VOLUME-6 | ISSUE-1 | JANUARY-2017 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

Original Research Paper

CONTENT BASED IMAGE RETRIEVAL SYSTEM: A REVIEW

Engineering

KEYWORDS: - CBIR, Query

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ABSTRACT

Searching of Images in the huge database is one of the serious problem in retrieval of images, mainly two types of retrieval is used that is text based (data such as keywords, tags, or descriptions associated with the image) and content based (using the features of image like shape, texture and color). Though this field has acquired much wide popularity, CBIR has not yet reached its mellowness and is not yet being used on a large scale. The results show a distinct opinion on the usefulness and accuracy of CBIR systems in handling required images on large real-life image databases. This indicates that the research area is still full of zip and methods to improve existing results are in great demand. In This Paper Various existing methods with their efficiency in terms of computational time and correctness is reviewed.

INTRODUCTION

Searching of Images in the huge database is one of the serious problem in retrieval of images, mainly two types of retrieval is used that is text based (data such as keywords, tags, or descriptions associated with the image) and content based (using the features of image like shape, texture and color). Figure 1.1 shows the basic CBIR system.

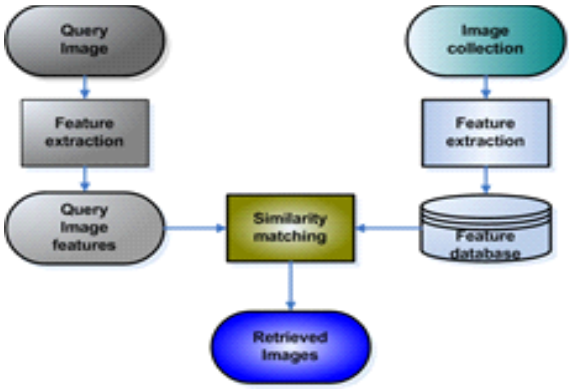

Figure 1.1 Basic CBIR System

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" means that the search analyzes the contents of the image rather than the data such as keywords, tags, or descriptions associated with the image[1]. The word "content" in this background refers 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.

In order to retrieve the query or required image from the plentiful image database web search engines uses text base metadata (image annotation). However searching a query image in such a huge database is a challenging need today. For quicker response time, association of metadata is carried out as an off-line process known as image-annotation. The image search results, appearing on the first page for input text query rose black, are shown in figure 1.2. As can be seen, many resultant images of Figure 1 are mismatched with the meaning of the text-query, showing huge scope for research of new technique which may be a combination of existing ones which gives precise and efficient results in less time.

Though this field has acquired much wide popularity, CBIR has not yet reached its mellowness and is not yet being used on a large scale. The results show a distinct opinion on the usefulness and accuracy of CBIR systems in handling required images on large real-life image databases. This indicates that the research area is still full of zip and methods to improve existing results are in great demand.

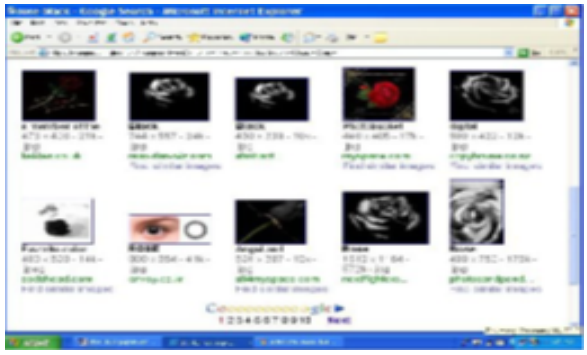

Figure 1.2 Output for query Rose black using Text input

II. Liturature study

Khoa Duc Tran[5] proposes a new content-based retrieval method based on a Multi-Objective Genetic Algorithm (MOGA), which is capable of finding multiple trade-off solutions in one run and providing a natural way for integrating multiple image representation schemes. This research focuses on structural similarity framework that addresses topological, directional and distance relations of image objects. This research presents an overview of similarity retrieval framework and research efforts on content-based retrieval using simple GAs. It then proposes a new technique for content-based retrieval method using the multi-objective GA named NSGA-II. Based on prior empirical studies, the NSGA-II is proven to provide a natural way for integrating multiple image representation schemes to facilitate effective and efficient image retrieval. The scope of this research does not permit empirical evaluations of the new approach to be carried out.

