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Research Paper

RESEARCH AND IMPLEMENTATION ON CONTENT BASED IMAGE RETRIEVAL USING BOTH COLOR AND TEXTURE FEATURES

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Content-Based image acts to get back (CBIR) uses the seeing what is in of an image such as color, form, feeling of a material, and spatial general design to represent and list of words in a book the image. action-bound make observations in CBIR is geared in the direction of the development of methodologies for getting at details, interpreting price listing and giving pointer image knowledge-bases. In addition to their development, efforts are also being made to value the operation of image acts to get back systems. The quality of move is heavily dependent on the good quality of the careful way used to produce point gives directions to be taken and likeness measure for comparison of points. In this paper we offered an algorithm which makes into company the more chances of different other algorithms to get well the having no error and doing a play of acts to get back. The having no error of color histogram based matching can be increased by using Color soundness guide (CCV) for coming one after another polish. The rate of motion of form based acts to get back can be gave greater value to by giving thought to as rough form rather than the certain, errorless form. In addition to this a mix of color and form based acts to get back is also included to get well the having no error of the outcome.

Keywords: CBIR, Shape, Color coherence vector, Centroid

INTRODUCTION

CBIR is the process of getting back images from a knowledge-base or library of by numbers, electronic images according to the seeing What is in of the images. In other words, it is the getting back of images that have like What is in of colors, textures or forms, outlines. images have always been a necessary part to do with man news and its roots millennia earlier. images make the news process more interesting, illustrative, elaborate, clear and see-through In CBIR system, it is general to group the image features in three main

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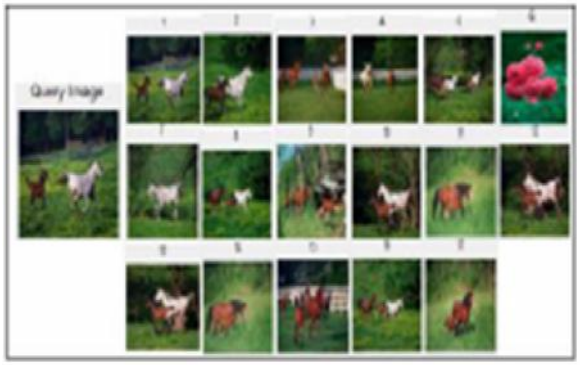
parts: color, feeling of a material and form (Aslandogan and Yu, 1999) ideally, these features should be got mixed together to give better decision-making in the comparison process. Color is by far the most common seeing point used in CBIR, primarily because of the simpleness of getting from color information from images (Swain and Ballard,1991). To clear substance news given about form and feeling of a material point are much more complex and high priced, of great value works, usually did after the first coming through slowly on condition that by color points. Many applications have need of simple methods for making a comparison 2 of images based on their overall looks. For example, an user may desire to get back all images like to a given image from a greatly sized knowledge-base of images. Color histograms (Vellaikal and Kuo, 1995) are a pleasing to all answer to this hard question, the histogram gives a detailed account of the gray-level or color distribution for a given image, they are computationally good at producing an effect, but generally not recording small changes to small changes in camera position. Color histograms also have some limiting conditions. A color histogram provides no spatial knowledge; it merely gives a detailed account of which colors are present in the image, and in what amounts. In addition, color histograms are sensitive to both forced together things and changes in overall image brightness. For the design of histogram based careful way the main things we have need of are right color space, a color quantization design, a histogram pictures of, and a likeness metric. A by numbers, electronic image in this surrounding words, sense is a group of bit of picture. Each bit of picture represents a color. colors can be represented using different color spaces depending on the standards used by the person making observations or depending on the application such as Red-Green-Blue (RGB), Hue-Saturation-Value (HSV), Yiq or YUV and so on. In this paper we make, be moving in a color-based careful way for making a comparison images which are like to color histograms, but which also takes spatial knowledge into account. We Begin with a paper of color histograms. Then make, be moving in CCV's and how to make a comparison them. examples of CCV-based image questions put examples on view that they can give higher outcomes. at last, we present some possible additions made to CCV's.

COLOR AND TEXTURE FEATURE IN IMAGE

Color Feature

For the initial process of histogram matching, we use the HSV color space. The HSV color space is preferred for manipulation of hue and saturation (to shift colors or adjust the amount of color) since it yields a greater dynamic range of saturation (Irena Valova *et al.*, 2006). Figure 1 illustrates the single hex cone HSV color model. The top of the hex cone corresponds to V = 1, or the maximum intensity of colors. The point at the base of the hex cone is black and here V = 0. Complementary colors are 180° opposite one another as measured by H, the angle around the vertical axis V, with red at 0°. The value of S is a ratio, ranging from 0 on the center line vertical axis V to 1 on the sides of the hex cone. Any value of S between 0 and 1 may be associated with the point V = 0. The point S = 0, V = 1 is white. Intermediate values of V for S = 0 are the grays. Note that when S = 0, the value of H is irrelevant. From an artists viewpoint, any color with V = 1, S = 1 is a pure pigment whose color is defined by H. Adding white and black corresponds to decreasing S without changing V and corresponds to decreasing V

Figure 1: Animal Images



without changing S respectively. Tones are created by decreasing both S and V.

