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A Review on Image Segmentation

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Abstract: This paper provide a brief review of different image segmentation techniques. In areas such as computer vision and image processing, image segmentation has been and still is a relevant research area due to its wide spread usage and application. This paper offers a review of achievements, problems being encountered, and the open issues in the research area of image segmentation and usage of the techniques in different areas.

Keywords: Image segmentation, edge detection, region based detection

I. INTRODUCTION

Image segmentation is an expedient tool in many demesnes including industry. health care, astronomy, and various other fields. Segmentation in concept is a very simple idea. Just looking at an image, one can tell what regions are confined in a picture. Is it a building, a person, a cell, or just simply background? Visually it is very easy to determine what a region of interest is and what is not. Doing so with a computer algorithm on the other hand is not so easy. How do you determine what defines a region? What features distinguish one region from another? What determines how many regions you have in a given image? The main aim of image processing in imaging science, is to recover necessitated information from the given image so that it will not effects the any other features of target image. The process of image segmentation is to split an image into a number of non-overlapping regions. Which gives characteristics like gray level, color, tone, texture etc? Conspicuous techniques which are quiet being used by the researchers are edge detection, region based methods, threshold, histogram and watershed transformation. Images are divided into two types on the basis of their color, i.e. Gray scale and color images.

II. IMAGE SEGMENTATION

Image segmentation is the process of dividing of a digital image into multiple segments recognized as super pixels. The aim of segmentation is to simplify and/or change the representation of an image into something that is more significant and easier to study. [1]

Image segmentation is normally used to locate objects and boundaries (lines, curves, etc.) in the images. More accurately, image segmentation is the process of allocating a label to every pixel in an image such that pixels with the same label portion certain visual characteristics. Image segmentation is normally used key technique in image representation of the digital images.

A. Region Based

In this method pixels that are related to an object are collected for segmentation [2].The threshold technique is bound with region based segmentation. Region based segmentation is also known as "Similarity Based Segmentation" [4]. The area that is detected for segmentation should be closed.
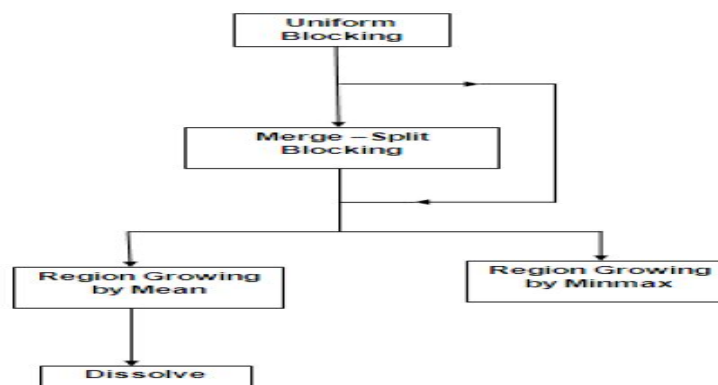

Fig 1. Region Based Algorithm [2].

B. Edge Based

Segmentation can also be done by using edge detection techniques. There are various techniques and is shown in Fig 2. In this technique the boundary is identified to segment. Now, we need to convert the ideas of detection and localization into a mathematical form that is solvable. For the signal-to-noise ratio and localization, we let the impulse response of the filter to be f(x) and the edge itself to be G(x).

$$SNR = \frac{\left| \int_{-W}^{+W} G(-x) f(x) dx \right|}{n_0 \sqrt{\int_{-W}^{+W} f^2(x) dx}}$$

C. Threshold

Threshold is the easiest way of segmentation. It is completed by that threshold values which are obtained from the histogram of t edges of the original image. Thresholding based image segmentation aims to partition an input image into pixels of two or more values through comparison of pixel values with the predefined threshold value T individually.
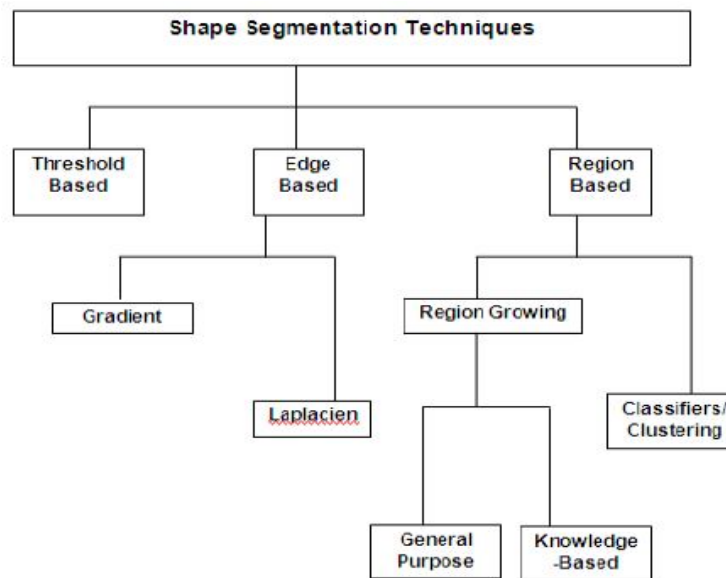

