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An Analytical Study on Content Based Image Retrieval

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Abstract: The paper deals with the realization of the different techniques used in image retrieval based on content. This paper gives a general idea of the currently accessible literature on content based image retrieval. There are many impressive features for retrieval of an image like Shade, quality and shape is discussed. The implication of content based image retrieval system (CBIR) relies on the adopted appearances to symbolize images in the knowledge base. The demand to recover the accuracy of image retrieval systems and diminish the semantic gap is high in observation of the growing requirement for retrieval of content based image. To attain this accuracy, user communication with the retrieval system is critical since elastic configuration and alteration of queries can only be obtained by involving the user in the retrieval procedure. From the performance obtained by the existing CBIR systems, review on different techniques is discussed in this paper.

Keywords: Content based image retrieval, feature extraction, Retrieval, Performance

I. INTRODUCTION

Content Based Image is the recovery of involved images from database image collection to compete the query based on properties of images themselves. The image properties used are low level such as insignia, textures, shades and shapes etc. extracted from the images include in the database. CBIR is often proficient by comparing these features based on a supposition that similarity of these low level features of images can imitate the resemblance among images [3, 4]. In one of the most basic image retrieval work by IBM, two types of low level features which are color and shape are used. Another fit recognized work on CBIR, the Berkeley Chabot system, both text-based image description and low-level visual features of images are used in retrieving images. Mostly the work in CBIR measured features based on color, particularly the color histogram, as one type of their low level features. Content based Image Retrieval are categorized into

a. Annotation based image retrieval approach
b. (QBE) named as Query by example approach

Though enormous attention and a huge numeral techniques and systems are apparent in content-based image retrieval in the last decades, the gap between low level features and high level semantic sympathetic of images, which is also known as problem of semantic gap, the gap between worldwide objects and the information based on computation is the blockage to auxiliary improvement of the performance of a CBIR. In order to resolve the tribulations and improve performance of image retrieval, image explanation, Region Based Image Retrieval based techniques and consequence feedback have been established which payed more attention in the recent years.

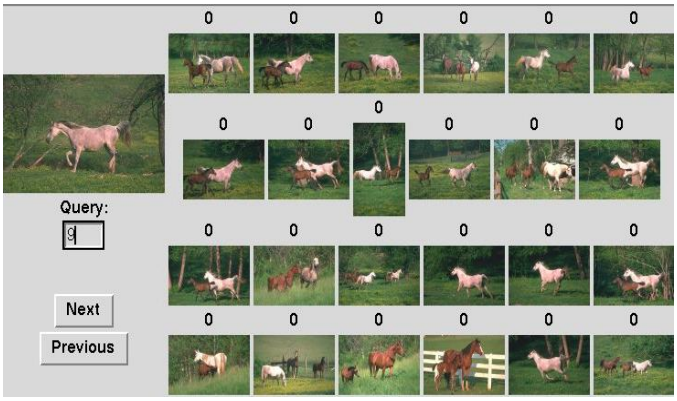

Figure1. Content based Image retrieval

II. LITERATURE SURVEY AND PREVIOUS TECHNIQUES USED

Paper Name	Author	Technique Name	Advantage	Disadvantage	Performance Parameters
Content Based Image Retrieval using Relevance Feedback [5]	Yong Rui Thomas S Huang and Sharad Mehrotra	Relevance Feedback	Efficient in boosting image retrieval accuracy	Requires five or more iterations to achieve high performance	Precision =85.50
Optimization on Active Learning Strategy for Object retrieval [6]	David GORISSE, Matthieu CORD, Frederic PRECIOSO	Object Ontology	Easy to design, suitable to application with simple semantic	No proper system available for texture naming	Average time of iteration and mean average precision
Relevance Feedback Using Semi-supervised learning Algorithm for Image	Gui-Zhi Li, Ya-Hui Liu, Chang-Sheng Zhou	Machine learning	Suitable for complex semantics	Low speed of learning.	Average Precision with number of iteration = 0.9

