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An Improved Content Based Image Classification Using Content Search and Global Distribution

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Abstract— A New Improved Content Based Image Classification Using Content Search and Global Distribution are proposed. Finding the similar images using content search, and to inspect the global distribution of images according to image classification. So that users can organize the retrieval task into an iterative browsing process that makes them specify their queries more accurately. In content-based image classification using content search the most efficient and simple searches are the color-based searches, which can be realized by several color descriptors. As a result the users are more satisfied with what the system what retrieves.

Keywords— CBIR, Image Classification, Image retrieval, content search and global distribution

I. INTRODUCTION

The color has great importance in content-based image retrieval systems, which is stored in the intensity vectors of image pixels, and this information can be retrieved.Very large collections of images are growing ever more common. From stock photo collections to proprietary databases to the Web, these collections are diverse and often poorly indexed; unfortunately, image retrieval systems have not kept pace with the collections they are searching.In this paper we propose an image retrieval system, called Wavelet-Based Color Histogram Image Retrieval[1] (WBCHIR),based on the combination of color and texture features.

The shortcomings of these systems are due both to the image representations they use and to their methods of accessing those representations to find images:

1. While users generally want to find images containing particular objects , most existing image retrieval systems represent images based only on their low-level features, with little regard for the spatial organization of those features.
2. Systems based on user querying are often unintuitive and offer little help in understanding why certain images were returned and how to refine the query. Often the user knows only that he has submitted a query for, say, a bear and retrieved very few pictures of bears in return.

In CBIR systems, the image descriptor is a very important element. It is responsible for assessing the similarities between images. Descriptors can be classified depending on the image property analyzed, like, for example, color or texture descriptors, that analyze color or texture properties, respectively. In CBIR systems, the searching process works as follows. The user queries the system, usually, by using a query image. Its properties are extracted and then compared against the properties from the database images that had been previously extracted. In this paper, we make use of CIRCUS, a content-based image retrieval system using visual features such as color, layout, texture, or any combination of them. Furthermore, to support all three stages of active query, we have added a set of dynamic overview techniques that allow users to become familiar with the collection of the images before specifying the query, either using keywords, explorator , or direct search methods.

The remainder of this paper is ordered as follows. In Section II, we discuss related work. Section III describes our proposed content based image classification using content search and global distribution system. Experimental setup and results are presented in Section IV. Finally, section V gives future directions of topic and Section VI provides a conclusion of our work.

II. RELATED WORK

In [1], proposed a color-texture and color-histogram based image retrieval system (CTCHIR). They proposed three image features, based on color, texture and color distribution, as color co-occurrence matrix (CCM), difference between pixels of scan pattern [2] (DBPSP) and color histogram for K-mean [3] (CHKM) respectively and a method for image retrieval by integrating CCM, DBPSP and CHKM to enhance image detection rate and simplify computation of image retrieval. From the experimental results they found that, their proposed method outperforms the Jhanwar et al. and Hung and Dai methods. Raghupathi et al. have made a comparative study on image retrieval techniques, using different feature extraction methods like color histogram, Gabor Transform, color histogram+gabour transform, Contourlet Transform and color histogram+contourlet transform. Hiremath and Pujari proposed CBIR system based on the color, texture and shape features by partitioning the image into tiles. The features computed on tiles serve as local descriptors of color and texture features. The color and texture analysis are analyzed by using two level grid frameworks and the shape feature is used by using Gradient Vector Flow. The comparison of experimental result of proposed method with other system found that, their proposed retrieval system gives better performance than the others. Rao et al. proposed CTDCIRS (color-texture and dominant color based image retrieval system), they integrated three features like Motif co-occurrence matrix (MCM) and difference between pixels of scan pattern (DBPSP) which describes the texture features and dynamic dominant color (DDC) to extract color feature.

To understand how non-professionals look for images, we conducted a user study on a set of 40 computer literate subjects. We asked them several questions among which to tell us the type of images they are looking for, describe how they usually do the searching. The following give an idea of the different answers recorded:

- If you look for images for presentations. You have a Corel CD of images. You have to browse the book that comes with the CD until will find one that you like.
- If you look for images to represent intelligence as a logo for your research group on intelligent systems. You have to use the WWW based search engines. You finally discovered Corbis and was able to type the word intelligence.
- If you are looking for images of paintings of nature. – If you like to like to find images of nature with lakes in a bluish background, definitely not dark reddish background such as those in a sunset.
- you'd like to find red images because you like the color red.

