



# A Survey On various Image Retrieval Techniques

KAM Sajad Hyder<sup>1</sup>

Research Scholar  
Department of Computer Science,  
JJ College of Arts and Science (Autonomous),  
Pudukkottai, Tamilnadu, India

Dr.M.Vanitha<sup>2</sup>

Assistant Professor  
Department of Computer Science and Engineering  
Alagappa University, Karaikudi

**Abstract**— The various image retrieval approach techniques allows users to create share and comment media on large data scale. content based image retrieval (CBIR) is evolved to defeat the image and text retrieval systems. There are various image retrieval methods proposed in literature survey based on the content color, shape and texture. In this paper we will provide in various approach for image retrieval techniques.

**Keywords**— CBIR, image processing, color, shape and texture retrieval.

## I. INTRODUCTION

Content-Based Image Retrieval (CBIR) is defined as a process that searches and retrieves images from a large database on the basis of automatically-derived features such as color, texture and shape. Lalith Agarwal, et al. Content based image retrieval is one of the utmost standard and growing research areas of the DIP (Digital Image Processing). Most of the offered image search tools, for instance Google Images and Yahoo! Image search, are centered on textual annotation of images. In these tools, images are manually annotated with keywords and then recovered with the help of text-based search approaches. The performances of these schemes are not acceptable. The objective of CBIR is to excerpt visual content of an image inevitably, like color, shape or texture. The CBIR tools can be utilized in numerous applications such as digital libraries, photo sharing sites and crime prevention. Such a scheme has great value in capturing suspects and recognizing victims in forensics and law enforcement. A probable application is matching a forensic sketch to a galleria of mug shot images. The part of recover images based on the visual content of the request picture intensified lately, which strains on the quite wide approach spectrum on the field of the image processing [2]. Lately, the content-based image retrieval has grown as hot topic and the methods of content-based image retrieval are recognized as a great development work [3]. In typical content based image

retrieval (CBIR) system the visual content of the images in the database are extracted and described by multidimensional feature factors. Color features are usually utilized for image retrieval in an Image Retrieval System. Figure- 1 shows the content based image retrieval.

When the user queries are compared with un-ranked list, the rank of the text and images are predicted only by the queries. In re-ranking, both the query relevance and the preference of the users are considered to produce the exact search result. Here, a natural two-step computation scheme is followed: re-ranked score between the query and the document is computed to find the result of estimating the user's preference to that particular query. Finally, a merge operation is implemented to generate a final rank list. This two-step computation scheme suffers from certain problems such as, interpretation and intuition. Therefore, determining the merging strategy is not so trivial. In this survey various methods to retrieve text and images are discussed. Also, various approaches to retrieve information and images using ranking are interpreted and their limitations are discussed.

As processors become increasingly powerful, and memories become increasingly cheaper, the deployment of large image databases for a variety of applications have now become realizable. Databases of art works, satellite and medical imagery have been attracting more and more users in various professional fields for example, geography, medicine, architecture, advertising, design, fashion, and publishing.

## 2. IMAGE RETRIEVAL TECHNIQUES

The image retrieval techniques involves the following systems

### A. Color-based Image retrieval

Wang and Qin, et al. (2009) [4] Out of the many feature extraction techniques, color is considered as the most dominant and distinguishing visual feature. Generally, it adopt histograms

to describe it. A color histogram describes the global color distribution in an image and is more frequently used technique for content-based image retrieval because of its efficiency and effectiveness.

### B. Shape Based Image Retrieval (SBIR)

There are many methods for the extraction of shapes from digital images. Some methods include contour based shape extraction, Region based shape extraction, Boundary based methods and generalized Hough transform (GHT) etc. Generalized hough transform is the most commonly used shape extraction technique. Generalized hough transform gives the complete information of the object shape and can detect multiple occurrences of object shape in a single pass. Generalized hough transform is tolerant to noise and robust to the deformalities of shape.

### C. Texture Based Image Retrieval (TBIR)

Texture is the regular repetition or pattern on the surface of any object. The texture of an image can be extracted using Grey level co-occurrence matrix (GLCM), Wavelets, Fourier transform, entropy, correlation methods. Grey level co-occurrence matrix feature extraction technique is more commonly used, because it is more similar to the human visual system features. The features extracted using Grey level co-occurrence matrix are energy, entropy, correlation etc.

### D. Content Based Image Retrieval (CBIR) :

Komal V. Aher et al. 2014 Mostly content based image retrieval systems work in the similar manner as: Extract a feature vector of each image in the database and the set of all feature vectors is prepared as a database index. Various systems differs in the features selection and in the algorithms that are used to evaluate feature vectors(5). The diagram of basic CBIR system is shown in Fig. 1.

