Query Based Image Content using Semantic Signature

D Dhayalan[1] | R Keerthana[2]

[1](Assistant Professor,Department of MCA,Vel Tech High Tech Dr.Rangarajan Dr. Sakunthala Engineering College, Chennai, India, dhayalan@velhightech.com)

[2](PG Scholar- Department of MCA,Vel Tech High Tech Dr.Rangarajan Dr. Sakunthala Engineering College, Chennai, India, keerthi301993@gmail.com)

Abstract— *Multimedia re-ranking, as an efficient way to improve the search results of web-based image search, has been adopted by recent commercial search engines such as yahoo and Google. Given a query keywords, a pool of images are first retrieved based on text based information. A major challenge is that the similarities of visual features do not correlated with images semantic meanings which interpret users search intention. Currently people proposed to match images in a semantic space which is used attributes or reference classes closely related to the semantic meanings of images as basic. A universal visual semantic space to highly diverse images from the web is difficulty and effectiveness. In this paper, we propose a Bayesian re-ranking framework which automatically offline learns different semantic signatures. At the online stage, multimedia images are re-ranked by comparing their semantic signature obtained from the semantic spaces specified by the query keywords. The proposed Query-specific semantic signatures significantly improve both the accurate and efficient of multimedia re-ranking.*

Keywords— Image search, Image re-ranking, Semantic signature, and Semantic spaces, image retrieving

1. INTRODUCTION

Image retrieval is the process of searching and retrieving images in the large database of user keywords. They suffer from specific keywords because it is very hard to search accurate images in web data. A major challenge is retrieving images in large databases. One of the major problems was highlighted for difficulty of locating a accurate images in a large and variety collection. Suppose it may be possible to identify a accurate images from a few collection simply by searching, most effective ideas are provided with collections contained Thousands of images. To identify some images, a user provides some keywords, image details, URL links and the system will show some images related to the query. Most similarity used for searching condition could be some tags, color, shape, attributes. Unfortunately, image retrieving system is not kept safe with the collections they are searching.

Now a day's these system are due both the image representations they use and to their steps of accessing these representing to search images. Retrieval of images is becoming most recognized and they find for some solution a highly active area for research and development. Now a day, a large scale storing of images they need to have some efficient methods of images finding and retrieving was high. Most of the image retrieval system presented. Now a day are using only text-based, in which images are manually corrected by text-based query keywords and when we keywords are matching to the content of the images, when system matches the query to the keywords presented in the large database.

2. LITERATURE SURVEY

In many area of government, academics and hospitals, huge collection of multimedia images are being developed. Many of this collection are the product of digitizing existing collections of analogue photos, drawings, painting, etc .Usually, and only one way of searching these collections are keyword for indexing or simply browsing. Multimedia images databases are however open the way to Query based image content searching. This field of image-based content retrieved and automatically images annotation are becoming more and more relevant to the ways in which huge libraries of digital media are stored and accessed. Query based image content retrieval is an general purpose are identify the images in large database is a major challenging problem because of the huge size of the database, the difficulty to understanding the images, So people and computer, the difficulty of formulating a query and the problems are evaluating results properly.

A number of general-purpose images search engines have been created. The common ground for QBIC system is an extract a signature for every image based on its pixel values and to define a rule for comparing images. The signature serves as a pictures representation in the "view" of a QBIC system. The components of the signature are called features. One merits of a signature over the original pixel values is the significant compression of images representation. However, a most important reason for using the signature is to gain as an improved correlated between image semantic and the pixel presentation, which is to develop a better correlated with image semantic s. In existing general-purpose QBIC system roughly fall into some categories depending on the approaches exact signatures: colour layout, histogram, shape and region-based searches. There are also systems that combine retrieval results from individual algorithms by a weighted sum matching metric, or other merging schemes.

3. EARLY SCENARIO

Although Text-Based search techniques are shown in their effectiveness in the document search, they are some problematic issues when applied to the image based search. There are two major problem are: One is the mismatching between images and their associated text information, resulting into irrelevant images appearing into the search based results. For example, an image which is an irrelevant to "BEAR" will be mistaken as relevant images if there is a word "BEAR" existing in its surrounding text. The other problem is that the text information is correlated to represent the semantic content to the multimedia images. The same query keywords also may refer to images that are semantically different, Example, we cannot compare an animal BEAR images from an images for a person whose name is Bear, just with the text word "bear". Because the text information is correlated for semantic image retrieval, a natural resource is the visual information. Recently a bunch of images/video are re-ranking methods has been proposed to exploit the usage of the visual information for refining the text-based search results. Most of these re-ranking methods utilize the visual information in an unsupervised and passive manner. Unsupervised re-ranking methods, can only achieve limited performance improvements.