Fig 2. Various Types of Segmentation [2].

D. Feature Based Clustering

Segmentation is also done using Clustering. They followed a different procedure, where most of them apply the technique directly to the image but here the image is converted into histogram and then clustering is done on it. Pixels of the color image are clustered for segmentation using an unsubstantiated technique Fuzzy C.

E. Model Based

Markov Random Field (MRF) based segmentation is known as Model based segmentation. An inbuilt region-smoothness constraint is presented in MRF which is used for color segmentation.

III. LITERATURE REVIEW

Diagnosing diabetics with reflex zones of the tongue using color image segmentation is discussed in this paper. The tongue is a powerful organ that has capacities to deglutition, taste and speech. It is an effectively available organ for the valuation of health in patients. Any abnormal working of the Stomach, Pancreas, Liver Gall Bladder and Intestines will be reflected on the tongue. The characteristic changes happen in the tongue can be truly helpful and will provide some signs for diagnosing a percentage of the diseases [1].

A New Parallel Segmentation Algorithm for Medical Image is discussed by the authors. In medical Image analysis, the parallel segmentation is the main technology. As one of the previous classical methods and regional growth algorithms have some problems:

it is hard to confirm the feed points automatically. To resolve this defect, a new parallel segmentation algorithm with regional growth and support vector machine (SVM) is suggested. As SVMs has a good result in segmentation but a non-ideal convergence rate. Which have been the advantage of regional growth method. So by combining them and the idea of the algorithm is clearly classify by SVM to search the seed points and then segmented by regional growth method [2].

Author Comparing the Performance of L*A*B* and HSV Color Spaces with Respect to Color Image Segmentation. Color image segmentation is a very developing topic for image processing research. Since it has the ability to present the result in a way that is much more close to the human eyes recognize, so today's more researches are going on this area. Choosing a proper color space is a most important topic for color image segmentation technique [3].

Image Segmentation for Food Quality Evaluation Using Computer Vision System is studied, Quality assessment is very important factor in food processing industries using the computer vision system where human inspection systems provide high inconsistency. In many countries food processing industries aims at manufacturing defect free food materials to the consumers. Human inspection techniques suffer from high labor costs, inconsistency and variability. Thus new techniques provides various steps for detecting defects in the food material using the computer vision systems. Various steps in computer vision system are image acquisition, Preprocessing, image segmentation, feature identification and classification [4].

A New Approach towards Clustering based Color Image Segmentation, In this Color image segmentation is currently a very evolving topic for researchers in Image processing. Clustering is a frequently chosen methodology for this image segmentation job. But for a better segmentation, there rises the need of an optimal technique. In this paper, author proposed an integrated approach for color image segmentation which is a new of its kind. Here, the famous k-means algorithm is integrated with watershed algorithm. But, by choosing 'cosine' distance measure for k-means algorithm to optimize the segmented result of the later one [5].

A Survey Paper on Fuzzy Image Segmentation Techniques, in this, the image segmentation plays an important role in the day-to-day life. The new technologies are emerging in the field of Image processing, especially in the domain of segmentation. Segmentation is considered as one of the main steps in image processing. It divides a digital image into multiple regions in order to analyse them. It is also used to differentiate different objects in the image. Several image segmentation techniques have been developed by the researchers in order to make images smooth and easy to evaluate [6].

A Survey Paper on Image Segmentation with Thresholding, in this In computer vision, image segmentation is the process of partitioning a digital image into multiple sections. The aim of segmentation is to simplify and to change the representation of an image into something that is more important and easier to examine. Image segmentation is usually used to locate objects and background in images [7].

