Image Segmentation Based on Background Recognition And Edge Detection

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Abstract- *In this paper, our exploration object is to propose image segmentation procedure based on background recognition and edge detection. Here we detecting the object confines solely based on some general possessions of the real world objects. The main aim of this paper is for foreground objects which are known as structured objects having many parts ,we developed a edge detection model that recognize the relation between the different objects ,then finally collect them together without depending on object-detailed information.*

Keywords- Image segmentation, structured objects, unstructured objects, Edge detection.

I. INTRODUCTION

Image processing is a method which is used convert an image into digital form and implements some processes on it, in order to get an enriched image or to extract some suitable information from it. Here we are using image as two types one is unstructured objects (e.g., sky, road, trees, grass, etc.) and second is structured objects (e.g., cars, buildings, people, etc.). Usually the unstructured objects are background objects and structured objects are foreground objects. Foreground objects are having multiple parts based on color, textures, etc [1][2][3].

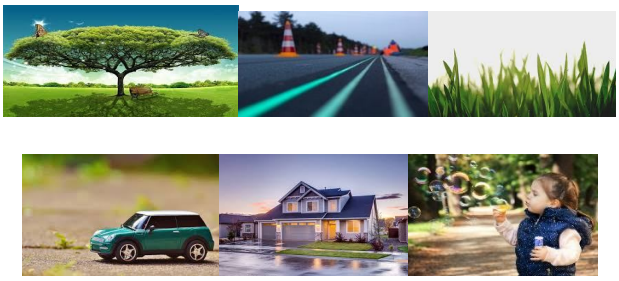


Fig1: Classification of natural arena images a) Unstructured objects b) Structured objects Algorithms used in image processing are grey-level segmentation or Thresholding Methods, Edge detection Techniques.

Image segmentation is an essential stage in image analysis. Segmentation splits an image into different parts or objects. Segmentation algorithms for images generally based on the discontinuity and similarity of image intensity values. This result is a set of regions that cover the entire image together and set of contours extracted from the image.

There are different image segmentation techniques.

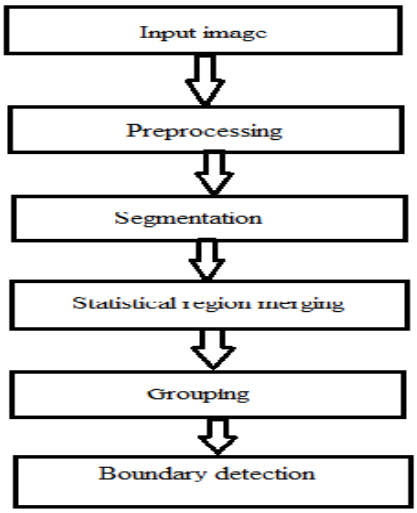
- Pixel based segmentation
- Feature based approaches
- Detecting Boundary information based
- Semantic image segmentation
- Image segmentation based on edge detection

The main aim of outdoor segmentation from the foreground objects that are often composed of multiple parts, each part having different features (e.g., colors, textures, etc.). Without knowing about an object it is difficult to group together. Few studies [4][1][2].To overcome this disadvantage this paper developed edge detection so we can make the relation between the structured images and group them together. Then we can easily detect the silent objects under different outdoor environments.

II. RELATED WORK

Identification of background and edge detection in natural scenes can be done following steps.

FLOW CHART:



- Input image is converted into grey scale image.
- Then segmenting the image by using bottom up segmentation technique.
- Now convert the segmented image into binary image based on threshold value.
- Later we recognized the background of an image based on colour, texture, etc.
- Finally we detected the boundaries of given image

STEP1: Input image is converted into grey scale image

In this step the original image is converted into the grey scale image by using uniform CIE lab colour space.

Fig2:(1)original image (2):grey scale image

We convert input image into grey scale image because we can avoid the luminance and hue RGB image has different colours for different pixels by pre-processing of each pixel loss the so much of memory and data. So in order to represent in single channel we convert the given original image into grayscale image.

