

# The Study and Selection of Color Image Segmentation Techniques – Survey

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**Abstract** - Image segmentation is definite by the certain moralities of segmentation that divide the image into several specific and unique sections which is the key step in image processing, its segmentation effects directly affect people's considerate and use of the image, therefore, image segmentation is the attention in computer image studies. In which Region Based, Edge Based, Threshold, Feature Based Clustering, Model Based methods are used. These techniques shown that good segmentation presentation is achieved by the enhanced algorithm, which may not only shorten the run time and recover the quality of image segmentation efficiently, but also be applied to the real-time processing of image segmentation.

**Keywords** - Image segmentation, Region based, Clustering Technique, edge based and improves quality.

## 1. INTRODUCTION

Segmentation may also depend on various features [1] that are contained in the image. It may be either color or surface. Before denoising an image, it is segmented to recover the original image. The main motto of segmentation is to reduce the [2] material for easy analysis. Segmentation is also useful in Image Analysis and Image Compression. Image Segmentation is the process of unscrambling an image into multiple disjoint, non-overlapping regions such that pixels that belongs to the same region will be same based on some image property like grey scale value, color, texture etc. of the pixels. Image segmentation is considered to be a medium level activity in an image processing system. When an image is segmented mainly five conditions should be satisfied.

1. First, the segmentation process must be complete that means each pixel belongs to at least any one of the region [3].
2. Second, the pixels in a region must be connected i.e. each region is a connected set of pixels.
3. Third, two regions cannot intersect with each other. This condition may be violated in case of fuzzy segmentation.
4. Fourth, each region of the segmented image must gratify a predicate based on the grey scale value, texture etc.

The aim of image segmentation is to cluster pixels into salient image regions, i.e., regions corresponding to discrete surfaces, objects, or natural parts of objects. Segmentation could be used for object recognition, border estimation within

motion or stereo systems, image compression, image editing etc.



Fig.1 Original Image



Fig.2 Segmented Result

## II. TECHNIQUES OF IMAGE SEGMENTATION

### A. Region Based

In this technique pixels that are related to an object are congregated for segmentation. The thresholding system is bound with region based segmentation. The area that is detected for segmentation should be closed. Region based segmentation is also termed as "Similarity Based Segmentation". There won't [5] be any opening due to absent edge pixels in this region based segmentation. The boundaries are identified for subdivision. In each and every step at smallest one pixel is related to the region and is taken into consideration. After identifying the change in the colour and texture, the edge flow is converted into a vector. From this the edges are detected for further segmentation.

### B. Edge Based

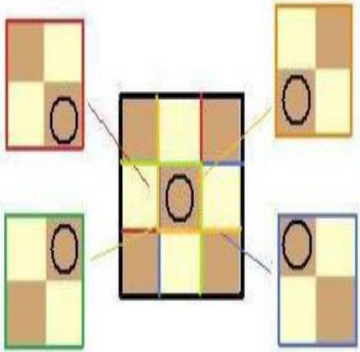
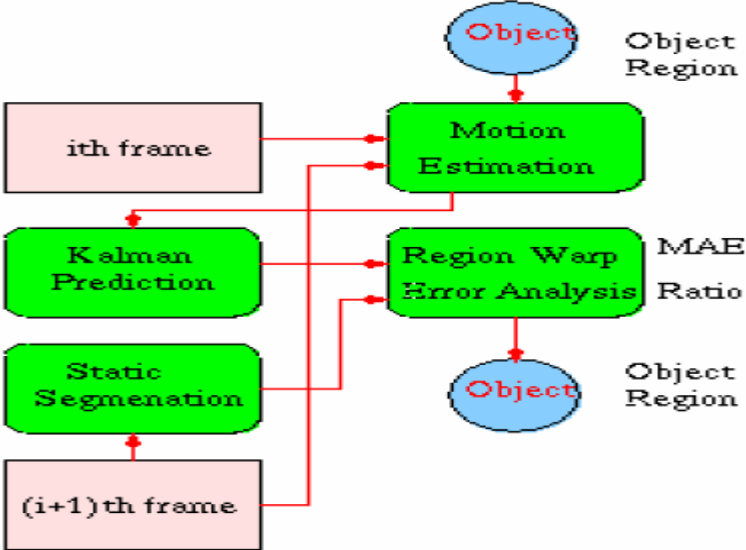
Segmentation can also be done by using edge detection techniques. There are various techniques. In this method the boundary is identified to segment. Edges are detected to identify [8] the breaks in the image. Edges on the region are traced by recognizing the pixel value and it is compared with the neighboring pixels.