3.1 Disadvantages

1. User intention is not considering in image processing.
2. Re-ranking methods usually fail to capture the user's intention when the query term is efficient.
3. Text-Based search methods are problematic when applied to the image search because of the mismatching between images and their associated textual information.
4. Textual information is insufficient to represent the semantic content of the images.

4. PRESENT SCENARIO

The proposed system has a Bayesian framework for multimedia content retrieval approach. Instead of constructing a universal visual dictionary, it learn different visual semantic spaces for different query keywords in images individually and automatically also the semantic spaces related to the images to be re-ranked can be significantly narrowed down by the query provided by the user. For example, if the query (image) is "apple", the semantic concepts of "mountains" and "Paris" are unlikely to be relevant and can be ignored. Instead the semantic concepts of "computer" and "fruits" will be used the visual semantic spaces related to" apple". The query based image content specific visual semantic spaces can more accurately model the images to be re-ranked, since they have removed other potentially unlimited number of irrelevant concepts, which serve only as noise as the performance of re-ranking in terms of both accurate and computational cost. The visual features of images are then projected into their related visual semantic spaces to get semantic signatures. Images are re-ranked by compared their semantic signatures obtained from the visual semantic spaces of the query images.

4.1 Advantages

1. Re-ranking is a user interaction and active re-ranking is introduced in this system.
2. Collection of information from users to obtain the specific semantic space.
3. The visual characteristics of the user intention in this specified semantic space.

5. System Design

Preprocessing of the image to reduce the influence of different acquisition circumstance in images. Extractions of low level feature of visual data i.e. shape and color. Image and pattern recognition is used to measure such feature extraction of high-level feature and image semantic. In some cases, semantics can be extracted automatically from the images based on the combination of low-level feature and rules. Description in textual form of the images contents and acquisition characteristics. Based on image size, image pixel, number of images in a sequence information and also metadata describing the content. Visualization, which present a view of the data for inspection, her by improving the effectiveness of the search. Indexing and pre-selection, this filter out images that is not pertinent only to a query and extract only those database items that are relevant to the query. Retrieval: matching procedure and similarity metrics. Relevancy feedback: a mechanism by which the user can give feedback by indicating positive or negative relevance of retrieved items.

Functionality

Initially, user interface typically consists of a query formulation part and a result presentation part. Specification of which images retrieve from the database can be done in many ways. First way is a browse through the database one by one. Other way is to specify the image in terms of query keywords, or in term of images feature that are extracted from the images, such as a color histogram. Another way is to provide an image or paint from which features of the same type must be extracted as the database images, in order to match these features. A combination of four feature extraction methods namely color histogram, color moment texture, and edge histogram descriptors. There is a provision to add new different features in future for better retrieval. This is provided through user interfaces in the form of relevance feedback. Indexing is often used as identifying feature within an image; with indexing data structure we here mean structure to speed up the retrieval of features within image collection.

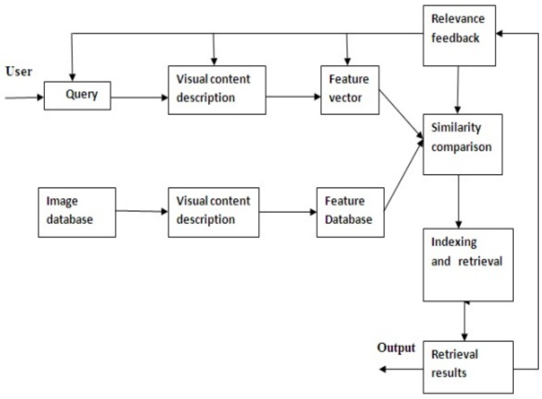

Figure 1 Query Based Image Retrieval

1. Indexing and feature Extraction.
2. Query processing and retrieval

6 INDEXING AND FEATURE EXTRACTION

In parallel to an efficient indexing system, a query system is the fast query response time was very crucial in Query-based image retrieval system; the complexity of the computation involved in query processing must be reduced as much as possible. Since in query based image indexing and retrieval system images are indexed once (preprocessing stage) and queried many times over and over, we may want to allocate complex operation (if any) to the preprocessing stages.

