

Image Based Retrieval Using Edge Detection Algorithm

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Abstract:

The increasing necessity of image retrieval based on content given technique can be used in a number of domains like Data Mining, Academics, Medical, Crime Prevention, Weather forecasting, Remote sensing and Management of Resources. This paper presents the content based image retrieval, using an edge detection called as canny edge detection algorithm in which the image can be viewed as binary image so that the exact image can be found with the accuracy.

Keywords:

Image Retrieval, Edge Detection, Texture, Color.

Introduction:

Here the image retrieving is based on so many things like texture, space, color, data what we are entered etc. And in these paper the images are retrieved based on color, feature and also by using a detection algorithm called edge detection algorithm. Generally the edge detection is to reduce the amount of data in an image significantly and also by preserving the structural properties and these are to be used for further image processing. There are many algorithms existing are developed but it is old and standard among all the edge detection algorithms. The Color is a important clue for extracting images basing on color. Content based image retrieval uses color histograms for extraction and these are useful in so many algorithms for the image extraction. The Texture is also an important feature because the image can be identified with the color but it may be differ with shape so it plays an important role in extraction.

The rest of paper describes the following sections. Section 1 describes Key Concepts and Section 2 describes architecture of image Retrieval and Section 3 describes Related Work and mainly these paper focus on using detection algorithm.

1 KEY CONCEPTS:

In these we undergo what are concepts we are used and what are the things used in these paper.

A. Image:

An image is an object that describes the visual observation for example a picture can be viewed by an representation will give the image description.

B .Digital image:

A Digital image is a representation of a two numeric dimensional image. Image resolution depends up on the image can be viewed in the digital image form and these digital images can also be called as bitmap image.

C. CBIR:

Content Based image retrieval is technique used in image retrieval and the image is searched in large databases and the searching is done by using the features like color, texture etc.

D .Color:

Color is the visual property which is very common in identifying many things so it plays an important role in retrieval and these was originated from the spectrum which is like an light interacts of eye.

E. Texture:

An image can be viewed in a box like structure from which we can get the appearance of the image.

2 BACKGROUND CONCEPTS:

Here the image can be retrieved based on some features like color, texture etc about these we discussed in the above but here we are using a technique called canny edge detection algorithm and content based image retrieval is discussed in detail.

2.1 Architecture:

Content based image Retrieval is the technique which is also called as Query by image content. This will come under Computer vision Technique. Content based means the search analysis of the contents in the image The term content in the context refers to color, shape and texture and by any other information. There are many CBIR techniques like query technique and the semantic technique etc and there are many other and in this paper we are using the Query technique that involves providing the cbir system with an example of the image is given as query and the from the database the related images are searched. And the result images will share all the common elements in the query image. For Example if the image given is rose flower which is red in color and having there petals open as the query image then we can see the results of red color roses as a result. this is how the content based image retrieval works. The retrievals may be based on only color and only shape and only texture etc. For Example, if the Retrieval may be the shape it will have architecture separate the image can be undergone through the shape analysis such as the image is undergone through the segmentation and then processing etc.

2.2 Concept of edge Detection Algorithm:

The Edge Detection algorithm is an Algorithm in which the image will taken from there edges and the and these images also called as Discontinuity based algorithm where the image can be is sub divided into the components and the objects. The idea is to partition an image based on abrupt change in intensity such as Edge the Discontinuity may be an line, point also. Basically the edge detection is used to have the correct the image on extraction where the image is extracted

with respect to the binary image this binary image comes when the image is thresholded. There are three basic steps involved in every basic edge detection algorithm they are

1. Removing noise using filter
2. Smoothing
3. Thresholding.

For Example, if we an image like camera in database there may be an lots of cameras in that and if use the detection mechanism the image will follow the above steps mentioned and gives the result. But in this paper we are using the Canny Edge Detection Algorithm.

3 Related Work:

Here for the Retrieval of images the Edge Detection Algorithm is used along with that the color, Feature also added to that. Canny Edge Detection Algorithm is an Discontinuity based algorithm in which is segmented and the image is undergone through the analysis and then retrieved. And also the important steps for the edge detection algorithms they are:

1. Detection:

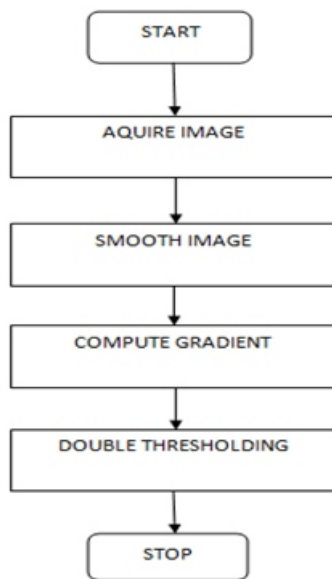
The Detection of real edge points should be increased so that the probability increases and detecting the false non edge detection points should be decreased so that this probability decreases.