A. Color Space and Descriptors

In the below Table I, it describes about the color spaces [4]. RGB Color space used for image display, and it is composed of three color components.HSV color space is frequently used in computer graphics and it is also composed of three color components.CIE XYZ is a set of tristimulus values called X,Y,Z.CIE YCbCr is a family color spaces used in video systems. Opponent color space uses opponent color axes.

Table I Description Of Color Space

Color Space Names	***Description***
RGB Color Space	*RGB space is a widely used color space for image display. It is composed of three color components red, green and blue. Since color cameras, scanners and displays are most often provided with direct RGB signal input and output.*
HSV Color Space	*HSV space is frequently used in computer graphics and is a rather intuitive way of describing color. The three color components are hue, saturation (lightness) and value (brightness).*
CIE XYZ Color Space	*In the CIE XYZ color space, the tristimulus values are not the S (short), M (middle), and L (long) stimuli of the human eye, but rather a set of tristimulus values called X, Y, and Z, which are also roughly red, green and blue, respectively*
CIE YCbCr Color Space	*YCbCr is a family of color spaces used in video systems. Y is the luma component and Cb and Cr the blue and red chroma components*
Opponent Color Space	*The opponent color space uses opponent color axes (R-G, 2B-R-G, R+G+B). This representation has the advantage of isolating the brightness information on the third axis.*

B. Feature Vector Generating Techniques using Color

In the below Table II, it describes about the feature vector generating techniques using color [5]. Color moments have been proved to be efficient and effective in representing color distribution of images. Color Histogram is easy to compute and effective in characterizing both global and local distribution of images. Color coherence vector is proposed in order to get different way of spatial information.

Table II Description of Feature Extraction methods using color

Method	***Description***
Color moments	*The first order (mean), the second (variance) and the third order (skewness) color moments have been proved to be efficient and effective in representing color distribution of images*
Color Histogram	*The color histogram is easy to compute and effective in characterizing both the global and local distribution of color in an image*
Color coherence vector	*In a different way of incorporating spatial information into the color histogram, color coherence vector , was proposed.*

C. Overview Methods for CBIR

In the below Table III, it describes about the overview methods for CBIR [6]. CIRCUS IR [7] System uses CIRCUS2 retrieval model .In visual economy the first approach to create an overview of an image collection we use single screen space. Real-time display system offers zoom and pan capabilities.

Table III description of overview methods for CBIR

System methods	***Description***
CIRCUS IR System [7]	*The retrieval model used by CIRCUS2 is an adaptation to image retrieval of the Latent Semantic Indexing method. The core idea is to extract a compact, useful representation of the relations between terms and documents*
Visual taxonomy[8]	*The first approach to creating an overview of an image collection summarizes the collection into a visual taxonomy using a single screen space. In one collection, we visualize 9 categories with a total of 650 starting images*
Real-time display and Galaxy[9]	*It is a real-time display system offering zoom and pan capabilities. The axes meanings can be defined by the user among a choice of visual and alphanumeric attributes.*

III. PROPOSED SYSTEM

Fig.1 shows the general scheme of Multilevel and Multiple approaches for Feature Reweighting to reduce semantic gap in CBIR System using relevance feedback. The basic idea of relevance feedback is a human and computer interaction system to shift the burden of finding the right query formulation from the user to the system.