Indexing deals with a insertion of feature vectors into the database and is an fundamental task in every query-by-content database system. In many applications, due to the diverse nature of queries, the feature vector may need to be constructed from multiple, mostly unrelated, features are present. However, when diverse feature are present in a feature vector; it is very important how the feature space is organized. For example, if two vector are compared, which parts of the feature vector should be matched, all or partial? Some feature may be of higher importance than the others. What is the computational complexity of this matching? When all the features in a feature vector are assumed to be equally important, the problem reduces to computing Euclidean distance in a multidimensional space. In some other cases, different weights may be assigned to each of the features in the feature vector, the weights and the similarity metric are determined through simulation based on certain optimization criteria.

6.1 Feature Extraction

Feature Extraction is involved some following steps:

6.1.1 Histogram approach

The approaches are more frequently adopted for QBIC systems is based on the conventional color histogram which contains occurrences of each color obtained counting all image pixels having the color. Every pixel is associated to a some specific histogram only on the basis of its own colors, and color similarity across different bins and color dissimilarity in the same bin is not taken into an account. Since any pixel in the image can be described in three components in a certain color space, a histogram. However, a histogram with large number of bins will not only increase the computational cost, but will also be in appropriate for building efficient indexes for image database.

6.1.2 Color descriptors

Color is the most distinguish visual feature in images and video retrieval. It is robust to changes in the background colors and is independent of image size and orientation. Many forms of color distribution and representation are adopted, including some color-spatial descriptors such as color layout, color structure. And some color quantization based descriptors such as scalable color and dominant color.

6.1.2.1 Color layout descriptors

Color layout descriptor (CLD) is designed to capture the spatial distribution of color in an image. The extraction process of feature consists of two parts: grid based representative color selection and discrete cosine transform (DCT) with quantization.

These standards propose different methods to obtain these descriptors and one tool defined to describe the color is the Color layout descriptors, it permits describing the color relationship between sequence and group of images. This is a very compact descriptor being highly efficient in fast browsing and search applications. It also can be applied to still images as well as to videos.

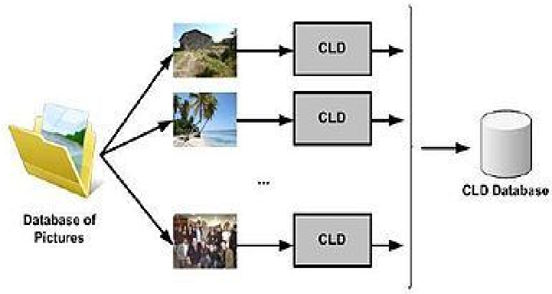

Figure 2 color layout descriptor

6.1.3 Dominant color descriptor

DCD is a compact color descriptor, designed for small storage and high speed retrieval image feature is formed by a small number of representative colors. These color are normally obtained by using clustering and color quantization. The descriptor consist of the representative colors, their percentage in a region, spatial coherent of the color, and color variance.

F {(c, p, y), s}, {i, 1, 2……n)

Where n is the number of dominant color. Each dominant color value is vector corresponding of color spaces. The percentage pi (value between 0's and 1's) is the fraction of pixels in the image or image region corresponding representative to color. The optional color variance VI describes the variation of the color value of the color values of the pixel in the corresponding representative color. The spatial coherency s is a single number that represent the overall spatial homogeneity of the dominant color in the image.

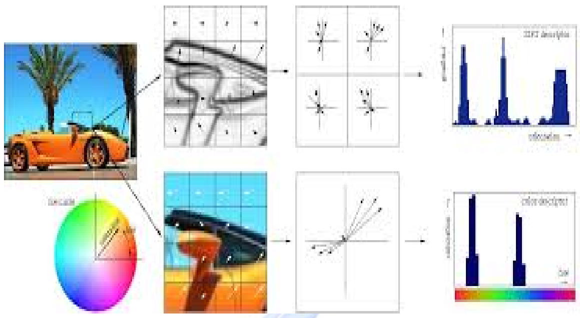

Figure 3 Dominant color descriptor

6.1.4 Edge Histogram Descriptors

Edge Histogram descriptor is designed to capture the spatial distribution of edges by dividing the image into 16 non-overlapping blocks and then calculating 5 edge directions in each and every block. The output is a bins histogram for each block EHD capture spatial distribution of edges with similar approach to CLD. It is describing non homogeneous texture in contrast to HTD. EHD divide an image using a 4*4 grid. With use of edge detection algorithms, edges from different orientation are formed into a 5-bin histogram for each grid tile. It is very compact since the descriptor size is very small.