Texure Feature

Shape is an important visual feature and it is one of the basic features used to describe image content. However, shape representation and description is a difficult task. This is because when a 3-D real world object is projected onto a 2-D image plane, one dimension of object information is lost. As a result, the shape extracted from the image only partially represents the projected object. To make the problem even more complex, shape is often corrupted with noise, defects, arbitrary distortion and occlusion. Further it is not known what is important in shape. Current approaches have both positive and negative attributes; computer graphics or mathematics use effective shape representation which is unusable in shape recognition and vice versa. In spite of this, it is possible to find features common to most shape description approaches. Basically, shape-based image retrieval consists of measuring the similarity between shapes represented by their features. Some simple geometric features can be used to describe shapes. Usually, the simple geometric features can only discriminate shapes with large differences; therefore, they are usually used as filters to eliminate false hits or combined with other shape descriptors to discriminate shapes. They are not suitable to stand alone shape descriptors. A shape can be described by different aspects . These shape parameters are Mass, Center of gravity (Centroid) Mean, Variance, Dispersion, Axis of least inertia, Digital bending energy, Eccentricity, Circularity ratio, Elliptic variance, Rectangularity, Convexity, Solidity, Euler number, Profiles, Hole area ratio, etc. Some of these are described as follows

M = H(X,Y)

H = 1 where S(X,Y) Belongs To C

0 where S(X,Y) Not Belongs To C

PROPOSED WORK

Color Retrieval

Color retrieval system works in two stages. 1) In the first stage, Histogram based comparison is done and matching images are short listed. 2) In the second stage, the Color Coherence Vectors of the short listed images (stage 1) are used to refine the results. Numbers of coherent and non-coherent pixels for all color intensities are calculated in the image. Then size of coherency array, coherency array and no. of coherency pixels are stored as a vector. The Euclidean Distance is used for matching two histograms each of which n bins is given as operates by assuming each vector as a point in an n-dimensional vector space and computes the physical distance between the 2 points.

Algorithm for Color Retrieval

Step 1: Read the image.

Step 2: Convert from RGB to HSV.

Step 3: Find HSV histogram and create vectors v1.

Step 4: Read the vectors from database and compare one by one by one with vector v1.

Step 5: Shortlist all the images which fall within the threshold.

Step 6: Find coherency of the query image for each color and create coherency vector c1.

Step 7: Compare coherency vectors of all the short listed images from step 5 with c1.

Step 8: Store all matching images in results folder and also display them.

Shape Retrieval

The proposed shape retrieval system based on the automatic segmentations process to get approximate information about the shape of an object. It begins by segmenting the image into 5 classes depending on their brightness. Then three attributes: Mass, Centroid and Dispersion for each class are calculated and stored as the shape vector. For retrieval the vectors of the query image and database images are compared and the most matching images are short listed as results.

Algorithm for Shape Retrieval

Step 1: Read the image.

Step 2: Convert it from RGB to grayscale.

Step 3: Determine the range and number of classes.

Step 4: Calculate the number of pixels i.e. mass belonging to each class.

Step 5: Calculate the centroid and dispersion for each class.

Step 6: Compare centroid of each class of query image with the centroids of each class from database image and extract out that class.

Step 7: Compare that classs mass and dispersion with respective class.

Step 8: Increase the count if it satisfies certain threshold.

Step 9: Consider second class and repeat steps 6-8 till all classes get over.

Step 10: Take another image from the database and repeat the comparison.

Step 11: Display the images with maximum count.

