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EDGE DETECTION COLOR MODEL FOR IMAGE SEGMENTATION

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Abstract

Interpreting the contents of the image is one of the objectives of seeing the computer specifically in the process of the image. In this era, many researchers have received. In the interpretation of the image, the image is divided into an object and the background is a step of the server. The segment separates the image into regions or objects that are configured. Divide the image you need to divide the background object to read the image correctly and carefully select the content of the image. In this context, an edge detection is an essential tool for the classification of images. This study tries to study the performance of the most common edge detection techniques for the division of images. These techniques are compared to an experiment that uses the MATLAB tool.

Introduction

The division of images is an essential step in the analysis of images. Fragmentation separates the image into its components or components. The level at which the chapter moves depends on the problem solved. When you cannot access objects of interest in an application, the partition must stop. An interpolation approach consists in dividing an image according to abrupt variations of density and similarity according to a set of predefined criteria. Therefore, the choice of image fragmentation technology depends on the problem being studied. Contour detection is part of the fragmentation of the image. The effectiveness of many images processing also depends on computer vision tasks on the integrity of large contour detection. This is one of the techniques for detecting density discontinuities in a digital image. Process for classifying and establishing interrupts in the so-called edge detection method Conventional edge detection methods combine the image with the operator configured to recognize large gradients in the image despite null values in uniform areas. There are many edge detection techniques designed for each cognitive style for certain types of edges. The variables involved in selecting the edge detection engine include edge orientation, edge structure, and noise environment. The geometry of the operator determines a distinctive trend that is more sensitive to edges. Operators can be enhanced to search for vertical, horizontal, or diagonal edges. Contour detection is a difficult task in noisy images because the edges and noise contain high-frequency content. Noise reduction efforts lead to uneven and distorted edges. The techniques used to disrupt images tend to be deeper, so the data can be quite common to compensate for noisy local pixels. This leads to a smaller location on the edges. All edges do not involve a change in step intensity.Things such as refraction or reduced focus can result in objects through boundaries defined by a regular change in intensity. The method wants to be accepted for such a systematic change in these cases. Therefore, there are problems related to the detection of counterfeit contours, position edges, missing real edges, noise problems and large processing times, etc. The goal is to make a comparison between a variety of edge detection and analyze various techniques in various circumstances, performance.

In this article, it was an attempt to examine some of the most commonly used techniques that revealed the limitation of the procedure of image division, as well as the implementation of the performance of these techniques in the image using the Matlab software. Section 2 presents the basic concepts that are used mainly in the literature. Section 3 provides a theoretical basis and complete sports to detect contours and explains the different calculation methods to detect the edge. Section 4 provides a comparison between the different techniques of edge detection with an image. Article 5 contains a quick discussion of the work that has been examined, in addition to the conclusion

Image Segmentation

Image segmentation is the process of dividing a digital image into multiple regions or groups of pixels. Basically, the image sections are different objects that have the same texture or color. The results of the division of the image represent a series of areas that cover the entire image together and a series of pincers extracted from the image. All pixels in an area are similar to properties such as color, density or texture. The neighborhoods are very different in relation to the same individuality. The different methods are (1) when the boundaries between regions based on discontinuities at density levels are found, (2) thresholds based on the distribution of pixel properties, as density values, and (3) on the basis of locating regions directly. Therefore, the choice of image fragmentation technology depends on the problem under consideration. Area-based methods are based on continuity. These techniques divide the whole image into sub-regions based on some rules so that all the pixels in an area must have the same level of gray. Area-based technologies are based on common patterns in density values within a group of adjacent pixels. Mass is known as the region, as is the aggregation of regions according to their anatomical or functional roles that are subject to image fragmentation. The threshold is the easiest way to divide. Threshold technology areas can be classified into base range values, which apply to pixel density values in the image. Threshold Converts the inserted image to a split binary image output. Partial methods are based on finding regions directly to look for sudden changes in density value. These methods are called the edge or edge method. Edge detection is a fundamental problem in image analysis. Edge detection methods are generally used to find breaks in grayscale images. Detecting dependencies in the grayscale image is an important common approach for detecting edges. The methods of image fragmentation to detect breaks are edge-dependent methods.

Edge Detection Techniques

The edge of the image greatly reduces the amount of data that will be processed, but retains basic information about the shapes of objects in the scene. This interpretation of the image is easily integrated into a large number of object recognition algorithms used to display the computer with other image processing applications. The main feature of edge detection technology is its ability to extract the thin wire line with better orientation and more edge detection research over the last three decades. On the other hand, there is still no common performance guide to judge the performance of edge detection techniques. The performance of edge detection techniques is always evaluated individually and applied separately to the application. Edge detection is an essential tool for image classification. Edge detection techniques convert original images into sharper images based on changes in the gray image. In image processing, especially in artificial vision, the detection of position edges takes care of important changes in the image at the gray level and reveals the physical and geometrical properties of objects in the scene. It is a basic process that detects and aligns an object and the borders between objects and the background in the image. Edge detection is one of the most common methods for detecting large breaks in density values. Borders are local changes in image density. The edges generally appear on the edge between two regions. The main features can be extracted from the edges of the image. Edge detection is a fundamental feature of image analysis. These features are used by advanced artificial vision algorithms. Edge Detection is used to detect objects, which are used for various applications, such as processing, medical images, biometric measurements, etc. Edge detection is an active search area where it is easier to analyze images at a higher level. There are three different types of gray-level breaks, such as a dotted line and borders. Special masks can be used to detect the three types of breaks in an image. There are many edge detection techniques in the image segmentation literature. In this section, we review the most common persistence-based edge detection techniques. These techniques are used for Roberts edge detection, Sobel edge detection, Prewitt edge detection, Roberts edge

