

Techniques for Image Segmentation for the Wide Range of Regional Texture in Aerial and Natural Images

¹Selva Suman Ray

Gandhi Institute of Excellent Technocrats, Bhubaneswar, India

²Sarmistha Das

Samanta Chandra Sekhar Institute of Technology and Management, Koraput, Odisha, India

Abstract: Image processing plays a major role in evaluation of images in many concerns. Manual interpretation of the image is time consuming process and it is susceptible to human errors. Computer assisted approaches for analyzing the images have increased in latest evolution of image processing. Also it has highlighted its performance more in the field of medical sciences. Many techniques are available for the involvement in processing of images, evaluation, extraction etc. The main goal of image segmentation is cluster pixeling the regions corresponding to individual surfaces, objects, or natural parts of objects and to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze.

The proposed method is to conquer segmentation and texture extraction with Regional and Multitude and techniques involved in it. First for aerial and natural imaging we present region based segmentation. Homogeneous regions depend on image granularity features. Second a local threshold based multitude texture regional seed segmentation for Aerial and natural image segmentation is proposed. Here extraction is done with dimensions comparable to the speckle size are to be extracted. The algorithm provides a less natural metrics awareness in a minimum user interaction environment. The shape and size of the growing regions depend on look up table entries. The experimental evaluation is conducted with training samples of natural and aerial images to show the performance of multitude textural extraction for more efficient image segmentation with sharp demarcation of edge portions along with intensity levels.

Key Words: Image Segmentation, Texture Extraction, Region Growing, Natural and Aerial Images

I. INTRODUCTION

In Image processing the inputs is mainly an image photograph or video frame. The output after image processing will be either an image or set of characteristics of parameters related to the image. Image segmentation is one of the important aspects in processing of image. Its work is clustering the pixels and changes the representation into some meaningful images. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. This usually results in set of segments that collectively cover the entire image.

There are many types of image segmentation available here. Some of them are Edge detection; Region boundaries, Region Growing, Threshold etc., Region boundaries and edges are closely related. So this has been used as the base of another segmentation technique. If no edges are detected, the neighboring pixels are examined and added to a region class. This process is iterated for each boundary pixel in the region. If adjacent regions are found, a region-merging algorithm is used on weak edges are dissolved and strong edges are left in tact.

The major advantage of Region growing over conventional segmentation is the borders of regions found by region growing are perfectly thin and connected. And also the algorithm is very stable with respect to noise. The important thing is that membership in a region can be based on multiple criteria. We can take advantage of several image properties, such as low gradient or gray level intensity value, at once.

II. LITERATURE WORKS

In image segmentation we have a simple method called thresholding. The method is based on a clip-level (or a threshold value) to turn a gray-scale image into a binary image. The key of this method is to select the threshold value (or values when multiple-levels are selected).

In image processing we have a well-developed field called Edge detection. There is a sharp adjustment in intensity in region boundaries so they are closely related. Edge detection techniques have been the base of all segmentation technique. The edges identified by edge detection are often disconnected. Closed region boundaries are necessary to segment an object from an image.

Region Growing is an approach to image segmentation in which neighboring pixels are examined and added to a region class if no edges are detected. This process is iterated for each boundary pixel in the region. If

adjacent regions are found, a region-merging algorithm is used on weak edges are dissolved and strong edges are left in tact.

Region Growing offers several advantages over conventional segmentation techniques. Unlike gradient and Laplacian methods, the borders of regions found by region growing are perfectly thin (since we only add pixels to the exterior of our region) and connected. The algorithm is also very stable with respect to noise. Our region will never contain too much of the background, so long as the parameters are defined correctly. Other techniques that produce connected edges, like boundary tracking, are very unstable. Most importantly, membership in a region can be based on multiple criteria. We can take advantage of several image properties, such as low gradient or gray level intensity value, at once. Hybrid method uses both boundary based and region growing method.

III. Region Based Texture Extraction Method

Segmentation is usually a process of partitioning a digital image into multiple segments the major objective of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. . Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. In short we can say, image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain visual characteristics.

As said earlier Region Growing offers several advantages over conventional segmentation techniques. Here the borders of regions are perfectly thin and connected. The algorithm is very stable with respect to noise. Until the parameters are defined correctly the region never contains too much of background. Most importantly, membership in a region can be based on multiple criteria. The image properties such as low gradient or gray level intensity value are also taken into account.

