Content-Based Image Retrieval using Color Coherence Vector

R. Anburasi
Bharathidasan University

Abstract- *Searching and retrieving images based on text process is a time consuming. Content-Based Image Retrieval (CBIR) uses the visual contents of an image such as color, shape, texture, and spatial layout to represent and index the image. There is a need for efficient retrieval of images. CBIR is a technique which retrieves the image based on metrics. The proposed an algorithm in such a way that it filters the image based on color coherence and distance metrics. The proposed method is identified and retrieved images faster foe the given query image. It is due to find the approximate image rather than accurate image. The accuracy of color histogram based matching has been increased by using Color Coherence Vector (CCV) for successive refinement.*

I. INTRODUCTION

Content-based image retrieval (CBIR), also known as query by image content (QBIC) and content-based visual information retrieval (CBVIR) is the application of computer vision techniques to the image retrieval problem, that is, the problem of searching for digital images in large databases . Content-based image retrieval is opposed to traditional concept-based approaches.

"Content-based" means that the search analyzes the contents of the image rather than the meta data such as keywords, tags, or descriptions associated with the image. The term "content" in this context might refer to colors, shapes, textures, or any other information that can be derived from the image itself. CBIR is desirable because searches that rely purely on metadata are dependent on annotation quality and completeness. Having humans manually annotate images by entering keywords or metadata in a large database can be time consuming and May not capture the keywords desired to describe the image. The evaluation of the effectiveness of keyword image search is subjective and has not been well-defined. In the same regard, CBIR systems have similar challenges in defining success

Semantic retrieval

Semantic retrieval starts with a user making a request like "find pictures of Abraham Lincoln". This type of open-ended task is very difficult for computers to perform - Lincoln may not always be facing the camera or in the same pose. Many CBIR systems therefore generally make use of lower-level features like texture, color, and shape.

Content comparison using image distance measures

The most common method for comparing two images in content-based image retrieval (typically an example image and an image from the database) is using an image distance measure. An image distance measure compares the similarity of two images in various dimensions such as color, texture, shape, and others. For example a distance of 0 signifies an exact match with the query, with respect to the dimensions that were considered. As one may intuitively gather, a value greater than 0 indicates various degrees of similarities between the images. Search results then can be sorted based on their distance to the queried image. Many measures of image distance (Similarity Models) have been developed -Color / Texture / Shape.

II. BACKGROUND

[1] Demonstrate that it is much more efficient than the existing image feature descriptors that were originally developed for content-based image retrieval, such as MPEG-7 edge histogram descriptors, color autocorrelograms and multi-texton histograms. It has a strong discriminative power using the color, texture and shape features while accounting for spatial layout.

[2] Demonstrate that the proposed method has higher retrieval accuracy than other conventional methods combining color moments and texture features based on global features approach. The experiment also shows that only color features or only texture features are not sufficient to describe an image. There is considerable increase in retrieval efficiency when both color and texture features are combined. Thus it is rightly said that only color or only texture cannot differentiate a cheetah and a tiger.

[3] Color Coherence Vector (CCV) is a classical method of CBIR. It is similar to the color histogram method, and it also considers some spatial feature, and is proved to be more effective. This paper describes an improved color

coherence vector method, which has more spatial information, and works more efficiently.

[4] The experimental results show that the method with high recall and precision is promising.In this paper proposed method has high recall as well as precision even when the images are under attack or image-processing. Moreover, the average compression rate is high up to 99.78% conducing to high-speed image retrieval.

[5] The speed of shape based retrieval can be enhanced by considering approximate shape rather than the exact shape. In addition to this a combination of color and shape based retrieval is also included to improve the accuracy of the result.

III. METHODOLOGY

Algorithm for Color Retrieval

Step1: Read the image
Step2: Convert from RGB to HSV
Step3: Find HSV histogram and create vectors v1.
Step4: Read the vectors from database and compare one by one by one with vector v1.
Step5: Shortlist all the images which fall within the threshold.
Step6: find coherency of the query image for each color and create coherency vector c1.
Step7: Compare coherency vectors of all the short listed images from step5 with c1.
Step8: Store all matching images in results folder and also display them.