C. Window based classification Method

A covering window based method is functional on each pixel to calculate moment. All possible windows have been

defined in which current pixel is positioned at different [6,7] positions of window and moment value is figured for each window illustration.

Table no: 1 Difference between window based and Tracking based Image segmentation

| Window based  | Tracking based  |
|---|---|
| 1. An overlying window based method is applied on each pixel to calculate moment. All conceivable windows have been distinct in which current pixel is placed at different positions of window and moment value is calculated for each window representation. | 1. Tracking objects in image classifications is an important task for vision-based control, human computer communication, content-based video indexing and construction from motion etc. A great variety of visual tracking algorithms have been projected, they can be classified roughly into two categories [5].   |
| 2. The window size is one of the essential parameter in this work. There is no specific scheme to estimate window size which will be suitable for different types of images and fulfill all requirements.   | 2. The first is the feature-based method. A typical instance in this category estimates the 3D pose of a target object to fit into the image features such as contours given a 3D regular model of the object.  |
| 3. The determination of seeing different window size is to analyze their effects on implementation time and various features of image. The window size will also mark the value of moment   | 3. The second is the region-based method. Associated to the feature-based methods the region-based approaches are more robust, insensitive to small partial occlusions. The region based approaches can be subdivided into two groups: <ul style="list-style-type: none"> <li>a) The view-based method and the parametric method.</li> <li>b) The view based method finds the best match of a region in an exploration area with a reference template.</li> <li>c) The parametric method accepts a parametric model of changes in the target image and figures optimal fitting of the model to pixel data in a district.</li> </ul> |
|  <p style="text-align: center;">Fig.3 Window Based Method</p>  |  <p style="text-align: center;">Fig.4 Tracking Method</p>  |

III. RELATED WORK

Yi-hua Lan et al., 2009 [1] proposed an original image segmentation method based on arbitrary walk model. First of all, they down- sample the original large image to the small image which can be resolved fast, then the small image segmentation indications to sparse linear equations of much smaller scale. After getting the solution, the likelihood results will be up-sampling to the up layer, and then resolve the sparse linear equations in this layer; repeating this up-

sampling procedure until to the top layer which is the original image. At last, segment the final likelihood image with a pre-set verge. Shaohua Zhu et al., 2011[2] In this paper, choosing chip mechanisms as research object, completing the alteration of the colour space based on the theory of Realistic and Image processing and realizing the conversion from the non-uniform RGB colour space to HSV space for human eyes comment by means of MATLAB. Pick the better H domain as segmentation object. After that eliminating noise, filter and

