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A Review on Image Segmentation Techniques

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Abstract: **In general for certain applications such as image compression, image aquistion, image watermarking or image recognition the entire image cannot be processed because they are all impractical and inefficient. So,to overcome this disadvantage the image segmentation is used which its efficient techniques. Segmentation is the method which subdivides the image into regular or uniform regions. Also then segmentation is divided into two forms namely non-contextual and contextual techniques. And so this survey describes the different types of image segmentation methods and prescribes its uses.**

Key words: **Wavelet Analysis, Image Recognition, Feature Extraction, Feature Matching**

I. INTRODUCTION

Image processing is classified with two dimensional function and the main goal is to provide the meaningful representation of the image to the human during the needs. Image Segmentation is one of the main steps of image processing, in which any image is being subdivided into multiple segments. Each segment will represent some kind of information to user in the form of color, intensity, or texture. Hence, it is important to isolate the boundaries of any image in the form of its segments [1]. This process of segmentation will assign a single value to each pixel of an image in order to make it easy to differentiate between different regions of any image. This differentiation between different segments of image is done on the basis of three properties of image, i.e., color, intensity, and texture of that image. When the word implies "extract " an object in an image it mean that there is an identification of the pixels that make it up. To impose this there is a creation of an array as of the original image and issue a name to each pixel a **label.** All pixels that make up the object are given the same label. The label is nothing but a number but it can be of anything a color or letter. Often label images are also referred to as classified images as they indicate the **class** to which each pixel belongs.

Therefore the selection of any image segmentation technique is done after observing the problem domain [2]. It is observed that there is not a perfect method for image segmentation, since each image has its own different type. It is also a very difficult task to find a segmentation technique for a particular type of image. Since a method applied to one image may not remain. successful to other type of images, therefore segmentation techniques has been divided into three types, i.e. segmentation techniques based on classical method, AI techniques, and hybrid techniques [3].

II. IMAGE SEGMENTATION TECHNIQUES

As numerous image segmentation techniques are in use but by researchers some of the important and widely used image segmentation techniques are shown in Fig. 2. New research work on image segmentation techniques are presented in Fig. 3 and discussed below.

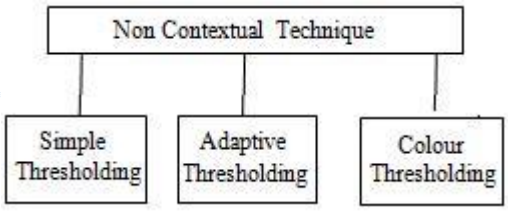

Figure 1: Non –Contexual techniques

Non Contextual Technique

Inhere the features of the image is been ignored. On the concept of some global attribute Pixels are simply grouped together. eg: grey level.

Simple Thresholding

Salem Saleh Al-amri [4] proposed that a threshold in the image is between two overlapping peaks which separates their main bodies but detects falsely with intermediate signals on the pixels. The best solution on threshold is that low downs the needed numbers of false detections will not cross with the lowest point between two overlapping peaks. The important feature like position and shape of an object on the basis of region on interest should be available in the binary image. The main advantage of using a binary image is that it decreases the complexity and simplifies the concept of recognition. By using single threshold value T the convertion of a gray level image to a binary image is possible. By that all the gray level values below this T will be classified as black (0), and those above T will be white(1). Automatically selected threshold value for each image by the system without human intervention is called an automatic threshold scheme.

Adaptive Thresholding

Normally, threshold divides the background from the object the adaptive thresholding division may consider of probability distributions of an object (e.g. dark) and bright pixels on the background of an object. This type of threshold should overcome two types of errors: assigning a background pixel to the object and assigning an object pixel to the background. Derek Bradley [5] proposed that the goal of thresholding an image is to classify pixels as either "dark" or "light". Adaptive thresholding is a form of thresholding that takes into account spatial variations in illumination. So a technique for real-time adaptive thresholding using the integral image of the input is used in advance.

Colour Thresholding

Rafika Harrabi [6] Proposed that a new color image segmentation method, based on multilevel thresholding and data fusion techniques which aim at combining different data sources associated to the same color image in order to increase the information quality and to get a more reliable and accurate segmentation result. The proposed segmentation approach is conceptually different and explores a new strategy. In fact, instead of considering only one image for each application, our technique consists in combining many realizations of the same image, together, in order to increase the information quality and to get an optimal segmented image Comparing to a greyscale image a color segmentation may be more perfect because of enough into based on the pixel level.To exclude repetition and to determine the exact object/background colour irrespectively strongly recommended Hue –Saturation-Intensity and RGB-Red Green Blue are created.

Contextual Thresholding

Comparing with non-contextual technique it make full use of the relationship between image features. So this technique will group together pixels that have same grey levels and close to each other.

Split and Merge method

The top-down split-and-merge algorithm considers initially the entire image to be a single region and then iteratively splits each region into subregions or merges adjacent regions until all regions become uniform or until the desired number of regions have been established. D. Chaudhuri [8] proposes Image segmentation can be performed by recursively splitting the whole image or by merging together a large number of minute regions until a specified condition is satisfied. The split-and-merge procedure of image segmentation takes an intermediate level in an image description as the starting cutest, and thereby achieves a compromise between merging small primitive regions and recursively splitting the whole images to reach the desired final cutest. The proposed segmentation approach is a split-andmerge technique. The conventional split-and-merge algorithm is lacking in adaptability to the image semantics because of its stiff quadtree-based structure.

Region growing

Region growing is the easy region based segmentation that helps to group the pixels and divided regions into a larger region and this method starts with the seed points. Yu xiaohan [7**]** proposed Region growing typically can result in three different types of segmentation errors: An object boundary is detected by region growing but no real edge in the image corresponds to the boundary. An edge is present in the image but region growing fails to detect the edge. The boundary detected by region growing does not coincide with a nearby edge in the image. To overcome this a new algorithm is created with combination of smoothing, edge detection and region growing by different uniformity criteria.

Pixel Connectivity

In normal Binary valued digital imaging a pixel can either have a value of 1 during the time its part with the pattern or 0 during the time its part with the background but with pixels with value 1 are black while zero valued pixels are white.

In order to identify ***objects***, we need to locate groups of black pixels that are "connected" to each other. In other words, the ***objects*** in a given digital pattern are the ***connected components*** of that pattern.

Region Similiarity

Rafael C. Gonzalez proposes [9] on region similiarity means to partition an image into regions that are similar according to a set of predefined criterion this includes image segmentation algorithms like thresholding, region growing**.**

III. CONCLUSION

In this paper, a study based representation of different segmentation techniques were discussed. Throughout this study of the segmentation techniques, we concluded out various facts: First, the image segmentation is the most important part of the image processing. Second, the segmentation technique would help to detect the segments in A quit simple way and enhanced was an image is segmented on the basis of features

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