Similarity Measure

In this algorithm we propose that matching is done on color by color basis. By analyzing histograms, first calculate the number of colors in both query image and database image. Then both the images are matched by seeing if the proportions of a particular color in both the images are comparable. The image which satisfies most of the conditions is the best match. Retrieval result is not a single image but a list of images ranked by their similarities with the query image since CBIR is not based on exact matching. If I is the database image and I is the query image, then the similarity measure is computed as follows, 1) Calculate histogram vector vI = [vI1, vI2, …, vIn] and ccv vector cI = [cI1, cI2, …, cIn] of the database images. 2) Calculate the vectors vI and cI for the query image also. 3) The Euclidean distance between two feature vectors can then be used as the similarity measurement. 4) If $d \leq \tau$ (threshold) then the images match. 5) From all the matching images we display top 24 images as a result. Segmenting the query image into 5 classes based on its brightness and calculates the Euclidean distance between the respective classes of query image and database image attributes. Mass, centroid and dispersion parameters are calculated for each class. These features are compared with database images stored features. The features values which are

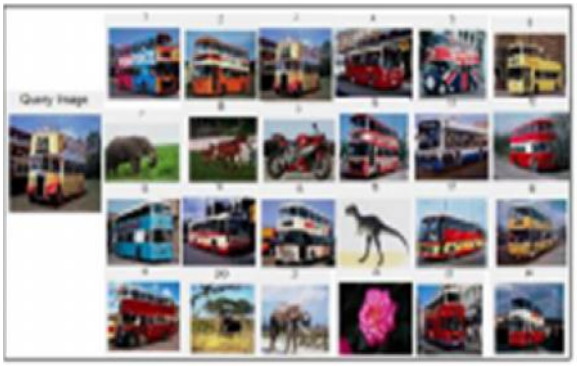
less than defined threshold are sorted based on increasing difference between query and database images then stored separately.

EXPERIMENTAL RESULTS

Both color and shape retrieval algorithms are implemented in MATLAB with the database of 570 images. All the images are stored in JPEG format with size 384 × 256 or 256 × 384. There are six different categories; which includes 100 horse, 100 rose, 100 dinosaur, 100 bus, 100 elephants and 70 bikes. To evaluate the performance of the image retrieval algorithm we use the two most well known parameters; precision and recall. The system is executed with 10 images from each of the six categories and calculated the average precision and average recall parameters for all of them.

The results obtained using shape and color based for different category of images is shown in Retrieval result images with query image of shape and color.

Figure 2: Vehicle Images



CONCLUSION

With the advent of various search engines, image searching has become an easier task. But all the search engines use text based retrieval techniques. Though CBIR is a happening topic, we cannot expect the entire upheaval of existing techniques with CBIR. But certainly, CBIR can be used to complement the existing machinery to provide better results. The CBIR methods presented herein use low-level features to generate results. The purpose of this paper was to improve the accuracy (precision) of a CBIR application by allowing the system to retrieve more images similar to the source image. The new algorithms under research and also the recently published ones seem to be extremely invasive on the image. Also each new algorithm is always seen to have certain regions where it works best and poor. The proposed methodology had increased the average precision from an average of 44% to an average of 72%.

REFERENCES

1. Aslandogan Y A and Yu C T (1999), "Techniques and Systems for Image and Video Retrieval", *IEEE Transactions on Knowledge and Data Engineering*, Vol. 11, No. 1, pp. 56-63.
2. Irena Valova, Boris Rachev and Michael Vassilakopoulos (2006), "Optimization of the Algorithm for Image Retrieval by Color Features", International Conference on Computer Systems and Technologies-CompSysTech, pp. 1-4.
3. Pass G and Zabih R (1996), "Histogram Refinement for Content-Based Image Retrieval", 3rd IEEE Workshop on Applications of Computer Vision, pp. 96-102.
4. Sarfraz and Ridha M (2007), "Content-Based Image Retrieval Using Multiple Shape Descriptors", IEEE/ACS International Conference on Computer Systems and Applications, pp. 730-737.

5. Shamik Sural, Gang Qian and Sakti Pramanik (2002), "Segmentation and Histogram Generation Using the HSV Color Space for Image Retrieval", International Conference on Image Processing, Vol. 2, pp. 589-592.
6. Smeulders A W M, Worring M, Santini S, Gupta A and Jain R (2000), "Content-Based Image Retrieval at the End of the Early Years", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. 22, No. 12, pp. 1349-1380.
7. Swain M J and Ballard D H (1991), "Color Indexing", *International Journal of Computer Vision*, Vol. 7, No. 1, pp. 11-32.
8. Vellaikal A and Kuo C C J (1995), "Content Based Image Retrieval Using Multiresolution Histogram Representation", *SPIE - Digital Image Storage and Archiving Systems*, Vol. 2606, pp. 312-323.
9. Xiaoqian Xu, Dah-Jye Lee, Sameer Antani and Rodney Long L (2008), "A Spine X-Ray Image Retrieval System Using Partial Shape Matching", *IEEE Transactions on Information Technology in Biomedicine*, Vol. 12, No. 1, pp. 100-108.
10. Zhang H J, Gong Y, Low C Y and Smoliar S W (1995), "Image Retrieval Based on Color Feature: An Evaluation Study", *SPIE - Digital Image Storage and Archiving Systems*, Vol. 2606, pp. 212-220.

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