward assembling cues, one can now fabricate rather impressive segmentation on a large set of images. The segmentation may not always be very accurate, In some cases from an image, meaningful objects have been recognized based on variations of color depth beyond a threshold value. threshold values to be put by the users on the segmentation based on color, texture shape or spatial locations.

VI. CONCLUSION

In this paper we studied the area of image segmentation in various ways and its vast developed techniques. The segmentation technique of the image could be used as per the required applications or the usage as image is segmented based on its fearture s and properties. All the techniques we discussed sofor has there own adavantage's and some restriction. But by implementing them in various ways to gets quite an idea , how to overcome these limitations and where to avoid using them .One need s to have a good hold of both the traditional algorithms for image filtering and also new adavanced R-CNN …Neural Networks implementations.CNN model is used to frame the ROI and then segmented by learning segmentation method to upgrade the segmentation processes and its effects.It isbelived that in future research and advancement there will be more scope for image demarcation to further develop and more widely used.

References

[1]. Antani, S., Rodney Long, L., Thoma, G.R. 2004. Based Image Retrieval for Large Biomedical Image Archives, MEDINFO 2004, 829-33

[2]. A test bed on region-based image retrieval using multiple segmentation algorithms with MPEG-7 experiment Model T::he Schema Reference System.

[3].IRMA(Image Retrieval in Medical Applications), http://phobos.imib.rwthaachen.de/irma/index_en.php

[4].Color Texture Analysis-based Image Retrieval www2.wmin.ac.uk/oreillyp/Posters/Poster _AM.Hoang.ppt

[5]. Chun, J., Stockman, G. (2001). Subband image segmentation using VQ for content-based image retrieval, Proceedings of the ninth ACM international conference on Multimedia September 30 - October 05, 2001 Ottawa, Canada, 486-8

[6].Nikita Sharma , Mahendra Mishra ,Manish Shrivastava,"COLOR IMAGE SEGMENTATION TECHNIQUES AND ISSUES: AN APPROACH ",international.

[7]. Punam Thakare," A Study of Image Segmentation and Edge Detection Techniques" for International journal on computer science and engineering (IJCSE) vol . 3 No . 2 Feb 2011

[8] I. R. I. Haque, and J. Neubert, "Deep learning approaches to biomedical image segmentation," Informatics in Medicine Unlocked, vol.18, 100297,2020.

[9] R. E. Armya, & A. M. Abdulazeez, " Medical images segmentation: A review," Qubahan Academic Journal, vol. 1, no.2, pp.71-80, 2021.

[10] S. K. Abdulateef, M. Mahmuddin, & N. H. Harun, "Approach for colour food image segmentation," ARPN Journal of Engineering and Applied Sciences, vol.12, no. 23, pp. 6904-6910, 2017.

[11] N. M. Zaitoun, & M. J. Aqel, "Survey on image segmentation techniques". Procedia Computer Science, vol.65, pp.797-806, 2015. [14] W. Min, S. Jiang, L. Liu, Y. Rui, & R. Jain, "A survey on foodcomputing," ACM Computing Surveys (CSUR), vol. 52, no.5, pp. 1-36, 2019.

[12] I. Chen, H. Shen, & F. Wang, "Quantifying the thickness of each color material in multilayer transparent specimen based on transmission image," Textile Research Journal, vol. 90, no.21-22, pp.2522-2532, 2020. 174 | Abdulateef & Salman

[13] P. Pouladzadeh, S. Shirmohammadi, & A. Yassine, "Using graph cut segmentation for food calorie measurement," In Proceedings of MeMeA: The IEEE International Symposium on Medical Measurements and Applications, pp.1–6,2014.

[14] N. Senthilkumaran and R. Rajesh , " Edge Detection Techniques for Image Segmentation –A Survey of computing Approaches",International Journal of recent Trends in Engineering vol. 1 No 2. May 2009.

[15] Rajeshwar Dass ,Priyanka , Swapna Devi, "Image Segmentation Techniques" ,IJECT Vol.3 , Issue 1,Jan – March 2012.