image enhancement by using technology of image pre-processing. **Chunming Li et al., 2011 [3]** suggests an original region-based method for image segmentation, which is able to transaction with intensity in homogeneities in the subdivision. First, based on the model of images with intensity in homogeneities, they derive a local concentration clustering property of the image intensities, and define a local grouping criterion function for the image strengths in a neighborhood of each point. This local clustering standard function is then integrated with respect to the district center to give a global criterion of image segmentation. In a level set preparation, this standard defines an energy in terms of the level set purposes that characterize a partition of the image domain and a bias field that versions for the intensity inhomogeneity of the image. Therefore, by diminishing this energy, our method is able to instantaneously segment the image and estimate the bias field, and the assessed bias field can be used for intensity inhomogeneity correction. **Hui Zhang, Quanyin Zhu et al., 2012 [4]** efforts on the research of image segmentation accuracy problematic because out dated Sobel operator image segmentation is easy to cause the imprecision of image segmentation, difference is not apparent, segmentation accuracy is low. Absorbed against these defects, this paper puts forward an enhanced Sobel operator 2-d maximum entropy digital image segmentation method. This algorithm primarily carries out image segmentation, rendering to digital image features, and then finds its real edge through the threshold of Sobel edge detection algorithm. **ChuanLong Li, Ying Li et al., 2012 [5]** propose a novel fuzzy c-means image segmentation algorithm. Its effectiveness is due to two apparatuses. The first mechanism is the replacement of the Euclidean distance conventionally used to measure similarity of the image pixels by a novel resemblance measure which is considered spatial neighborhoods using Gaussian kernel, and thus technique becomes less sensitive to the noise of the image. The second mechanism is not necessity of any similarity penalty term in FCM's objective function as some FCM's variations to reduce the inspiration of noise on the result of image segmentation; in addition, our method needs no condition of setting parameter according to the image.

#### IV. HOW TO SEGMENTATION IS POSSIBLE IN IMAGE?

Image segmentation is a procedure of separating an image into regions or extracting an object of attention. Segmentation plays an imperative role in computer vision [10], image analysis, medical image processing, and remote distinguishing and geographical information system. When segmentation is performed on the image, each object of the image, denoted by a set of gray levels, is isolated from the rest of the image.

Image segmentation is based on two basic properties of image.

a) Dissimilarity: which relates to breaks in the image which are caused by sharp changes in intensity values such as edges and

b) Similarity: that relates to joining the pixels with their neighboring [11] pixels based on the criteria of matching gray level values of pixels. The standing image segmentation techniques are, edge detection, region growing and region merging, histogram thresholding, watershed transformation based methods, gray level co-occurrence matrix based approaches, level set method based approach, clustering method and object corresponding method.

#### V. PROBLEM FORMULATION

1. Blood vessel segmentation is the basic substance while developing retinal screening systems, since vessel serve as one of the main retinal innovative features.
2. Prior works on blood vessel detection and segmentation can be mainly separated into three categories:
  - 1) Window based,
  - 2) Classifier based and
  - 3) Tracking based.

Segmentation of blood vessel in retinal images allows initial diagnosis of disease; automating this process delivers several benefits including minimizing partiality and eliminating a painstaking; deadly task.

3. Physical detection and examination of the retinal images is a time consuming and undependable task; and as the number of images increases; the study becomes very tough. However it is comparatively time consuming when the seed become quite large and need to be applied recurrently with different orientations. Tracking-based methods utilize a certain model to track the vessels.
4. The main problems are whether it is possible and, if yes, how to choose an acceptable threshold or a number of inceptions to separate one or more desired objects from their background. In many applied cases the simple thresholding is unable to segment objects of interest. Minimizing the normalized cut is NP-complete.

#### VI. OBJECTIVES

The objectives are mentioned below:

1. To study and evaluate Region based technique of image segmentation.
2. To implement the pre-processing of image this deals with the GUI having uploading image, region-based and detection of image.
3. To implement a purposed algorithm for K-mean clustering, feature extraction (SIFT) and optimization using Ant Colony Optimization Technique to reduce image segmentation.
4. To evaluate the performance parameters like sensitivity, specificity, far, fir and enhance the accuracy.

5. Developed the proposed work algorithm and comparison with existing algorithm.

## VII. CONCLUSION

In this paper, an overview of various image segmentation is presented. From the survey, it is found out that intensity and texture based methods based on level set function efficiently segment the image. The quality of the image with the presence of noise analysed and improved on texture based methods. The paper focused on conversation of color image segmentation. Associated with gray image, color image segmentation makes full use of type, capacity and other more useful information. Color image segmentation approaches have astounded the deficiency of gray image segmentation that loses color information during segmentation dispensation. Color image segmentation procedures can segment details of color information and obtain better conclusion.

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