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Research paper

Impact of Threshold in Gray Level Slicing and Seeded Region Growing Segmentation

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Abstract

Traffic surveillance is the most important area of research which involves the safety issues in driving. Video Sequences are taken and it is converted as image sequences. By calculating the centroid of the image the image sequences are analyzed. The centroid value has been chosen as seed point in the image. From the seed point the region is expanded using the seeded region growing algorithm. Similarities of the pixels are considered within neighborhood pixels and based on the threshold value the segmentation have been done to identify the object. Gray level slicing method is used to identify the vehicles in the images. When it is compare, the seeded growing method the efficiency of the segmentation in image sequences is improved.

Keywords: *Segmentation, Gray Level Slicing, Seeded Region Growing, Threshold, Region of interest, Centroid , Vehicle detection, Tracking, Motion Analysis*

1. Introduction

Usually the objects are different from the background objects in the video image sequences. To detect the object in the video sequence, the background subtraction can be used. The method identified is robust against the changes in illumination. Then it should not waste time by detecting the non-moved objects in the video sequences. The non-moved objects like rain, snow, shadow are to be ignored while detecting the images. Video analysis can be made through the detection of moving objects, tracking of such objects from frame to frame, and analysis of object tracks to recognize their behavior. The segmentation techniques for the image is classified as region based or edge based.

2. Problem Definition

Digicam used to shoot the video. Video database converted as a image sequences as frames using the OSS decompiler. The video has been considered for all day and night as well as cloudy time, evening . All the information is processed using MATLAB R2011a.
The proposed system uses the seeded region growing method for the segmentation. It can be implemented with two steps. First, we have to analyze the region of interest. We have to calculate the centroid for the image. This centroid value is used to fix the seed. Then the region starts from the place already decided as seed starting point. Expanding the region is entirely based on the neighbor pixels and threshold values.

The neighboring pixels have to be considered in all directions that includes left, right, up, down with top and bottom . Compare the intensity value of neighboring pixels with the threshold. If the value is less than the threshold value the identified region starts to expand. Examine the pixels visited and non-visited. Ignore the visited pixels. It reduces the computations. An identified region in the first stage can be given to the second step. Expanded region can be stopped by analyzing the frequent changes in the intensity value of the neighbors. If it is frequently changed the expanded region will stop at that point. From the seed point to till the stop is identified as the segmented area.

3. Seeded Region Growing

It is a method to segment an image with free running parameters. The selection of seed point requires knowledge of the user. It is easy to implement. Since it is a region growing method it can be used for the larger databases. The similarity of the pixel is alone considered. User can easily control the region growing by the careful selection of seed points.

3.1 Region Growing Process

In this method, the input is the video image sequences. This image has been mapped with the pixels. Pixels are interconnected are identified as regions with some similarities. Identify the seed point in the image and fix that point for region growing. This point isfixed by the user. The neighborhood pixel can be selected based on the distance from the seed point or the usual properties of the neighbor pixels. For single pixels there will be 4 or 8 neighbors. These 4 or 8 pixels

are used to check the region properties of similarity. Now the growing extended additionally by using the other neighbors of 4 or 8 pixels. This process should be repeated for all pixels in the image. The result is as a set of connected pixels determined to be located within the region of interest.

Advantages:

1. Suitable user defined region identification
2. Good segmentation result
3. Easy and simple
4. User can define the seed point
5. Useful in noisy images.

3.2 Steps for Seeded Region Growing

The following steps have been implemented for seeded region growing method in segmentation.

1. Select an input image
2. Convert the image to grayscale using the rgb2gray function inmatlab
3. Create the mask for segmentation
4. Give the subplot coordinates which acts as a seedpoint
5. Create a frontier list
6. Compare the frontier list with the neighborhood pixels
7. If it's less than the threshold the seed grows with the neighborhood pixels
8. Select the next pixel to examine

4. Gray Level Slicing

Thresholding is a clipping used for segmentation and output is a binary image. The thresholding is used to convert the image as a binary one. Intensity level slicing method is used with the background and also without background. It is used to segment the gray level in the images from the video sequences.

5. Results and Discussion

In the sample image, the threshold value is set to 0.02. As a result one particular point is selected as the seed point in the image. As a continuation of this threshold value is set to 0.04 and 0.06. The output images are shown here. With the minimum threshold value only one object alone identified as an extension of the seed point. For the value 0.04 the object has been extended the region little more. For the value 0.06, most of the objects are identified with the same seed point selection. Implementation of this method has been done using Matlab R2012b.