Roberts Edge Detection

The Edge of Roberts was presented by Lawrence Roberts (1965). Measure the simple and fast spatial gradient of an image. This method focuses on regions with a high spatial frequency that often corresponds to the edges. The input to the reader is a grayscale image in the same output mode, the most common use of this technology. The pixel values at each point in the output represent the total estimated size of the spatial gradient of the input image at this point

-1	0
0	+1

Gx

0	-1
+1	0

Gy

Sobel Edge Detection

The Sobel edge detection method was introduced by Sobel in 1970 (Rafael C. González (2004)). The Sobel method for detecting edges to cut images finds the edges using the Sobel approximation of the derivative. Before the edges in those points where the gradient is higher. The Sobel technique performs a two-dimensional gradient in an image and highlights areas with a high spatial frequency that corresponds to edges. In general, it is used to find the estimated absolute gradient size at each point of the grayscale image input. In divination, at least the operator consists of a pair of 3x3 multiplication granules as contained in the table. One core is simply another that rotates 90 °. This is quite similar to the Roberts Crossover operator.

-1	-2	-1
0	0	0
+1	+2	+1

Gx

-1	0	-1
-2	0	+2
-1	0	+1

Gy

Prewitt Edge Detection

It suggests Prewitt edge detection in 1970 (Rafael C. González [1].) To estimate the size and direction of the edge Prewitt is the correct way, even if the different detection edge of the graduation wants a silent time count to estimate the trend of measurements in the X Andy directions, the edge detection compass is placed directly from the main address with the highest response and is limited to the 8 possible directions, however, knowledge shows that the most direct trend estimates are no longer the estimate of the perfect edge detector based on the gradient in the 3x3 area of eight directions, the entire account. Of eight compatibilities, then choose the complexity of a single mask, which is the purpose of the greater unity

-1	-1	-1
0	0	0
+1	+1	+1

Gx

-1	0	+1
-1	0	+1
-1	0	+1

Gy

Log Edge Detection

$$\nabla^2 f = \frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2}$$

Meir (1982) proposed the Gaussian Laplacian (LoG). The LoG image off (x, y) derives from the second order known as,

It has two effects, smooths the image and calculates the Laplacian, which gives a double image. Select the edges and then consist in finding zero crossings between the double edges. The digital implementation of the Laplacian function is usually performed through the mask below

0	- 1	0
-1	4	-1
0	-1	0

Gx

-1	-1	-1
-1	8	-1
-1	-1	-1

Gy

Laplacian is usually used to determine if the pixels are on the dark or light side of the edge.

Discovery of the Edges

In the industry, Canny Edge is a standard edge detection technology. Created for the first time by John Kenny for his master's thesis at MIT in 1983, he still overcomes many of the new algorithms that have been developed. To find the edges by separating the noise from the image before finding the edges of the image, Canny is a very important way. The on-board method is a better way without altering the characteristics of the edges of the image and then applying the orientation to find the edges and the serious value of the threshold. The computational steps are as follows:

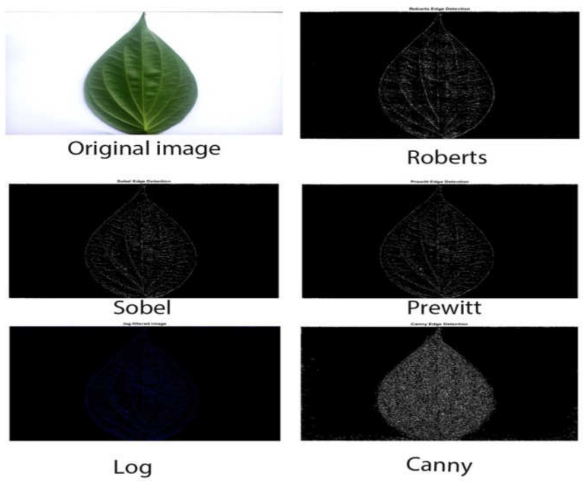
- Rotate the image f (r, c) using the Gaussian function to obtain a smooth image f ^ (r, c). F (r, c) = f (r, c) * G (r, c, 6)
- Apply the first difference gradient to calculate the edge strength, then get the edge size and direction as before.
- Apply maximum or minimum suppression to the scale.
- Apply a non-extreme image suppression threshold.

Unlike Roberts and Sobel, the abrupt process is not susceptible to noise. If the Canny detector works well, it would be better.

The Experimental Result

This section provides the relative performance of various edge detection techniques such as Roberts Edge Detectors, Sobel Edge Detectors, Prewitt Edge Detectors, LoG Edge Detectors and Canny Edge Detectors.

Edge detection techniques have been implemented using MATLAB R2016a and have been tested using a profile (Universidad de Mujeres Madre Teresa). The goal is to produce a clean edge map by extracting the characteristics of the image border. The original image and the image obtained are provided using different edge detection techniques in Fig.



In fact, the results of Roberts, Sobel, and Bruet deviated from the others, and the Log and Canny recorded almost the same edge map. Robinson's edge maps are almost the same. Observed in the figure, the clear result is higher than the date in other results.

Conclusion

In the artificial vision, image processing is an area of rapid movement. Its growth has been driven by technological advances in digital images, computer processors and large storage devices. In this paper, we try to review edge detection techniques that depend on density holding levels. The relative performance of the different edge detection techniques is performed using an image using the MATLAB software. The observed results of the record and the Kani edge detectors are approximately equal to the edge of the map. The critical result is better than all for a specific image because the different edge detection operations work best under different conditions. Although there are many edge detection techniques in the literature, it is a difficult task for research communities to detect the exact image without the noise of the original image.

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