IV. EXPRIMENTAL AND RESULTS

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.

V. RESULT & ANALYSIS

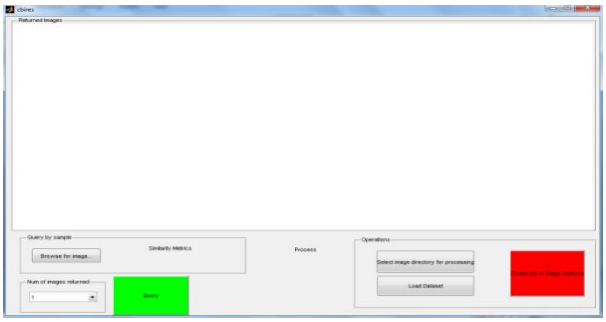


Fig CBIR Based System Simulation input

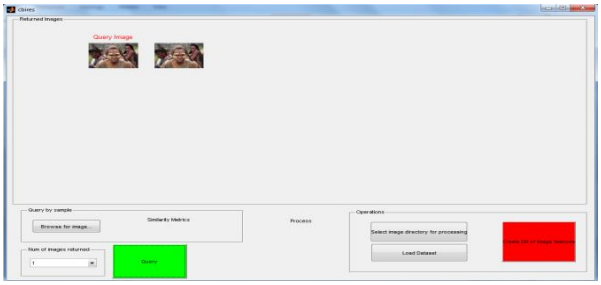
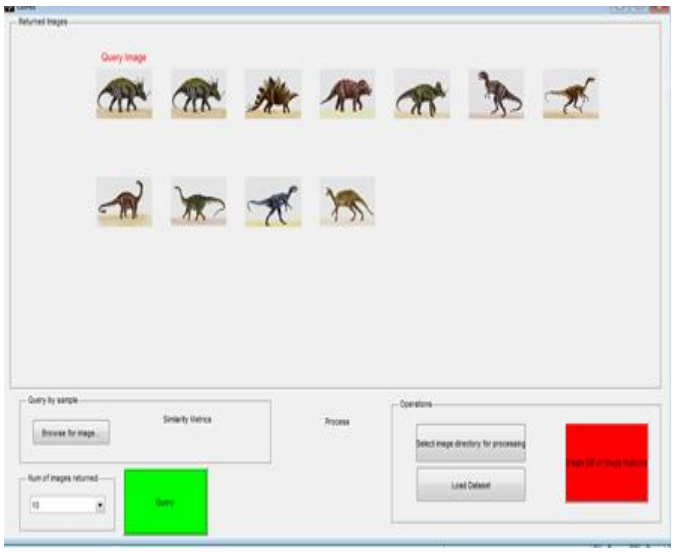


Fig CBIR Based System Simulation Searches result

Color Based Image Retrieval For Buses



Color Based Image Retrieval For Dinosours

We have 10000 different images to experiment. Before comparing them, a mean-filter processed all the images in order to eliminate small variations between neighboring pixels. We get the feature database from the image database through extracting the improved CCV.

VI. CONCLUSION

The purpose of Content-Based Image Retrieval (CBIR) systems is to operate on collections of images and, in response to visual queries, extract relevant image. The application potential of CBIR for fast and effective image retrieval is enormous, expanding the use of computer technology to a management tool.

REFERENCES

[1] Content-based image retrieval using color difference histogram Guang-Hai Liu ,Jing-Yu Yang 2013

[2] Content- Content-Based Image Retrieval using Color Moment and Gabor Based Image Retrieval using Color Moment and Gabor Texture Feature Texture Feature International Journal of Computer Science Issues,2013

[3] An Improved Color Coherence Vector Method for CBIR Xingfeng Chen, Xingfa Gu, Hua Xu

[4] Content-based Image Retrieval Based on Vector Quantization and Affine Invariant Region Chin-Feng Lee, Shu-Ching Wang, and Yi-Jia Wang

[5] Content Based Image Retrieval Using Color and Shape Features Reshma Chaudhari , A. M. Patil