The imaging is non-ionizing, fast, portable, inexpensive and capable of real time imaging. The images typically contain significant speckle and other artifacts which complicate image interpretation and automatic processing. The speckle formation is one in which the images of relatively poor quality and analysis in general is described. The speckles mask the low contrast lesion and reduce the ability of radiologist to resolve the actual information. It is difficult to segment the ultrasound image to detect objects with the correct position and shape because of speckle formation. In addition, boundary edges are usually incomplete, missing or weak at some places. For the aerial and natural image segmentation, mostly the methods are focused on five main approaches, namely, threshold technique, boundary-based method, region based methods, hybrid techniques which combine boundary and region criteria and active contour based approach.

Threshold is a technique where decision is based on local pixel information. This is an effective method when the intensity levels of the objects fall squarely outside the range of levels in the background. In Edge – based methods the weakness in connecting together broken contour lines make them, too, prone to failure in the presence of blurring. In active contour model, the main idea is to start with some initial boundary shape represented in the form of spline curves and iteratively modifies it by applying various shrink/expansion operations according to some energy function.

The Region – based texture extraction method usually done by partitioning the image into connected regions by grouping neighboring pixels of similar intensity levels. Then adjacent regions are merged. Over stringent criteria create fragmentation; lenient ones overlook blurred boundaries and over merge. Hybrid techniques using a mix of the methods above are also popular.

In our paper, a local threshold based multitude texture regional seed segmentation for medical image segmentation is proposed. Here, for local statistics, lookup table is prepared to use in initial region. Then pixels are grouped that satisfy a specify homogeneity criteria. Finally it produces a homogeneous region, and merging the neighboring regions, which have similar intensity values.

Algorithm implementation is done by using seeded region growing procedure where each pixel is taken as seed point. The shape and size of the growing regions depend on look up table entries. The region merging is done after the region growing. This suppresses the high frequency artifacts. The merged regions output will be in the form of segmented image with higher efficiency than watershed method. The less noise sensitive pixel is produced in SRG algorithm. It also allows a segmentation of the accurate homogeneous regions compared with morphological filter segmentation.

IV. MULTITUDE REGIONAL IMAGE SEGMENTATION

The next proposal is applying texture feature-based multitude regional image segmentation on aerial and natural image. Less metrics awareness in a minimum user interaction environment is provided in the proposed system. This helps in batch work and to the novice computer users. The usage of 2D semi-automatic

SRG with texture feature is deployed in aerial and natural image segmentation. Feasible texture feature in aerial and natural image segmentation are found after comparing with morphological filter and watershed methods

For aerial and natural image local threshold selection based segmentation procedure has been developed. Look up table controls the preserved aerial and natural images that consist of homogeneity and statistical values of each pixel. 11 x 11 window size is used for computation of local statistics. This choice is based on the small homogeneous regions, which are produced by the granularity. The window size must be large enough for the measurement of homogeneity region criteria and statistical similarity bound. The parameter selection of the similarity bound depends on the granularity or speckle into the images. The initial growing region shows the large number of false homogeneous region into the image, which was joined with their neighboring region by merging. The parameters for merging criteria depend on the high frequency artifacts such as over segmentation. This algorithm can be used for fully developed speckle images with efficient segmentation. The merged regions reduce over segmentation without using further smoothing into the image. The final segmentation results exhibit accurate homogeneous regions without implementing texture-based analysis.

V. CONCLUSION

In threshold technique, because spatial information is ignored, however, blurred region boundaries can create havoc. In Edge-based methods there is a weakness in connecting together broken contour lines make them, too, prone to failure in the presence of blurring. The region merging which is done after the region growing suppresses the high frequency artifacts. The region that is merged output will be in the form of segmented image with higher efficiency than watershed method. In region based methods. Over stringent criteria of proposed multitude texture extraction model for image segmentation create fragmentation, overlook blurred boundaries and over merge.

Aerial and natural imaging, the resulting contours after image segmentation can be used to create 3D reconstructions with the help of interpolation algorithms. The algorithm developed for fully speckle images with efficient segmentation to show sharp and fine edges of the segmented portion of the images. The merged regions reduce over segmentation without using further smoothing into the image.

VI. REFERENCES

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