a) Input Image b) Selecting the Seed point

c) Segmentation using Seeded Region Growing with Different Threshold Values

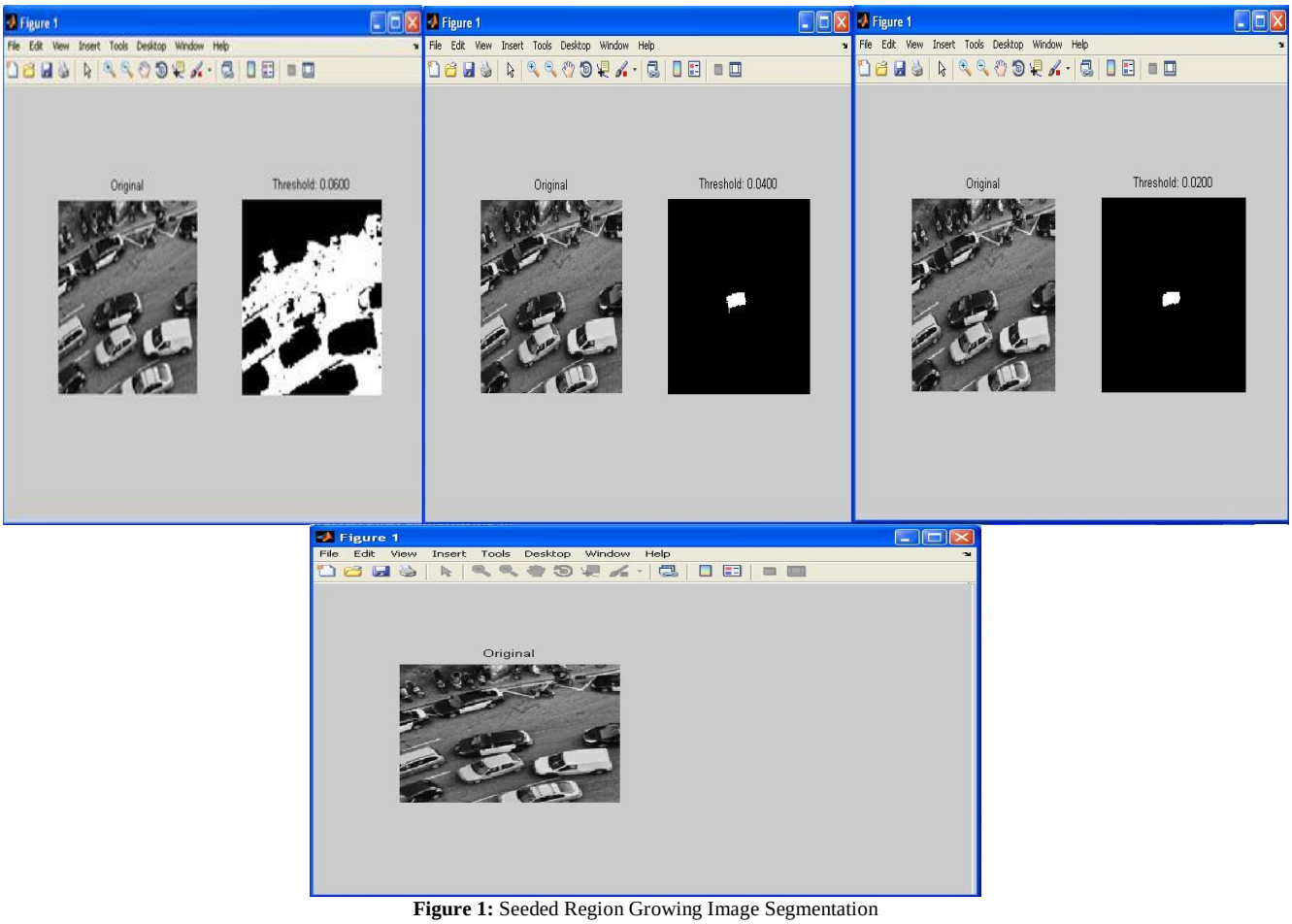

Figure 1: Seeded Region Growing Image Segmentation

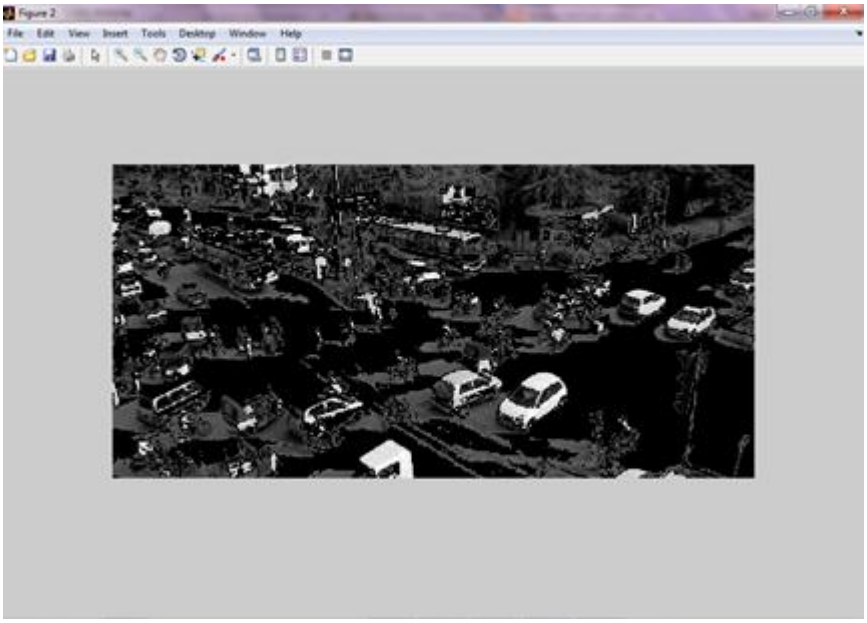

Figure 2: Gray Level Slicing

6. Conclusion

This method is useful is segmentation. Only the Seed points are selected based on the necessary region. If the neighbor pixels are noiseless, then the grey values it typical to the region. If the noisy region is identified one seed is there for the single pixel. If the user selected the wrong seed point, then the result may be degraded. To avoid this minimum region can be used to select the seed, especially in the noisy images. The threshold value in seeded region growing provides better picture information compred with gray level slicing

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