retrieval [7]					
A Long Term Learning Method in CBIR Systems by Defining Semantic Templates [8]	Esmat Rashedi, and Hossein Nezamabadi-pour	Semantic Templates	This method is proficient Maximum Recall Ratio	This method requires understanding in depth	Average Precision with number of iteration = 0.6
Compound Face Image Retrieval Based on Vertical Web Image Retrieval [9]	Ran Zheng, Shilei Wen, Qin Zhang, Hai Jin, Xia Xie	Web Image Retrieval	Provides additional information on Web	Results are not so much accurate	Precision using filtering algorithm = 0.9
Classification of Image Database using SVM with Gabor Magnitude [10]	Sultan Aljahdali Aasif Ansari Nisar Hundewale	SVM and Gabor Filter	It is easy to retrieve for the classification	It is difficult to handle the large number of inputs	Precision-recall (SVM)=0.77 Recall-recall (Gabor)= 0.68
Interactive Content Based Image Retrieval Using Ripplet Transform and Fuzzy Relevance Feedback [11]	Manish Chowdhury, Sudeb Das, and Malay Kumar Kundu	Fuzzy logic and Ripplet transform	It is able to progress the accuracy of retrieval and to reduce the computational	The designing is very difficult to implement	Average Precision =0.55
Use of Equalized Histogram CG on Statistical Parameters in Bins Approach for CBIR [12]	H. B. Kekre, Kavita Sonawane	Statistical momemts, Euclidian distance	It decrease the size of the vector based features And computational complexity	Length required to be traversed to collect all images is difficult	Min, Max and average longest precision in terms of precision and recall
Efficient Face Detection Recognition using Independent Component Analysis and Clustering [13]	Dr.V.Vaidehi, K.Gayathri, S.Vignesh	K-means clustering, Independent Component Analysis	Retrieving process is having highest match with query image Reduces time complexity	Feature extraction is difficult as compared to other techniques	Number of False positives using DCT
A Comparative Study of PCA, LDA and Kernel LDA for Image Classification [14]	Fei Ye, Zhiping Shi, Zhongzhi Shi	LDA, PCA, Kernel LDA	Having high precision and high speed using Kernel LDA than PCA and LDA	Congestion in the bits having larger mean difference	Precision 85.67 % and reduction in dimension
Gait Analysis for Identification by using BPNN with LDA and MDA techniques. [15]	Ira Gaba, Dr. Satinder Pal Ahuja	BPNN and LDA	Having ability to handle large number of inputs and less error probability	The feature vector set is heavy due to which lot of computations needed	Cumulative match score using BPNN+MDA
Content Based Image Retrieval by Combining Color, Texture and Centrist [16]	Guan-Lin Shen, Xiao-Jun Wu	Spacial Prinicipal Component Analysis	Learning method is used and region to region comparison is used to acquire high precision	Weights are not changed self-adaptively	Recall, accuracy and precision

III. FUNDAMENTAL ASPECTS OF CBIR

At past CBIR systems can be categorized into two categories

a. ***Text query****:* In this type of the system, images are divided by information of the text such as keywords and captions. Text features are dominant as a query, if suitable text descriptions are given for descriptions in an image database. Giving suitable descriptions must be done manually in general and it is time overwhelming [1]. There are various ways one can create a visual query. A high quality query technique will be normal to the user as well as capturing sufficient information from the user to extract significant results.

b. ***Pictorial query:*** In this type of system, an instance of the preferred image is used as a query. To recover related images with the example, image features such as color, textures are used. The typical CBIR system performs two main duties. The very first is extraction based on features where a set of features named as feature vector, is generated to precisely symbolize the content of each image in the database. A feature vector is much lesser in dimension than the original image, normally of the order of hundreds of elements. The second job is similarity measurement where a distance between the query image and each image in the database by their signatures is computed so that the closest images can be retrieved.

IV. USER INTERFACE

For CBIR systems, interaction of user with the recovery system is vital since bendable configuration and alteration of queries can only be analyzed by connecting the user in the retrieval process. User interfaces in image retrieval systems normally consist of a query formulation and a part based on result presentations.

A. Query Specification:

Specifying what kind of descriptions a user needs to recover from the database can be done in several ways. Commonly used query formations are: Browsing Category, conceptual query, query by sketch etc. Category browsing is

to browse from side to side according to the database category of the image. For this principle, images in the database are characterized into dissimilar categories according to their visual content .Query by concept is to retrieve imagery data according to the abstract explanation associated with every image in the record. Query by sketch is to draw a sketch or provide an instance representation from which images with alike visual features will be extracted from the database.

B. Relevance Feedback:

Human awareness of image resemblance is subjective and semantic. The recovery consequences based on the similarity of visual features are unavoidably perceptually and semantically significant. Each type of visual characteristic tends to imprison only one feature of image assets and it is typically hard for a user to specify evidently how dissimilar aspects are combined. To tackle these problems, *relevance feedback*, a technique in text based retrieval systems, was introduced. With this technique, it is possible to create the connection between high level concepts and small level features. For a known query, the scheme first retrieves a record of images according to a pre defined resemblance metrics. Then, the user inscripts the recovered images relevant to the query or not relevant. The structure will filter the retrieval consequences based on the feedback and present a new list of images to the user.