S. M. Zakariya et al. [6] proposes a method which is inspired from the idea that the Content-based image retrieval (CBIR) uses the visual features of an image such as color, shape, texture, and spatial layout to represent and index the image. CLUE (Cluster based image retrieval) is a well known CBIR technique retrieves the images by clustering approach [4]. This work proposes a content based image retrieval system based on unsupervised learning, where in, combine all the features values namely shape, color and texture of an image for assigning a weight on different images (as a target images) in the image database with 60% features stores of each visual features. Experimented with a standard image database consisting of approximately 1000 images to compare the performance of the proposed systems by combining both shape-color features and color-texture features. They have taken the union of these two approaches

and experimentally, They found that the union of both gives the better performance at different precision value of k. In this experiments Euclidean distance as the similarity measure for computing the similarity of images in the database with a query image.

ZhouBing and Yang Xin-xin[8] proposes a content-based parallel image retrieval system to achieve high responding ability. This system is developed on cluster architectures. It has several retrieval servers to supply the service of content-based image retrieval. This system adopts the Browser/Server (B/S) mode. The users could visit our system though web pages. This system uses the Symmetrical Color-Spatial Features (SCSF)[25) to represent the content of an image. The SCSF is effective and efficient for image matching because it is independent of image distortion such as rotation and flip as well as it increases the matching accuracy. The SCSF was organized by M-tree, which could speed up the searching procedure. Experiments shows that the image matching is quickly and efficiently with the use of SCSF. And with the support of several retrieval servers, the system could respond to many users at mean time.

Aster Wardhani and Tod Thomson[11] works on Content Based Image Retrieval Using Category-Based Indexing Cunently, most content based image retrieval (CBIR) systems operate on all images, without sorting images into different types or categories. Different image have different characteristics and thus often require different analysis techniques and quev types. Additionally, placing an image into a categoq can help the user to navigate retrieval results more effectively. To categorise an image, firstly the dominant region needs to be extracted using multi level colour segmentation. Based on the regions' features of colour, texture, shape and relation between regions, the image is then categorised.

Biren Shah et al. [12] extended and developed an efficient, effective and fully automatic CBIR system that supports online addition of new images into the image database. Online addition allows incrementally adding new images into the image database. This approach is scalable to large image collections. It is efficient and effective even when the image database is dynamic and user queries are framed with images that are external to the database. Experiments show that the first embedding method that we investigated preserves the order of the distances in the transformed space, results from the experiments that use Rnorm as an evaluation measure show that the image retrieval idea works effectively, both, with and without using online addition.

Danzhou Liu et al.[13] proposed four target search methods using RF for CBIR systems. Our research was motivated by the observation that revisiting of checked images can cause many drawbacks including local maximum traps and slow convergence. This methods outperform existing techniques including MARS (employing feature weighting), Mind Reader (employing complex feature weighting), and Q cluster (employing probabilistic models). All our methods are capable of guaranteeing finding intended target images, with NDC and GDC converging faster than NRS and LNM (which represents an improved version of Mind Reader).

W. Bruce Croft et al.[14] discuss how language models can be used to represent context and support context-based techniques such as relevance feedback and query disambiguation. Language models provide a potential representation for users and contexts. They described how relevance feedback and query ambiguity could be described using this approach. We also suggested how additional information about the user could be incorporated into the context estimation process. Much of this is preliminary; and many more experiments need to be done. They currently focuses on doing relevance feedback and query ambiguity experiments using TREC data.

Above discussed literature about the problem of giving correct output image in reference to the query image having only one problem or we can say that they are not giving output efficiently. In order to over come the problem of efficiency (drawing exact image from the data base) classifiers are the solution. However single classifier is not sufficient to overcome this problem we need to design an optimal classifier ensemble as an optimization problem. To over come this problem an approach to build an effective and efficient CBIR using the fusion of multiple individual CBIR systems. This will tries to overcome the limitation of individual system, therefore multiple individual systems need to be device and combined in such a way the fused system will be more robust than the individual systems. The proposed approach formulates a probabilistic framework of fusing individual CBIR system and it tries to utilize the complementary information of individual systems. The different application on which the proposed work is tested upon are : OCR (optical character recognition), logo identification, face detection

III.Conclusion

Various CBIR techniques have been discussed in this paper. However due to the complex features present in the query images and limitations of feature extraction and matching algorithms these methods cannot produce effective results in constraints with the computational time and exact image output. By creating a pool of individual system, by extracting various distinct features which captures color, texture and geometry features and by applying different feature matching techniques can produce effective results.

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