2. Localization:

The detected edges should be as close so that the real edges points so that the detection will be correct.

3. Number of results:

One real edge should not result in more than one detected edge. All the above three steps should be maintained while constructing an edge detection algorithm. The Canny Edge Detection Algorithm follow the procedure which is given below.



here the above diagram has the steps how an image is processed in the detection algorithm They are

The algorithm runs in five steps:

1. Smoothing: to remove noise by blurring the image.
2. Finding gradients: The images which have large magnitudes should mark with gradients.
3. Non-maximum suppression: The maxima of the edge should be marked
4. Double thresholding: Thersholding should be done to determine the potential edges.
5. Edge tracking by hysteresis: By suppressing all edges the final edges determined and they are not connected to a very certain (strong) edge. And the following data will explain how the above steps play a role in retrieval.

1.Smoothing:

It is un expectable that images taken from a camera will all contain some amount of noise To avoid that noise the edges have been taken and the apply an gaussian filter.

2.Finding Gradients:

The algorithm basically finds edges where the gray-scale intensity of the image changes the most. The gradients at each pixel in the smoothed image are marked as gradients of that particular image.

3.Non-maximum suppression:

The purpose of this step is to convert the blurred image into the sharp edges. This should be done by preserving all the wanted gradients in the image.

4.Double Thresholding:

The pixels of the real edge should remain after the non-maxima suppression steps are marked with pixel by pixel should be strengthen . This will make the edges stronger.

5.Edge tracking by hysteresis:

Strong edges are discontinued because of some weak edges or some certain edges this can be tracked by the Hysteresis. For Example if we taken an example like camera,



Here the above image are one is the original image and the other is the smoothed image.

3.1 Implementation:

A few things are here while implementing

1. The image or source and thresholds can be chosen randomly.
2. Only standard deviation with a smoothing filter is supported .
3. The implementation uses the “correct” measure for the edge strengths.

4. The filters which are different cannot be applied to edge pixels. This causes the output image to be eight pixels smaller in each direction. The last thing in algorithm is called as edge tracking. This can be implemented either iterative or recursive.

In this, as a part of implementation of canny edge detection technique the color and Texture features are also added to retrieve an image. As discussed earlier the image will be extracted basing on color and texture also. Here for extracting the color based image we have to use the RGB HSV features of an image it is very important to give the correct image. Color is the important cue in extracting the information from images. Color histograms are commonly used in content based retrieval systems and they are very useful for example distinguishing between a field of orange flowers and a tiger, because it lacks information about how the color is distributed spatially. The RGB HSV Features means the RGB mean that red, green, blue color major portions will be taken in to the consideration. HSV means the hue-saturation-value this will be taken because the color space is taken in a cone shape and then the coordinates of the (h,s,v) are taken with respect to that particular point. there is fact that for large values and saturations, hue differences are perceptually more relevant than saturation and value differences.

Texture and Color both are the low level visual features and we have discussed about the color. But color may have what the exact color we are given and we can guess what the color is. But the texture is not like that it is quite different and the texture is not having any particular definition. But Texture is also an important visual feature that refers to innate surface properties of an object and their relationship to the surrounding environment. many objects in an image can be distinguished solely by their textures without any other information. There is no universal definition of texture. Texture may consists of some basic primitives, and may also describe the structural arrangement of a region and the relationship of the surrounding regions. Texture plays an important role because all the region is spatially distributed on the image and that regions are taken into the consideration for the gradients calculation in the canny edge detection algorithm and the these region will be smoothed and the further steps will be done for that selected region and the this makes the work easy so that we can say texture will play an important role in the image retrieval.

In this way the content based image retrieval is developed using the color and texture feature and also by using the canny edge detection algorithm.

4 Conclusion:

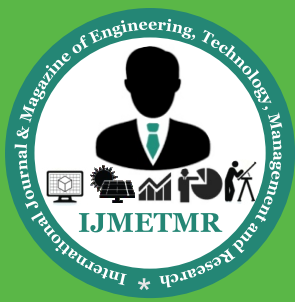
Here the Content based image retrieval is done by using the edge detection algorithm called canny edge detection algorithm and the color, texture is also added for retrieving the image so that the image retrieval will be accurate and the correct image will be retrieved and all the three will play a major role in the implementation.

5 Future Work:

Here there are many types of algorithms which can be developed by using the content based image retrieval and as we mentioned earlier that edge may be a point or line etc they also can be implemented. The image retrieval can also be done by adding spatial features also along with the color and shape. And the extension of these paper can be done by adding the spatial feature to the program. And these will give more accuracy for the image retrieval and also we can make a text based retrieval by adding that.

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