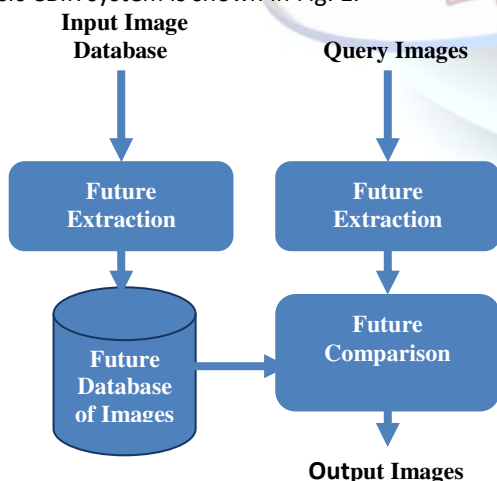


Fig. 1: Diagram for Content Based Image Retrieval System

### E. Purpose of Image retrieval

The purpose of image retrieval is divided into 5 groups. They are:

1. Visualization: Observe the objects that are not visible.
2. Image sharpening and restoration: To create a better image
3. Image retrieval: Seek for the image of interest.
4. Measurement of pattern: Measures various objects in an image
5. Image Recognition: Distinguish the objects in an image

## 3. LITERATURE SURVEY

Ivan Lee, et.al. (1996) [6] have present the analysis of the CBIR system with the human controlled and the machine controlled relevance feedback, over different network topologies including centralized, clustered, and distributed content search. In their experiment for the interactive relevance feed backusing RBF, they observe a higher retrieval precision by introducing the semi-supervision to the non-linear Gaussian-shaped RBF relevance feedback.

Verma, Mahajan, (2012) [7] have used canny and sobel edge detection algorithm for extracting the shape features for the images. After extracting the shape feature, the classified images are indexed and labeled for making easy for applying retrieval algorithm in order to retrieve the relevant images from the database. In their work, retrieval of the images from the huge image database as required by the user can get perfectly by using canny edge detection technique according to results.

Jaiswal, Kaul et.al [8] concluded that content based image retrieval is not a replacement of, but rather a complementary component to text based image retrieval. Only the integration of the two can result in satisfactory retrieval performance. In this paper they reviewed the main components of a content based image retrieval system, including image feature representation, indexing, and system design, while highlighting the past and current technical achievement.

Ryszard S. Chora's et. al (2007) [9] contributes their work for the identification of the problems existing in CBIR and Biometrics systems describing image content and image feature extraction. They have described a possible approach to mapping image content onto low-level features. Their paper investigated the use of a number of different color, texture and shape features for image retrieval in CBIR and Biometrics systems.

Peter Stanchev, et.al. [10] Proposed that several visual descriptors exist for representing the physical content of images, for instance color histograms, textures, shapes, regions, etc. Depending on the specific characteristics of a data set, some features can be more effective than others when performing similarity search. For instance, descriptors based on color representation might be effective with a data set containing mainly black and white images. Techniques based on statistical analysis of the data set and queries are useful.





The Color Selection exploited CBIR system [11], facilitates query-by-color. It is based on 11 color categories, used by all people, while thinking of and perceiving color. Then the low frequency DCT coefficients that are transformed from YUV color space as feature vectors are used for retrieval of images [12]. This system allows users to select its dominant feature of query images so as to improve the retrieval performance. But the technique is sufficient for performing effective retrieval by introducing users' opinions on the query images. In Region of Interest Image Indexing System [13], user can select the region of interest (ROI) and the system will search all the images in the database to find the all related regions among the database.

Content Based Image Retrieval is the retrieval of images based on visual features such as color, texture and shape. Reasons for its development are that in many large image databases, traditional methods of image indexing have proven to be insufficient, laborious, and extremely time consuming. These old methods of image indexing, ranging from storing an image in the database and associating it with a keyword or number, to associating it with a categorized description, have become obsolete. In CBIR, each image that is stored in the database has its features extracted and compared to the features of the query image. Several CBIR systems currently exist, and are being constantly developed.

#### 4. RESULTS

The various image retrieval of the survey are represented in the table1. Here, various image retrieval techniques have been compared to search and retrieve text, color, shape and images for a large dataset. The results imply that, by using various techniques, user queries are considered to produce more satisfactory results than compared with other methods to retrieve text, color, shape and images.

TABLE. 1

VARIOUS TECHNIQUES FOR IMAGE RETRIEVING

Authors	Year and Reference	Technique	Performance
Sang-Mi Lee et al.	1998 [2]	Content based Image Retrieval Methods using Color & Texture	Enhance the accuracy of image retrieval
Tienwei Tsai et. al	2003 [12]	Fast Image Retrieval Using Low Frequency DCT Coefficients	Visualizing concepts to retrieve images