STEP2: Segmentation of an image

The term image segmentation refers to the separation of an image into its components. Regions of image segmentation should be uniform and homogeneous with respect to some characteristic, such as grey level, color or texture. Segmenting the image based on different structural elements like disk, square, rectangle, octagon etc,. Boundaries of each segment should be smooth, not ragged, and should be spatially accurate; this is an identification of regions in the image.

The goal in many tasks is further regions to represent meaningful areas of the image, such as crops, urban areas, and Forests of satellite image. In order analysis tasks, the regions must be set of border pixels grouped into such structures as line segments and circular arc segments in images of 3D industrial objects regions may also be defined as groups of pixels having both a border and a particular shape such as a circle or ellipse or polygon. When the interesting regions do not cover the whole image, we can still talk about the segmentation, into foreground regions of interest and background regions to be ignored.

Fig3 :(1) Original image (2) Segmented image

Image segmentation has two aspirations:

The primary aspiration is to deteriorate the original image into segments for future evaluation. In simple cases, the environment should be well sufficient controlled so that the segmentation process calculable extracts only the parts that need to be analyzed future for example: color, the human face from color video image is segmented by an algorithm in which division is calculable, since the human face possesses identical components when differentiated with person's clothing and backgrounds. In complex cases, such as extracting a complete road network from a grey scale aerial image, the segmentation problem can be very difficult and might required application of a great deal of domain building knowledge.

The second objective of segmentation is to perform a change of representation. The pixels of image might be organised into higher-level units that are either more meaningful or more efficient for future analysis. A critical issue is whether or not segmentation can be performed for many different domains using general bottom up methods that do not use any special domain knowledge. In this segmentation methods that have potential use in many different domains both region-based and curve-basic units. The prospects of having a single segmentation system work well for all problems appear to be dim.

STEP3: Processing of binary image based on threshold value

Binary image analysis:

Segmentation produces homogeneous regions each region has uniform grey-level and each region is a binary image (Background, object or the reverse) more intensity values for overlapping regions. Binary images are easier to process and analyse than grey level images.

Fig3 :(1) original image (2): Binary image

Binary image analysis tasks are noise suppression, run-length encoding, component labeling, contour extraction, Medial axis computation, Thinning, Filtering(Morphological

operations), feature extraction (size,orientation) etc., Image analysis operations produces binary images, as usually images of 0'S &1'S. Binary images in background used in no. Of applications and separates objects from background and one another. Aggregate pixels for each object, Compute features for each object, these operations are performed by binary image analysis. The binary image analysis uses threshold value which depends on the original image intensity (i.e., threshold value = 0.5). Closing and openings are useful in binary images with tiny holes in the connect components that should be separate.

STEP4: Background Recognition

Objects located in natural scenes can be roughly divided into two categories, namely, structured and unstructured objects. Unstructured objects have same surface, whereas structured objects have many parts, with many parts having different characteristics (e.g., color, texture, etc.). The common backgrounds in outdoor natural scenes are those unstructured objects such as skies, roads, trees, and grasses. These backgrounds objects have low visual variability and, in most cases, are separated from other structured objects in an image.

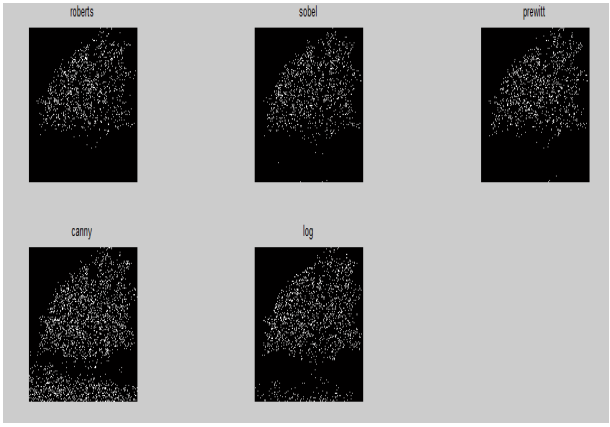
Fig5:(1)Original image(2)Background detected image

In the above figure the background of an image was detected based on colour from image we can know that the sky is white which is at background and tree and grass are in green colour so based on the colour we can easily identify the unstructured and structured objects .But in the background identification we cannot detect all the objects like structured objects in order to overcome this disadvantage we go for edge detection.