V. CONCLUSION AND FUTURE SCOPE

Content Based Image Retrieval is an energetic and speedy research area. In the past, remarkable progress has been made in both hypothetical investigation and system growth. The movement behind content-based image retrievals specified by the ease of use of digital sensors and the declining price of storage space devices. This paper presented a brief survey on work related to the young and exciting fields of content based image retrieval and the basic working and techniques of the CBIR systems.The future prospect of this pasture depends on the combined focus and overall advancement in each aspect of image retrieval, and how much the normal individual stands to benefit from it to gain high accuracy and high precision rate.

VI. REFERENCES

[1]. Liu, Yan-pei, Yuesheng Gu, and Jun Chen. "Research on component retrieval methods." Journal of Software 7, no. 7 (2012): 1633-1640.

[2]. W. M. Smeulders, M. Worring, S. Santini, A. Gupta, and R. Jain, “Content-based image retrieval at the end of the early years,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 22, no. 12, pp. 1349–1380, Dec. 2000.

[3]. S. Antani, R. Kasturi, and R. Jain, “A survey of the use of pattern recognition methods for abstraction, indexing and retrieval of images and video,” Pattern Recognit., vol. 35, no. 4, pp. 945–965, Apr. 2002

[4]. X. S. Zhou and T. S. Huang, “Relevance feedback in content-based image retrieval: Some recent advances,” Inf. Sci., vol. 148, no. 1– 4, pp. 129–137, Dec. 2002.

[5]. Li, Gui-Zhi, Ya-Hui Liu, and Chang-Sheng Zhou. "Relevance feedback using semi-supervised learning algorithm for image retrieval." In Machine Learning and Cybernetics (ICMLC), 2013 International Conference on, vol. 2, pp. 820-824. IEEE, 2013.

[6]. Gorisse, David, Matthieu Cord, and Frederic Precioso. "Optimization on active learning strategy for object category retrieval." In Image Processing (ICIP), 2009 16th IEEE International Conference on, pp. 1873-1876. IEEE, 2009

[7]. Li, Gui-Zhi, Ya-Hui Liu, and Chang-Sheng Zhou. "Relevance feedback using semi-supervised learning algorithm for image retrieval." In Machine Learning and Cybernetics (ICMLC), 2013 International Conference on, vol. 2, pp. 820-824. IEEE, 2013.

[8]. Rashedi, Esmat, and Hossein Nezamabadi-pour. "A long term learning method in CBIR systems by defining semantic templates." In 20th international conference on electrical engineering, University of Tehran. 2012.

[9]. Zheng, Ran, Shilei Wen, Qin Zhang, Hai Jin, and Xia Xie. "Compounded Face Image Retrieval Based on Vertical Web Image Retrieval." In Chinagrid Conference (ChinaGrid), 2011 Sixth Annual, pp. 130-135. IEEE, 2011.

[10]. Aljahdali, Sultan, Aasif Ansari, and Nisar Hundewale. "Classification of image database using SVM with Gabor Magnitude." In Multimedia Computing and Systems (ICMCS), 2012 International Conference on, pp. 126-132. IEEE, 2012.

[11]. Chowdhury, Manish, Sudeb Das, and Malay Kumar Kundu. "Interactive content based image retrieval using Ripplet transform and fuzzy relevance feedback." In Perception and Machine Intelligence, pp. 243-251. Springer Berlin Heidelberg, 2012.

[12]. Kekre, H. B., and Kavita Sonawane. "Use of equalized histogram CG on statistical parameters in bins approach for CBIR." In Advances in Technology and Engineering (ICATE), 2013 International Conference on, pp. 1-6. IEEE, 2013.

[13]. Vaidehi, V., K. Gayathri, and S. Vignesh. "Efficient face detection and recognition using block independent component analysis and clustering." In Recent Trends in Information Technology (ICRTIT), 2011 International Conference on, pp. 561-566. IEEE, 2011.

[14]. Ye, Fei, Zhiping Shi, and Zhongzhi Shi. "A comparative study of PCA, LDA and Kernel LDA for image classification." In Ubiquitous Virtual Reality, 2009. ISUVR'09. International Symposium on, pp. 51-54. IEEE, 2009.

[15]. Gaba, Ira, and Satinder Pal Ahuja. "Gait analysis for identification by using BPNN with LDA and MDA techniques." In MOOC, Innovation and Technology in Education (MITE), 2014 IEEE International Conference on, pp. 122-127. IEEE, 2014.

[16]. Shen, Guan-Lin, and Xiao-Jun Wu. "Content based image retrieval by combining color, texture and centrist."(2013): 16-16.