Color Image Segmentation Algorithms based on Granular Computing Clustering, in this color image segmentation algorithms are proposed based on granular computing clustering (GrCC). Firstly, the atomic hyper spherical granule is represented as the vector including the RGB value of pixel of color image and radii 0. Secondly, the union operator of two hyper spherical granules is designed to obtain the larger hyper spherical granule compared with these two hyper spherical granules [8].

Color Image Segmentation Using K-Means Clustering and Otsu's Adaptive Thresholding, In this paper, an approach for color image segmentation is presented. In this method foreground objects are distinguished clearly from the background. As the HSV color space is similar to the way human eyes see color, hence in this method, first RGB image is converted to HSV (Hue, Saturation, Value) color model and V (Value) channel is extracted, as Value corresponds directly to the concept of intensity/brightness in the color basics section. Next an Otsu's multi-thresholding is applied on V channel to get the best thresholds from the image [9].

Color Image Segmentation with Different Image Segmentation Techniques, in this paper deals with different image segmentation techniques to enhance the quality of color images. The technique follows the principle of clustering and region merging algorithm. The system is combination various stages like histogram with hill climbing techniques; auto clustering includes k means clustering, the consistency test of regions, and automatic image segmentation using dynamic region merging algorithms. The different techniques of image segmentation include thresolding, clustering, region merging, region growing, color segmentation, motion segmentation and automatic image segmentation. This paper mention different methods for efficient segmentation which is combination of different algorithms. Here the given image gets converted into histogram. The histogram is graphical representation of input image [10].

IV. CONCLUSIONS

Image segmentation based on colour is an important step to remove all background objects and insignificant information in the image. It generates a binary image containing the coloured image. This step reduces the amount of calculation needed in the

following steps as it generally reduces the number of steps. A colour segmentation algorithm should be strong enough to work in a wide spectrum of environmental conditions and be able to generate binary images even when organ colours are attenuated.

REFERENCES

[1] D. JyothiPreshiya, "Diagnosing diabetics with reflex zones of the tongue using colour image segmentation" Journal of Chemical and Pharmaceutical Research, 2015, 7(2):876-881.

[2] Sun Yongqian and Xi Liang "A New Parallel Segmentation Algorithm for Medical Image" International Journal of Signal Processing, Image Processing and Pattern Recognition Vol. 8, No. 2 (2015), pp. 139-146.

[3] Dibya Jyoti Bora, Anil Kumar Gupta, Fayaz Ahmad Khan "Comparing the Performance of L*A*B* and HSV Color Spaces with Respect to Color Image Segmentation" International Journal of Emerging Technology and Advanced Engineering (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 5, Issue 2, February 2015).

[4] Amanpreet kaur and Navjot kaur "Image Segmentation Techniques" International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 - 0056 Volume: 02 Issue: 02 | May-2015

[5] Nandhini. P, Dr. J. Jaya, "Image Segmentation for Food Quality Evaluation Using Computer Vision System", Journal of Engineering Research and Applications, Vol. 4, Issue 2(Version 5), February 2014, pp.01-03.

[6] DibyaJyoti Bora, Anil Kumar Gupta, Ph.D. "A New Approach towards Clustering based Color Image Segmentation". International Journal of Computer Applications, Volume 107 – No 12, December 2014. pp. 23-30.

[7] Bshara M. and Gustafsson F. "A Survey Paper on Fuzzy Image Segmentation Techniques. Ms. R. SaranyaPonSelvi et al Int. Journal of Engineering Research and Applications www.ijera.com ISSN : 2248-9622, Vol. 4, Issue 3(Version 1), March 2014, pp.429-434

[8] Prof. S. T. Khandare1, Mr. Akshay D. Isalkar2 "A Survey Paper on Image Segmentation with Thresholding". IJCSMC, Vol. 3, Issue. 1, January 2014, pg.441 – 446

[9] Hongbing Liu, Lei Li and Chang-a Wu. "Color Image Segmentation Algorithms based on Granular Computing Clustering". International Journal of Signal Processing, Image Processing and Pattern Recognition Vol.7, No.1 (2014), pp.155-168

[10] Vijay Jumb, MandarSohani, AvinashShrivas" Color Image Segmentation Using K-Means Clustering and Otsu's Adaptive Thresholding" International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-3, Issue-9, February 2014, 72-76.

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