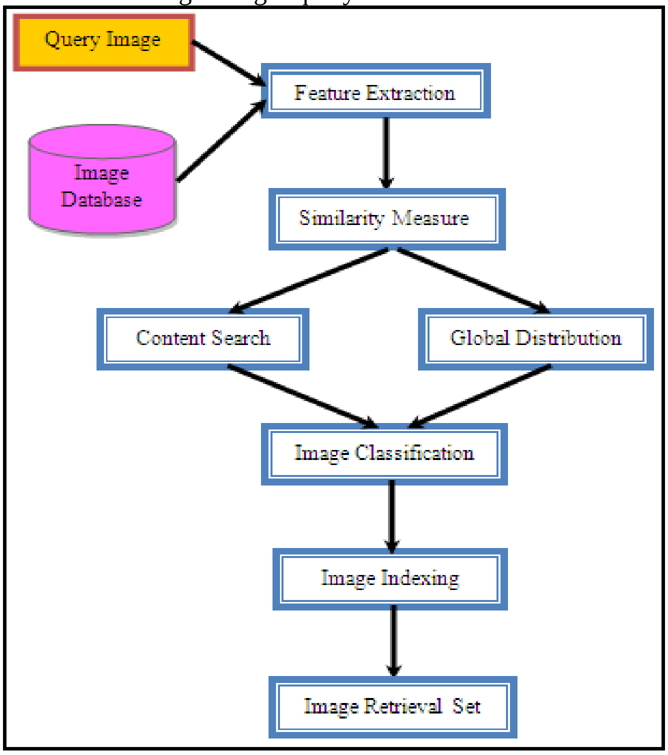

Fig. 1 An improved content based image classification using content search and global distribution architecture

Algorithm for proposed system is as follows:

Step 1: The initially the image database will be supplies to the system, which is stored database in the system.
Step 2: The user gives the query image to the proposed system.
Step 3: System will extract the visual features of query image and make comparison with the database image features and retrieves the set of relevant images to the user.
Step 4: The system will measure the similarity of the image database with the given query image.
Step 5: Here, the system will check the content of the query image and global distribution like shape, color and texture of an image.
Step 6: **F**rom step 5, the images are classified according to their global distribution and content search.
Step 7: After classification of images the system will give ranks according to their similarities called as Indexing.
Step 8: The images that are relevant are retrieved by the system and displayed to the user.

IV. EXPERIMENT SETUP AND RESULTS

A. Experimental Environment

In our experiment considered more than 500 images from COREL image database. Which are from different categories such as Natural pictures, painted images, landscapes, flowers, buses and building. So the domain of images can be considered very broad. In these images fulfilled the above proposed method in 7 color spaces using 6 color features.

B. Experimental Results

The achievement of experiments is summarized in Table IV.

Table IV Results of the experiments

Color space	Color descriptors	Classification
RGB	Moments of R channel	Lightness
XYZ	Moments of Z channel	Lightness Blue color
xyz	Moments of x channel	Red color
xyz	Moments of z channel	Blue color
YcbCr	Moments of Y channel	Lightness
YcbCr	Moments of Cb channel	Blue color
YcbCr	Moments of Cr channel	Red color
HSV	Moments of H channel	Number of colors
HSV	Moments of S channel	Sharp and blurred colors
HSV	Moments of V channel	Lightness
Opponent space	Moments of 1 channel	Blue and Red color
Opponent space	Moments of 2 channel	Blue color Sharp and blurred colors
RGB	Moments	Lightness, blue color
YCbCr	Moments	Lightness, blue color
HSV	Moments	Darkness, blue color
rgb	Histogram	Blue and green color
rgb	CCV	Lightness
xyz	CCV	Lightness Blue and green color
YCbCr	CCV	Blue color
Opponent space	CCV	Blue color

V. FUTURE SCOPE

The obtained achievements may be repaired, if other color descriptors ought to be tried in the representation of color features. Another improvement possibility, if for all objects of an image the color descriptors will be generated, and then applies the classification method. A further improvement possibility may be a development of a user interface, where considering the user's feedback, the mistakes of the classification may be repaired. After the repaired classification the images can be ordered into hierarchy. In order to this some methods [8] are necessary which are frequently used in object oriented classification

VI. CONCLUSION

This paper introduced a new improved content based image classification using content search and global distribution. Finding the similar images using content search, and to inspect the global distribution of images according to image classification. So that users can organize the retrieval task into an iterative browsing process that makes them specify their queries more accurately. In content-based image classification using content search the most efficient and simple searches are the color-based searches, which can be realized by several color descriptors. As a result the users are more satisfied with the result. The proposed system outperforms the current CBIR systems and performance is measured in terms of precision and recall.

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