Ryszard S et. al	2007[9]	Image Feature Extraction Techniques and Their Applications	Query and its associated meaning are handled for result generation
O. Kashefi, et al.	2010[14]	Test collection based on information retrieval	Execute the performance of documents with its corrected spellings
H. Kekre, et al.	2010[15]	Image retrieval system	Efficient method to retrieve images by filtering irrelevant images.
J. Abbas, et al	2010[16]	Text-Based Image Retrieval	Enhance the accuracy of image retrieval
S. Nowak, et al.	2011[17]	Photo annotations	Visualizing concepts to retrieve images
S. Mangijao Singh et al.	2012 [5]	Content-Based Image Retrieval using Color Moment and Gabor Texture Feature	Enhance the accuracy of image retrieval
Lalith Agarwal et al	2015 [1]	Survey on Content Based Image Retrieval Techniques	Handles the visual features of images with the query contents

#### 5. CONCLUSION

This paper presents a survey is to provide an overview of the functionality of various image retrieval techniques. The most CBIR systems uses color, shape, texture etc. As future extraction is mainly used for user oriented applications and is more similar to human visual features. It is the correct technique that can be used in CBIR field. The results of the survey show that retrieval of text and images of large data sets are not consistent. In this paper we survey some technical aspects of current content-based image retrieval systems.

#### REFERENCES

- [1] Lalith Agarwal et al, " Survey on Content Based Image Retrieval Techniques " (IJCST) International Journal of Computer Science and Information Technologies, Vol. 6 (5) , 2015, 4822-4824 ISSN:0975-9646
- [2] Sang-Mi Lee, Hee-Jung Bae and Sung-Hwan Jung, "Efficient Content based Image Retrieval Methods using Color & Texture," ETRI Journal, Vol. 20, No. 3, pp.272-283, 1998.
- [3] Gulfishan Firdose Ahmed and Raju Barskar "A Study on Different Image Retrieval Techniques in Image Processing", International Journal of Soft Computing and Engineering



- [4] Wang, S. and Qin, H. (2009), "A Study of Order-Based Block Color Feature Image Retrieval Compared with Cumulative Color Histogram Method", Sixth International Conference on Fuzzy Systems and Knowledge Discovery, FSKD '09, IEEE Xplore, Vol. 1, Pp. 81 – 84. (IJSCE), ISSN: 2231-2307, Volume-1, Issue-4, September 2011.
- [5] S. Mangijao Singh, K. Hemachandran, Content-Based Image Retrieval using Color Moment and Gabor Texture Feature, International Journal of Computer Science Issues, Vol. 9, Issue 5, 2012.
- [6] Ivan Lee, Paisarn Muneesawang, Ling Guan, "Automatic Relevance Feedback for Distributed Content-Based Image Retrieval", ICGST, IEEE.org/FLEXChip Signal Processor (MC68175/D), Motorola, 1996.
- [7] Pooja Verma, Manish Mahajan, "Retrieval of better results by using shape techniques for content based retrieval", IJCSC, Vol. 3, No.2, January-June 2012, pp. 254-257, ISSN: 0973-7391.
- [8] Gaurav Jaswal Amit Kaul, "Content Based Image Retrieval", National Conference on Computing, Communication and Control, A Literature Review, National Institute of Technology, Hamirpur-177001, Himachal Pradesh (India).
- [9] Ryszard S. Chora's, "Image Feature Extraction Techniques and Their Applications for CBIR and Biometrics Systems", International Journal of Biology and Biomedical Engineering Issue 1, Vol. 1, 2007.
- [10] Peter Stanchev, David Green Jr., and Boyan Dimitrov" MPEG-7: The Multimedia Content Description Interface", International Journal "Information Theories & Applications" Vol.11.
- [11] E.L. van den Broek, L.G. Vuurpijl, P. Kisters and J.C.M. von Schmid Nijmegen, "Content Based Image Retrieval: Color Selection exploited," International Journal of Engineering Science and Technology, Vol. 30, No. 3, pp. 456-462, 1997.
- [12] Tienwei Tsai, Taiwan, Yo Ping Huang and Te-Wei Chiang, "Fast Image Retrieval Using Low Frequency DCT Coefficients," International Journal of Engineering Science and Technology, Vol. 6, No. 3, pp. 106-120, 2003.
- [13] Greg Pazz, Ramin Zabih and Justin Miller, "Region of Image Indexing System by DCT and Entropy," International Journal of Engineering Science and Technology, Vol. 8, No. 2, pp. 93-101, 2002.
- [14] O. Kashefi, *et al.*, "Optimizing document similarity detection in Persian information retrieval," *Journal of Convergence Information Technology*, vol. 5, no. 2, pp. 101-106, 2010.
- [15] H. Kekre, *et al.*, "Image retrieval using fractional coefficients of transformed image using DCT and Walsh transform," *International Journal of Engineering Science and Technology*, vol. 2, no. 4, pp. 362-371, 2010.
- [16] J. Abbas, *et al.*, "Frame Work For Content Based Image Retrieval (Textual Based) System," *Journal of American Science*, vol. 6, no. 9, pp. 704-707, 2010.
- [17] S. Nowak, *et al.*, "The CLEF 2011 Photo Annotation and Concept-based Retrieval Tasks," in *CLEF (Notebook Papers/Labs/Workshop)*, 2011.