6.2 Query processing and Retrieval

The feature of each image are pre-computed and stored in database. When test image is input to the system, the preprocessing, feature extraction process is applied to compare with images in database. The matching degree and ranking are computed, the results are then output, the results are then output to screen according to the ranking of similarity. Given a query image, similarity retrieval involves searching the database for similar color distributions as the input query. Since the number of representative color is small, one can first search the database for each of the representative colors separately, and then combine the results. Calculate Euclidian distance in a color space can do searching for individual color very efficiently.

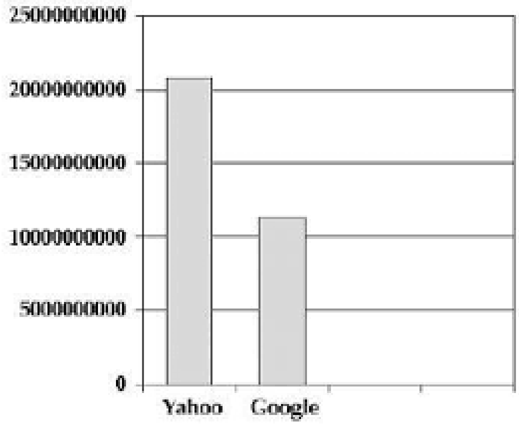

Figure 4

7. Conclusion

Multimedia retrieval system emerged as one of the most active research areas in the past few years. Most of the early research effort focused on finding the "best" image feature representation. Retrieval was performed as summarization of similarities of individual feature representation of fixed weights. While these computer centric approaches establish the basis of image retrieval, the usefulness of such system was limited due to the difficulty in representations high level concepts using low level features and human perception subjectivity. The proposed system summarizes an immense survey, incorporating all relevant technical details with a focus present ongoing research works in the related areas. It has been computationally superior and highly scalable in terms of query search time that depends only on the number of images similar to the query image and is relatively independent of the database size.

REFERENCES

[1] Xiao gang Wang; Ken Liu; Xiao Tang; "Query-specific semantic spaces for web image re- ranking," Computer Vision and Pattern Recognition (CVPR), 2011 IEEE conference on, vol., no., pp.857-864, 20-25 June 2011.

[2] "Content Based Image Retrieval Using MPEG-7 Dominant Color Descriptor" by Wong Ka Man, International Journal of Computer Applications, September 2004.

[3] "A Survey On: Content Based Image Retrieval Systems", International Journal of Computer Applications (0975 – 8887) Volume 4 – No.2, July 2010.

[4] “Content Based Image Retrieval using K-Means Clustering Techniques”, V.S.V.S. Murthy et al. International Journal of Engineering Science and Technology Vol. 2(3), 2010, 209-212.

[5] “Content Based Image Retrieval: a comparison between query by example and image browsing map approaches”, Christopher Cyan, Dept of System engineering and engineering Management, Chinese university of Hong Kong, 2004.

[6] “Content based image retrieval techniques – Issues, analysis and the state of the art” Dashiki G. Thakore1, A. I. Thrived B V M Engineering College, Vidyanagar, Gujarat IEEE Member, M. S.University, Vadodara, Gujarat.

[7] M.Flickers and H. S. Sawhney and J. Ashley and Q. Huang and B. Dom and M. Gorkani and J. Heffner and D. Lee and D. Petkovic and D. Steele and P. Yanker. Query by image and video content: The QBIC system. IEEE Computer, 28(9):23{32, Sept. 1995.

[8] A.Natsev, R.Rastogi, and K. Shim. WALRUS: A similarity retrieval algorithm for image databases. In Proceedings 1999 ACM SIGMOD International Conference on Management of Data (SIGMOD'99), pages 396{405, Philadelphia, A, June 1999.

[9] J.R.Smith and S.-F. Chang. Visual Seek: A fully automated content-based image query system. In Proceedings of the 4th ACM International Conference on Multimedia (MM'96), pages 87{98, Boston, MA, Nov. 1996.

[10] J. Huang, S. R. Kumar, M. Mitra, W. Zhu and R. Zabih, “Image Indexing Using Color Correlograms”, IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 1997, pp. 762 – 768.