STEP5: Edge Detection

The fundamental tool for image segmentation is egde detection. which transform original images into edge images benefits.This method mainly used for detecting the boundaries of an object nd eachj and every edge of an object. It is the most familiar approach for detecting significant discontinuities in intensity values. It is a fundamental process detects and outlines of an object and boundaries among objects and the background in the image.

There are different types of edge detections based on the intensity values.



Robert method:

This method determines the edges using Robert approximation to the derivative.
BW = edge (I, 'roberts') this function is used for specifies the Robert method
BW = edge (I,'roberts', threshold) specifies the particular threshold value.
[BW, thresh] = edge (I, 'roberts',) returns the threshold value.

Sobel method:

This method determines the edges using Sobel approximation to the derivative.
BW = edge (I,'sobel') this function used for specifies the Sobel method.
[BW, thresh] = edge (I,'sobel',) returns the threshold value.

Prewitt method:
This method determines the edges using Prewitt approximation to the derivative.
BW = edge (I,'prewitt') specifies the Prewitt method.

Laplacian of Gaussian method:

The Laplacian of Gaussian method finds edges by looking for zero crossings after filtering I with a Laplacian of Gaussian filter.

Canny method:

The Canny method determines the edges by looking for local maxima of the gradient of I. The gradient is evaluated using the derivative of a Gaussian filter. This method uses two thresholds, to detect strong and weak edges, and includes the weak edges in the output only if they are connected to strong

edges.BW = edge (I,'canny') specifies the Canny method.BW = edge (I,'canny', threshold)

III. RESULTS

Fig2:(1)Original image
(2):Grey scale image (3)Segmented image

(4): Binary image (5)Background detected image

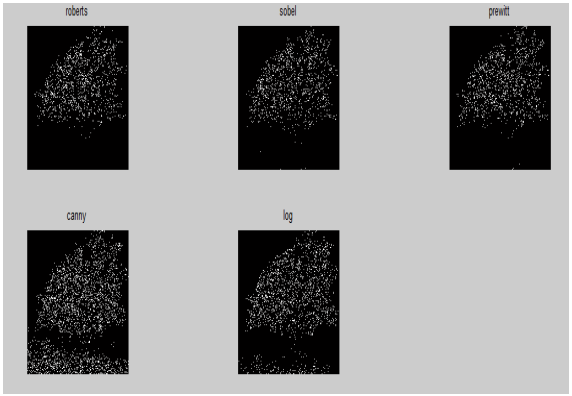


Fig: (6) Edge detection methods

IV. CONCLUSION

We presented paper on image segmentation based on background identification and edge detection. Our main contribution is that we develop a edge detection and we achieved good segmentation on images. The segmentation and image recognition should be treated as intersperse procedures. This method basically follows identifying background objects as a starting point after identifying the background objects we have to know where the structured objects are identified by using edge detection methods in all edge detection method canny is the better for recognize boundaries of an object based on the peak signal to noise ratio value in the précised region of an image. For multitude objects having polygon shapes, such as paramount objects appearing in the street (e.g., buildings, vehicles, signs, people, etc.). We developed the background detection by using canny edge detection which can able to detect the each and every object in the foreground based on their intensity values. In this method without necessitate identification of individual object parts main portion of the objects are identified. This paper shows that, for numerous impartial articulated objects, recognition may not be a requirement for segmentation. The geometric relationship of the constituent parts of the objects provides useful cues indicating the memberships of these parts.

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